STUDY FOR VEHICLES RESTRICTION SAFETY FACILITIES OF VILLAGE ROAD

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ABSTRACT

With the rapid development in the rural economy and society in china, many light trucks or heavy trucks are on village road. Overload trucks and heavy trucks can great destroy village road and seriously affect the safety of travel, therefore, it is very imperative to set the vehicles restriction safety facilities. The paper puts forward the principles and methods of vehicles restriction safety facilities, and gives some new type overload disposal safety facilities. Vehicles restriction safety facilities which are used on village road can extend village road service life and improve traffic safety to promote economic development of rural society better.

1. INTRODUCTION

Rural road is important infrastructure to promote rural economic development, create a harmonious society and build new socialist rural countryside [2].With the new policy of building rural areas and most county roads built-up at the end of the eleventh five-year plan, building village road will become a new task at the twelfth five-year plan of China [5]. Village road defines as a way link from downtown to village, or a way connects two or more villages, where most motor vehicles are agrimotors, microbuses and light trucks. Village road regards whole road as the net blood capillary, it is the foundation in the foundation [8].
Rural road is the component of network of our country road, it is very important way to travel in broad rural areas, moreover, the only one way, related to the life and production of every household [7]. As the end of the road network, often design load of village road can never meet their requirements of overload trucks and heavy trucks because of few investment restrictions and the low carrying capacity of roads [4]. Once overload trucks or heavy trucks are running on village road, bridge, road pavement will be destroyed; this seriously will affect the traffic safety and cause economic losses (see Figure 1).

Figure 1 -Village road destroyed by overload trucks

At present, vehicles restriction safety facilities of village road mainly include width restriction safety facilities and height restriction safety facilities. Vehicles restriction safety facilities designed and Installed by villagers, there are different forms, but no uniform standard. If vehicles restriction safety facilities are not properly, which will affect vehicle speed and cause traffic accident, even emergency vehicles cannot timely pass village road(see Figure 2), this engender enormous lose to people's life and property that cannot compensate by the country and society [9].

Figure 2 - Emergency vehicles cannot timely pass

Because overload trucks and heavy trucks can great destroy village road and seriously affect the safety of travel, so, how to set the vehicles restriction safety facilities is the most urgent task, the task must combine with overload disposal. As nine governmental departments jointly released "Guidance opinion of keeping lasting effect management mechanism to treat overload vehicles and over-size vehicles on national highway" and traffic department of transportation released "Width restriction and Height restriction of rural road", set scientific reasonable vehicles restriction safety facilities to prevent overload trucks and heavy trucks from entering village road on some major artery accesses and rural nodal locations of village road is a task for village road management department.

2. PRINCIPLES OF VEHICLES RESTRICTION SAFETY FACILITIES.

When vehicles are running on roads, all drivers hope that roads are quick, unobstructed and do not meet any interference facilities. However, vehicles restriction safety facilities will restrict some vehicles pass village road, it is inevitable for the unrestricted vehicles have

also been affected, even cause traffic accidents [1]. So, vehicles restriction safety facilities should be scientific and suitable, not only keep their effectiveness, but also assure traffic safety.

Principles of vehicles restriction safety facilities as follows:

(1) Authorized by local township government, village committees may set vehicles restriction safety facilities on the village road according to design criteria of village road.

(2) In the new-built and rebuilding of village road, according to the local condition, vehicles restriction safety facilities need plan, design, and implement as possible, practically prevent heavy trucks from entering village road.

(3) Vehicles restriction safety facilities are designed on basis of the traffic characteristic road, vehicles composition and proportion, the actual carrying capacity of bridge, whether road traffic safety facilities are complete.

(4) If vehicles restriction safety facilities criterion is too low, it is difficult to travel on village road for light trucks or cars. So, the safety warning marks that warn drivers of the attention must be installed before vehicles restriction safety facilities are set.

(5) When vehicles restriction safety facilities are set, emergency vehicles should be taken into consideration, and can pass village road at any time. Emergency vehicles include the fire engine, the ambulance, the road block removal truck, and so on [10].

3. METHODS OF VEHICLES RESTRICTION SAFETY FACILITIES

3.1Methods of width restriction safety facilities

(1) Material and location of width restriction safety facilities

Width restriction safety facilities of village road adopt generally width restriction blocks (see Figure 3). Width restriction blocks are cube or cylinder; these are made of precast cement concrete. Width restriction blocks are located in the entrance of village road or bridgehead of small bridge, which are placed on the road or embedded in the road, and keep from being moved depend on self-weight.

Figure 3 -Width restriction blocks of village road

Another width restriction blocks are also cube or cylinder, may be cast in reinforced concrete, deep embedded in the road. The blocks are very stable and not easy to be destroyed [3], but it is difficult to dismantle later or remove in an emergency. So, it is not generally recommended to use this blocks on village road.

