Title: GUARDRAIL WITH A BUFFER BRACKET FOR A ROAD

Abstract: A road guardrail having an impact buffering bracket between a waveform shape plate and a guardrail plate is disposed, in which an impact buffering bracket formed of a metallic plate is divided into a front bracket and a rear bracket, and the front and rear brackets are elastically engaged in forward and backward directions. When a vehicle collides with a guardrail plate, the engaged front and rear brackets are flexibly contracted for thereby releasing impact force, and in another embodiment of the present invention, an impact buffering bracket is formed in a rectangular tube shape, and a weak portion having a plurality of holes at both sides is formed. When a vehicle collides with a guardrail, the weak portion formed at the lateral sides is flexibly contracted for thereby releasing impact force.
Title: GUARDRAIL WITH A BUFFER BRACKET FOR A ROAD

Technical Field

The present invention relates to a road guardrail having an impact buffering bracket between a waveform shape plate and a guardrail plate, and in particular to a road guardrail having an impact buffering bracket between a waveform shape plate and a guardrail plate in which an impact buffering bracket formed of a metallic plate is divided into a front bracket and a rear bracket, and the front and rear brackets are elastically engaged in forward and backward directions. When a vehicle collides with a guardrail plate, the engaged front and rear brackets are flexibly contracted for thereby releasing impact force, and in another embodiment of the present invention, an impact buffering bracket is formed in a rectangular tube shape, and a weak portion having a plurality of holes at both sides is formed. When a vehicle collides with a guardrail, the weak portion formed at the lateral sides is flexibly contracted for thereby releasing impact force.

Background Art

As shown in Figure 1, in a conventional road guardrail, a circular pipe column 1 is vertically installed from the ground, and a guardrail plate 4 formed
by bending a steel plate in a waveform is fixed at one side or both upper sides
of the column 1 using a fixing bolt. An impact buffering bracket 2 made by
bending a steel plate is installed between the guardrail plate 4 and the column.

In the impact buffering bracket 2, an arc portion 5 contacting with a
circular surface of the column 1 is formed at a rear side of the same, and an
engaging portion 6 engaged at a flat portion of a back surface of the guardrail 4
is bent and formed at a front center portion of each side surface. An inclination
support portion 7 is formed at the upper and lower sides of the engaging portion
6 and contacts with an inclination surface of a groove portion formed at a
backside of the guardrail plate 4.

When a vehicle collides with the conventional road guardrail, it is
contracted in a waveform. Namely, an external impact force is first applied toe
guardrail plate 4. The impact force is transferred to the column 1 through the
impact buffering bracket 2. The impact buffering bracket 2 is manufactured
weaker as compared to the guardrail plate 4 and the column 1, So, when a
vehicle collides with the guardrail, the impact buffering bracket 2 is bent for
thereby releasing impact force for thereby minimizing the damages to vehicle
and guardrail.

However, the impact buffering bracket 2 made by bending a steel plate
is manufactured weaker with respect to an impact as compared to the guardrail
plate 4 and the column 1. In a state that colliding vehicle kinds and impact
forces are different, the impact buffering bracket is manufactured weaker. In this
case, it is impossible to set a weakness level, so that the steel plate used for manufacturing an impact buffering bracket is made using a thinner steel plate as compared to the steel plate which is used for manufacturing the guardrail plate.

5 Disclosure of Invention

Accordingly, it is an object of the present invention to overcome the problems encountered in the conventional art.

It is another object of the present invention to provide a road guardrail having an impact buffering bracket according to the present invention in which an impact buffering bracket formed of a metallic plate is divided into a front bracket and a rear bracket, and the front and rear brackets are elastically engaged in forward and backward directions. When a vehicle collides with a guardrail plate, the engaged front and rear brackets are flexibly contracted for thereby releasing impact force, and in another embodiment of the present invention, an impact buffering bracket is formed in a rectangular tube shape, and a weak portion having a plurality of holes at both sides is formed. When a vehicle collides with a guardrail, the weak portion formed at the lateral sides is flexibly contracted for thereby releasing impact force.

