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# Safety of motor vehicle product - Guidelines for risk assessment and risk control

# 汽车产品安全风险评估与风险控制指南



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## 1 Scope

This standard specifies the basic process of risk assessment and the basic methods of risk control of motor vehicle product safety.

This standard applies to the situation that in the process of motor vehicle product defect analysis and identification, make risk assessment and risk control for the dangerous events or situations of the motor vehicle products that have been sold.

## 2 Terms and definitions

The following terms and definitions apply to this document.

### 2.1 Hazard of motor vehicle product

Due to design, manufacture or identification, the vehicle itself, system, assembly or parts are in an unsafe condition. It is appeared in the form of fault and failure of the vehicle itself, system, assembly and parts.

### 2.2 Safety risk of motor vehicle product

It is the combination of the severity of dangerous events or situations that may result from the risk of motor vehicle product endangering the safety of person or property and the probability of occurrence.

Note: The dangerous events or situations in this standard include both what happened and what could happen.

### 2.3 Severity

It is the degree of damage to personal and property safety that dangerous events or situations can do.

### 2.4 Probability

It is the probability that motor vehicle product will have dangerous events or situations in its useful life cycle.

Note: Probability refers to the probabilistic predictions of dangerous events or situations and

# 4 Risk assessment

### 4.1 The basic procedure of risk assessment

The basic procedure of risk assessment mainly includes:

-- Determine risk assessment objects;

-- Identify dangerous events or situations;

-- Assess the severity of dangerous events or situations;

-- Assess the probability of dangerous events or situations occurring;

-- Determine comprehensive risk level.

### 4.2 Determine objects of risk assessment

During the assessment process, determine the risk assessment object after analyzing reasonably and trace back according to the actual situation of the fault or failure of motor vehicle product. In particular, it is necessary to analyze whether the fault or failure is related to design, manufacture or identification of motor vehicle product:

-- In the event of the fault or failure of motor vehicle product due to the design, the risk assessment object is all the batch of motor vehicle products that may have adopted the same design;

-- In the event of the fault or failure of motor vehicle product due to the manufacture, the risk assessment object is all the batch of motor vehicle products that may have adopted the same manufacturing process;

-- In the event of the fault or failure of motor vehicle product due to the identification, the risk assessment object is all the batch of motor vehicle products that may have adopted the same identification.

### 4.3 Identify dangerous events or situations

#### 4.3.1 Risk-transfer process

Identifying dangerous events or situations begins with a study of risk-transfer process, and a technical analysis of the fault or failure of motor vehicle product. Moreover, simulate potentially dangerous events or situations as well as possible accidents or injury scenario. Risk-transfer process is shown in Figure 2.

Different types of vehicles have certain impacts on the severity in their use, speed, accurate load number, weight, geometric dimensions, the level of active and passive safety and nature of cargo. Such as, high-speed sports car, medium and large buses, trucks and other high-speed, high-load vehicles, and dangerous goods transport vehicles, etc. It is necessary to increase the severity grade.

In addition to the above correction factors, in the process of correction of preliminary assessment results of severity grade, correction may also be made after comprehensive analysis based on the factors such as fault or failure mode, situation of vehicle accident depth investigation, degree of casualties, and analysis test results of defect engineering.

### 4.5 Assess the probability of dangerous events or situations

#### 4.5.1 Probability level of occurrence of dangerous events or situations

The probability of occurrence of dangerous events or situations is divided into five levels: high, relative-high, medium, relative-low and low. The probability assessment includes two steps: preliminary assessment and result correction. Probability assessment methods include: quantitative method, qualitative method and combination of quantitative and qualitative.

#### 4.5.2 Preliminary assessment of probability

In the case of fault or failure mode, the sample quality and quantity meeting the requirements of quantitative analysis, use trend forecasting model in statistical methods such as [such as Weibull Distribution model] or engineering analysis method to predict the probability of occurrence of dangerous events or situations for automotive products in their useful life cycle. The result of preliminary assessment of probability can be identified according to the industry average of fault or failure mode.

If the quality and quantity of the sample can not be analyzed quantitatively, organize relevant professional and technical personnel to use qualitative approach to assess. The qualitative assessment principles are as follows:

-- If the occurrence of dangerous events or situations is caused by design factors such as materials, structural design of parts, manufacturing process, software control strategy, overall layout or matching of components, the preliminary assessment result of the probability may be high or relative-high;

-- If the occurrence of dangerous events or situations is caused by manufacturing factors such as material processing, machining, improper assembly of components or production management, the preliminary assessment result of the probability may be relative-high, medium or relative-low;

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