(2) Span of two blocks

When vehicles are traveling on local village road, the span of two blocks may be selected and adjusted on basis of the actual situation. The span is 20~30 cm wider than the widest vehicle that is allowed on village road. At present, the span of two blocks is about 250 cm. It is recommended to adjust the span of two blocks on the basis of the actual condition of local village road.

(3) Notice

When width restriction blocks are set on village road, red - white warning markings or yellow - black warning markings are painted on width restriction blocks, and speed control safety facilities and width restriction signs are set before width restriction blocks, such as deceleration vibration markings, road rumps, slow pavement, and so on. It is mostly used to arouse drivers to pay attention to width restriction blocks and the span of two blocks at the same time, arouse the drivers to reduce speed and avoid vehicles loss (see Figure 4).

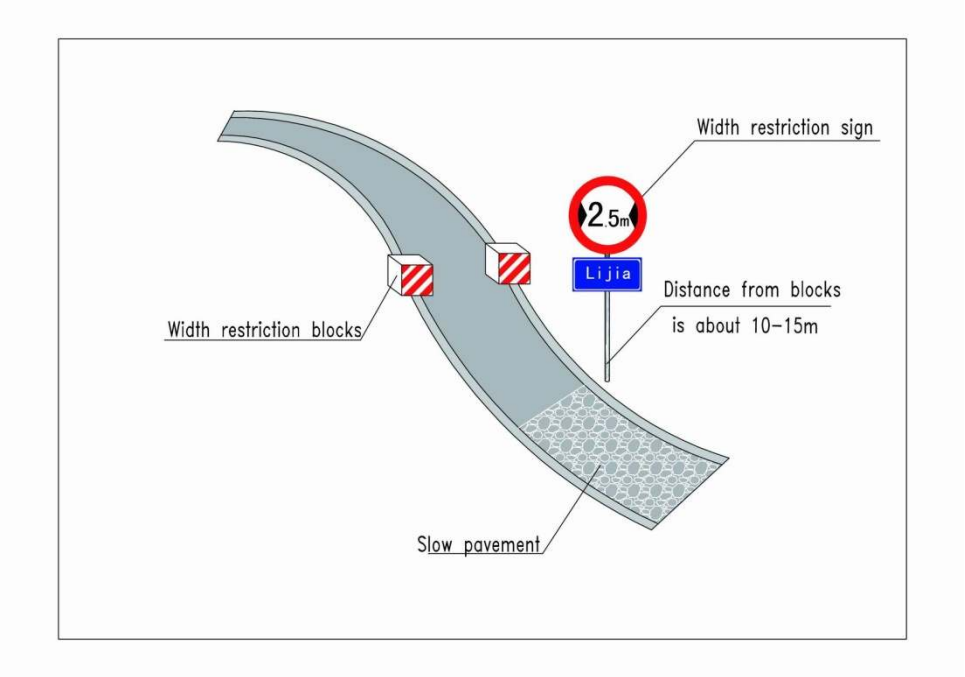

Figure 4 - Width restriction blocks schematic

3.2 Methods of height restriction safety facilities

(1) Material and location of height restriction safety facilities

Height restriction safety facilities of village road adopt generally height restriction barriers. Height restriction barriers adopt mainly the door frame type bracing structure (see Figure 5), which are made of welded steel pipe or wooden pole and located in the entrance of village road or bridgehead of small bridge, to keep heavy trucks or large-scale vehicles from entering village road.

Figure 5 - Height restriction barriers of village road

(2) The height of height restriction barriers

The height of height restriction barriers may be selected and adjusted on the basis of the actual situation when vehicles are traveling on local village road. The height of height restriction barriers is about 250 cm by investigation. It is recommended to adjust the height of height restriction barriers on the basis of the actual condition of local village road.

(3) Notice

When height restriction barriers are set on the village road, red - white warning marks or yellow - black warning marks are painted on height restriction barriers, and speed control safety facilities and height restriction signs are set before height restriction barriers , such as deceleration vibration markings, road rumps, slow pavement, and so on. It is mostly used to arouse the drivers to pay attention to height restriction barriers and the height of height restriction barriers, at the same time, arouse the drivers to reduce speed and avoid loss of life and property (see Figure 6).