To achieve the above objects, in a guardrail in which a waveform shape guardrail is fixedly installed at a front side or front or rear side of a column vertically installed on the ground of a road, with an impact buffering bracket
made by bending a metallic plate being interposed, there is provided a road

guardrail having an impact buffering bracket characterized in that said impact
buffering bracket is divided into front and rear brackets; in the front bracket, an
engaging shoulder portion made by bending a steel plate of the body is

provided on a front upper surface of the body of which upper and lower and rear

sides are open in a channel shape, with a vertical bent portion being caught by

the engaging shoulder portion at the upper end of the guardrail, with the vertical

bent portion being downwardly bent; and a plurality of bolt through holes are

connected in forward and backward directions at both sides of the body in a

peanut shape; a fixing engaging portion is formed at both sides of the front

surface of the body for supporting the plane surface of the rear side of the

guardrail plate and the upper and lower inclination surfaces of the groove

portion; and in the fixing engaging portion, the inclination engaging portion is

bent and formed at the plane engaging portion of the center and the upper and

lower sides of the same; and the rear bracket is formed with the front and upper

and lower sides being open, and an arc portion forming the bolt engaging hole

is formed and engaged with a fixing bolt while corresponding to the rounded

surface, and a peanut shape bolt through hole is formed in the forward and

backward directions at the portion corresponding to the bolt through hole of the

both sides of the rear bracket; and in the rear bracket, the arc portion is
engaged at the column using the fixing bolt, and the connection bolt passes through the bolt through holes at the front side of the rear bracket with the rear side of the front bracket and the front side of the rear bracket being inserted; and the fixing engaging portion 16 and the guardrail are engaged using the fixing volt in a state that the vertical bent portion of the guardrail is caught by the engaging shoulder portion at the front side of the front bracket.

**Brief Description of the Drawings**

The present invention will become better understood with reference to the accompanying drawings which are given only by way of illustration and thus are not limitative of the present invention, wherein;

- Figure 1 is a backside disassembled perspective view illustrating an installation state of a conventional road guardrail;

- Figure 2 is a disassembled perspective view illustrating a road guardrail having an impact buffering bracket according to an embodiment of the present invention;

- Figure 3 is a side cross sectional view illustrating an engaging state of Figure 2 according to the present invention;

- Figure 4 is a plane cross sectional view illustrating an engaging state of Figure 2 according to the present invention;

- Figures 5a and 5b are perspective view illustrating a manufacture
process of a front bracket of Figure 2 according to the present invention;

Figure 6 is a disassembled perspective view illustrating a road guardrail according to a second embodiment of the present invention;

Figures 7a and 7b are a perspective view and a plane cross sectional view of an installation state according to a third embodiment of the present invention; and

Figure 8 is a perspective view illustrating a fourth embodiment of the present invention.

**Best Mode for Carrying Out the Invention**

The road guardrail having an impact buffering bracket according to the present invention will be described with reference to Figures 2 through 7.

As shown in Figures 2 through 4, in the impact buffering bracket according to an embodiment of the present invention, the impact buffering bracket 2 is divided into front and rear brackets 10 and 20 in the guardrail in which a waveform shape guardrail is fixedly installed on the ground of a road in a state that an impact buffering bracket made by bending a metallic plate is disposed at a front side or front and rear sides of the column vertically installed on the ground of a road.

In the front bracket 10, an engaging shoulder portion 12 is provided at a
front upper side of a body 11 of which upper and lower sides and rear sides are open in a channel shape, with a vertical bent portion 4a being vertically bent downwardly and caught by an upper end of the guardrail plate 4, and with a steel plate of the body 11 being cut and bent to be exposed in the direction of the front upper side. A plurality of bolt pass holes 13 are formed at both surfaces of the body 11 and are connected in the forward and backward directions in a serial peanut shape.

A fixing engaging portion 16 is formed at both front sides of the body 11 and supports upper and lower inclination surfaces of the plane portion 8 of the back surface of the guardrail plate 4. The fixing engaging portion 15 includes a plane engaging portion 14 of the center portion, and an inclination engaging portion 15 of the upper and lower sides of the same, with the plane engaging portion and the inclination engaging portion being bent. A bolt hole 17 is formed at each engaging portion 14, 15. Here, the front side of the fixing engaging portion 16 is open and wide, and the rear side of the same is closed and has a narrow tapered portion.

Here, as shown in Figures 5a and 5b, in the front bracket 10, the front side of the body 11 is cut and open into two parts, and only the center portion opened in a hinge type is fixed, and two parts are bent to be open, and the upper and lower sides of the plate to be open are bent in inclination angle, and
the fixing engaging portion 16 is cut, and a rectangular opening 18 is formed at
the cut portion. The fixing bolt 3 is engaged through the opening 18.

In the present invention, the opening 18 is formed at the front surface of
the body 11. Both sides of the body 11 are cut with sizes as large as the fixing
engaging portion 16, and the cut portion is tapered for thereby forming the fixing
engaging portion 16.

