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Analysis of an Auto Black Box in Accident Reviewing*

XU Xiang-yang , LIU Bin

(1. Dept of Automotive Engineering, Beihang University, Beijing 100083;
2. 37 XueYuan Road, Haidian District Beijing, China, 100083)

Abstract: According to the theory of black box used in plane, a new accurate and efficient method for car accident reviewing is presented to overcome the shortcomings of car accident reviewing method being used.

Key words: accident reviewing; black box;

As the rapid development of transportation, the vehicle accidents in China becomes more and more serious problem which resulted in a large number of casualties and huge economic loses. With the development of highway and advanced technology of car manufacturing, the vehicle travel speed is increasing recent years, those may cause a potential risk of more accidents. So the responsibility of reviewing accident accurately becomes important. How to review accidents accurately is one of main contents in vehicle safety field.

1 Problem in Existing Accident Reviewing Methods

Table 1 shows that in vehicle accidents the main factor is human beings, Driver is the main factor in accident, driver is the one who manipulate the car, he decided the vehicle's moving situation, and high speed and unsuitable manipulation is the main character of these accidents.

Tab. 1 Distribution of causes of the vehicle accidents

Factor	Driver	Occupants	Pedestrian	Other
Percentage	87.52%	4.66%	5.19%	2.63%

In dealing with accidents, most methods depend on dynamic principles, use some message get from the accident, acquire witness about some questions, in this way, we can just review accident approximately, not accurately . So reviewing accidents in this way sometimes can cause error judgments. In reviewing accidents, reviewing the speed of accident car is a very important factor, if we know the accurate speed, then we can review the accident accurately. For this reason, we must find way to deal with those questions.

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2 Black Box

As we know, plane, especially passenger plane, has high demand in safety. Because plane's accident has a very bad aftermath, if we don't have some measure, we will find nothing about the accident, so we equip black box on plane, the data recorded in black box is the main message in reviewing accident.

2.1 Function of black box

Black box can record two categories data in accident: one is the parameter of plane, such as height、velocity、direction 、acceleration、temperature of engine. The other is sound in cabin, such as communication with airport、strange sound of engine 、stewardess' words to passengers, this record can last 30 min.

2.2 Material of black box

Plane's accident can produce very large destructive force; black box must assure that it can't be destructive in accident. So black box can stay long time in high temperature、large impulsive force and pressure、acid and alkaline solution , and keep intact .

2.3 Position of black box

Black box suit in the empennage where impulsive force is minimum. In order to find black box easily after accident, black box have colorful skin and can discharge electromagnetic signal to locate its position.

3 Auto Black Box

3.1 Main function of auto black box

Auto black box can record speed、breaking pressure 、signal of break 、signal of steering lamp、signal of steering wear、signal of trumpet. All the data recorded is very important in reviewing accident, but it can't get accurately now. Speed and breaking pressure can get from the sensor of ABS, speed can determine car's moving condition, breaking pressure can determine driver's response to accident; other signals can easily get from a electrical signal 0 and 1, those can determine driver's manipulation. Auto black box is device, which can save the data we needed in reviewing accidents. After accidents we can get data from auto black box, in this way, we can review accidents more precisely.

In addition, the software getting the data saved in black box is installed in computer separated from auto black box, because the responsibility of an accident can only be judged by traffic bureau. So that we needn't install it in auto black box, in this way, we can reduce the cost of auto black box.

Figure 1 show the working progress of auto black box, according to this figure, we

can see that auto black box can store the data truly, and then we can use those data to review the accident accurately.

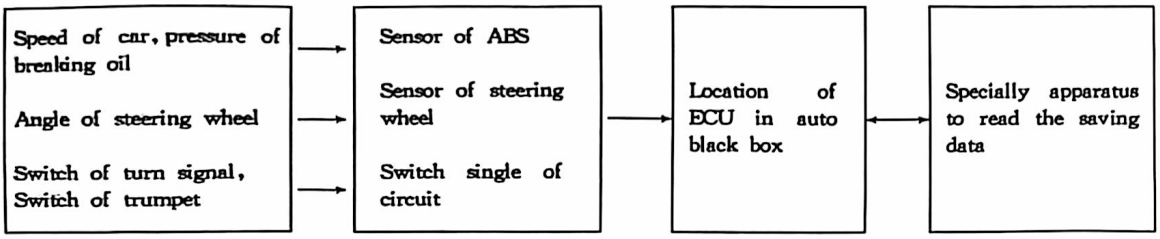

Fig. 1 Schematic working process of auto black box

3.2 Auxiliary function of auto black box

Highway is a closed, high-speedway, if accidents occurred in highway, it may be a serious one. If the wounded people in accident don't have communication equip, it will lose many time in saving wounded people. In plane black box can discharge signal to locate, according to this character, auto black box can discharge signal too, the purpose of discharging signal is not for locating, but for help. The signal it discharged can inform the nearest first-aid station, so it can save time to rescue the wounded

3.3 Position of auto black box

The force in accident decides the position of auto black box. In car accident, car's chassis is safer than other places, so auto black box can place on the chassis. Because car's moving situation is easier than plane, so we can image that auto black box's cost will be low.

4 Conclusion

According to the character of car moving, using the completed plane black box theory, we can produce a valuable and cheap auto black box to overcome the shortcomings of existing accident reviewing methods. As the development of digital picture's technology, auto black box can record pictures of every aspects in accident, then we can expect that reviewing accidents will be no error.

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