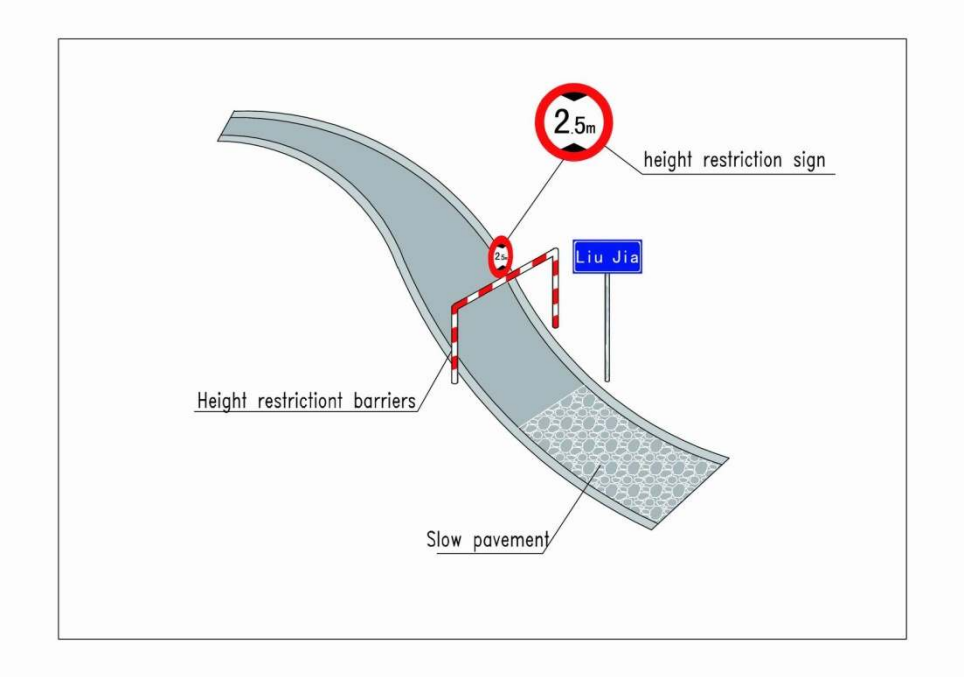

Figure 6 - Height restriction barriers schematic

Two side pillars of height restriction barriers should not be set inside the road, but must be set outside the shoulder of the road. This will avoid the collision of the pillars and loss of life and property when at night or in heavy foggy. As can be seen from figure 7, two side pillars of height restriction barriers had be installed inside village road, it is very easy to cause traffic accident.

Figure 7 - Unsafe pillars of height restriction barriers

Once ultra-height vehicles carelessly collide the height restriction barriers, the traffic accident may led to loss of ultra-height vehicles. To avoid accidents, it is recommended that height restriction barriers are breakaway (see Figure 8).

Figure 8 - Breakaway height restriction barriers

Moreover, when accidents happened, ultra-height emergency vehicles must pass the height restriction barriers and arrive rapidly at the spot. So, it is recommended that height restriction barriers can be raised and lowered, and need be managed by hand or village committees (see Figure 9).

Figure 9 - Height restriction barriers raised and lowered

3.3 Other vehicles restriction safety facilities

Except above width restriction blocks and height restriction barriers, at present, several vehicles restriction safety facilities are conducting extensive research. Such as original overload disposal, this method does not set any facility on the entrance of village road. Character is that village road is divided into two lanes: car lane and truck lane, cars are allowed on the car lane with width restriction and moderate grade; cars and trucks may run on the truck lane, but grade is very steep (see Figure 10).

Figure 10 - Original overload disposal

When grade of truck lane is over 10%, overload trucks and heavy trucks cannot run on truck lane. If deceleration vibration markings or road rumps are set before truck lane [6], it is very difficult.to run on the truck lane for overload trucks and heavy trucks after reducing driving speed, and this can effectively prevent overload trucks from speeding up and dashing uphill.

Advantages of original overload disposal as follows:

(1) The original overload disposal not only can ensure vehicles pass the village road, but also can avoid overload trucks and heavy trucks enter village road.

(2) The police and the transport department do not need monitor village road at work day and night, so this may reduce their work burden.

(3) The original overload disposal is economical practical, technology is simple, construction is convenient, and it is low for cost, which can save the massive manpower and the financial resource.

Disadvantages of original overload disposal as follows:

(1) It is very easy to cause traffic accident and traffic jams when the traffic flow is great and proportion of heavy trucks is higher

(2) When truck run on steep downgrade, truck speed is generally fast, this will straightly affect the running safety.

In conclusion, the original overload disposal may be selected and used on the basis of the actual condition. Village committees must focus on proper safety facilities and ensure traffic safety.

CONCLUSION

Overload trucks and heavy trucks can great destroy village road, shorten the service life, even seriously affect the traffic safety, it is an important project for the rural people. The paper puts forward the methods of vehicles restriction safety facilities including principles, type, material, location notice, relevant supporting facilities, and safety measures. According to the actual condition, vehicles restriction safety facilities may be scientifically selected and used, be provided with proper safety facilities, and may dismantle later, remove, raise and lower in an emergency. Moreover, the governmental departments strengthen publicity and education and improve villager's consciousness of the law, the overload trucks destroy village road must be punished. Vehicles restriction safety facilities better promote rural economic development and serve for the rural people.

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