The rear bracket 20 is formed in a shape that the front and upper and
lower sides are open, and the back side corresponds to the rounded surface of
the column 1, and an arc portion 5 having a bolt engaging hole 21 is formed and
fixed using a fixing bolt. A connection bolt 23 can shape bolt through hole 22 is
formed forwardly and backwardly at the portion corresponding to the bolt
through hole 13 of both surfaces of the rear bracket 20.

In the rear bracket 20, the arc portion 5 is engaged using a fixing bolt 3.
The connection bolt 23 passes through the bolt through holes 13 and 22 at the
front side of the rear bracket 20 in a state that the rear end of the front bracket
10 and the front end of the rear bracket 20 are inserted. The vertical bent
portion 4a of the guardrail 4 is caught by the engaging shoulder portion 12 at
the front side of the front bracket 10, and the fixing engaging portion 16 and the
guardrail plate 4 are engaged using a fixing bolt.

As shown in Figures 2 through 5, in the above descriptions, the impact
buffering bracket 2 installed at the guardrail 4 having two grooves is described. In the embodiment of Figure 8, there is provided an impact buffering bracket 2 installed at the guardrail 4 having three grooves. The second embodiment is the same as the first embodiment except for that the fixing engaging portion 16 is further provided with two or three grooves. So, the detailed description of the same is omitted.

Figure 7 is a view of a third embodiment of the present invention. In this embodiment, the impact buffering bracket 2 is formed of one rectangular tube.

According to the third embodiment of the present invention, in a guardrail in which a waveform shape guardrail is fixedly installed in a state that the impact buffering bracket made by bending a metallic plate is disposed at a front side or front or rear side of the column which is vertically installed on the ground of a road, a rectangular tube shape body 11a having an arc shape portion 5 is formed at a rear side of the impact buffering bracket 2, with the arc shape portion corresponding to the circular portion of the column 1. An engaging should portion 12 formed as a steel plate is bent is formed at the front upper side of the body 11a. A weak portion 19 having a plurality of holes is formed at both sides of the body 11a. A fixing engaging portion 16 having upper and lower inclination surfaces of the plane portion 8 and the groove portion 9 of the rear surface of the guardrail plate 4 is formed at both front sides of the body 11a. In
the fixing engaging portion 16, the plane engaging portion 14 of the center and
the inclination engaging portion 15 are bent and formed at the upper and lower
sides of the same. A bolt hole 17 is formed at the engaging portions 14 and 15.

The fourth embodiment of Figure 8 is the same as the third embodiment
except for that in the third embodiment, there is provided a two-groove guardrail
plate 4, and in the fourth embodiment, there is provided a three-groove
guardrail plate 4. The fixing engaging portion 16 is further provided based on
the difference of grooves. So, the description of the same construction will be
omitted.

In the third and fourth embodiments of the present invention, a plurality of
holes are formed at both sides. In the weak portion 19, a plurality of longitudinal
holes are formed in the radial direction. As shown in the drawings, the shapes of
the hole are not limited to the longitudinal direction. A certain shape of the home
may be adapted in the present invention.

The operation of the present invention will be described with reference to
Figures 2 through 8.

The rear bracket 20 is fixed at the front side or the rear side of the
vertically installed column 1 using the fixing bolt 3. The rear end of the front
bracket 10 is inserted into the opened front side of the rear bracket 20, and the
lengths of the front and rear brackets 10 and 20 are adjusted so that the
guardrail plate 4 is installed. The connection bolt 23 is inserted into the bolt through holes 13 and 22 passing through both sides of the front and rear brackets 10 and 20 for thereby fixing the front and rear brackets 10 and 20.

The guardrail 4 is installed at the front side of the front bracket 10. As shown in Figure 3, the downwardly vertical bent portion 4a is provided at the upper end of the column 1 while suspending over the engaging shoulder portion 12 which is bent upwardly at the front upper side of the front bracket 10. The fixing engaging portion 16 formed at both front sides of the front bracket 10 contacts with the inclination surface formed at the plane portion 8 of the rear surface of the guardrail 4 and the groove 9 of the upper and lower side of the plane portion.

In the above state, the fixing bolts are inserted into the bolt hole 17 formed at the plane engaging portion 14 and the inclination engaging portion 15 and the hole formed at the guardrail 4, so that the guardrail is installed at the front surface of the front bracket 10. At this time, when it is installed at the front bracket 10 of the guardrail plate 4, the guardrail 4 is suspended over the engaging shoulder portion 12 of the front bracket 4. Since the heavy guardrail plate 4 is suspended by the engaging shoulder portion 12, the installation work of the guardrail plate 4 can be easily performed in the present invention.

When a vehicle collides with the impact buffering bracket 2 according to
the present invention, the impact force that the vehicle collides with the guardrail plate 4 is first applied to the guardrail plate 4 and is second applied to the impact buffering bracket 2 which supports the rear surface of the guardrail 4. As described above, since the impact buffering bracket 2 is connected in such a manner that the connection bolt 23 passes through the peanut shape ball through holes 13 and 22 in which the front and rear brackets 10 and 20 are continuously formed, the front bracket 10 is pushed in the rear direction for thereby buffering the impact force.

In the second embodiment of Figure 6, when a vehicle collides with the guardrail plate 4, the front bracket 10 is backwardly moved for thereby buffering an impact force.

The operations of the third and fourth embodiments of the present invention will be described. In the impact buffering bracket 2, the arc portion 5 of the rear surface is installed by the fixing bolt 3, and the guardrail plate 4 is installed at the front side of the impact buffering bracket 2. The construction that the guardrail plate 4 is installed at the engaging shoulder portion 12 is the same as the assembling procedure of the first embodiment of the present invention. Namely, the guardrail plate 4 is suspended over the vertical bent portion 4a of the guardrail plate 4, and the guardrail plate 4 contacting with the fixing engaging portion 16 is fixedly engaged using the fixing bolt.
In the third and fourth embodiments of the present invention, when a vehicle collides with the guardrail, the impact force of the vehicle is first applied to the guardrail plate 4 and is second applied to the impact buffering bracket 2 formed in the rectangular tube shape. The impact buffering bracket 2 of the third and fourth embodiments of the present invention is installed between the guardrail plate 4 and the column 1, and the weak portion 19 having a plurality of holes is formed at both sides of the same. The weak portion 19 is contracted for thereby buffering an impact force, so that it is possible to minimize the passenger of the vehicle.

**Industrial Applicability**

As described above, in the road guardrail having an impact buffering bracket according to the present invention, an impact buffering bracket formed of a metallic plate is divided into a front bracket and a rear bracket, and the front and rear brackets are elastically engaged in forward and backward directions. When a vehicle collides with a guardrail plate, the engaged front and rear brackets are flexibly contracted for thereby releasing impact force, and in another embodiment of the present invention, an impact buffering bracket is formed in a rectangular tube shape, and a weak portion having a plurality of holes at both sides is formed. When a vehicle collides with a guardrail, the weak
portion formed at the lateral sides is flexibly contracted for thereby releasing n impact force.

As the present invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, it should also be understood that the above-described examples are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should be construed broadly within its spirit and scope as defined in the appended claims, and therefore all changes and modifications that fall within the meets and bounds of the claims, or equivalences of such meets and bounds are therefore intended to be embraced by the appended claims.
Claims:
1. In a guardrail in which a waveform shape guardrail is fixedly installed at a front side or front or rear side of a column vertically installed on the ground of a road, with an impact buffering bracket made by bending a metallic plate being interposed, a road guardrail having an impact buffering bracket characterized in that said impact buffering bracket 2 is divided into front and rear brackets 10 and 20; in the front bracket 10, an engaging shoulder portion 12 made by bending a steel plate of the body 11 is provided on a front upper surface of the body 11 of which upper and lower and rear sides are open in a channel shape, with a vertical bent portion 4a being caught by the engaging shoulder portion 12 at the upper end of the guardrail 4, with the vertical bent portion 4a being downwardly bent; and a plurality of bolt through holes 13 are connected in forward and backward directions at both sides of the body 11 in a peanut shape; a fixing engaging portion 16 is formed at both sides of the front surface of the body 11 for supporting the plane surface of the rear side of the guardrail plate 4 and the upper and lower inclination surfaces of the groove portion 9; and in the fixing engaging portion, the inclination engaging portion 15 is bent and formed at the plane engaging portion 14 of the center and the upper and lower sides of the same; and the rear bracket 20 is formed with the front and upper and lower sides being open, and an arc portion 5 forming the bolt engaging hole 21 is formed and engaged with a fixing bolt while corresponding to the rounded surface of [1], and a peanut shape bolt through hole 22 is formed in the forward
and backward directions at the portion corresponding to the bolt through hole 13 of the both sides of the rear bracket 20; and in the rear bracket 20, the arc portion 5 is engaged at the column 1 using the fixing bolt 3, and the connection bolt 23 passes through the bolt through holes 13 and 22 at the front side of the rear bracket 20 with the rear side of the front bracket 10 and the front side of the rear bracket 20 being inserted; and the fixing engaging portion 16 and the guardrail 4 are engaged using the fixing bolt in a state that the vertical bent portion 4a of the guardrail 4 is caught by the engaging shoulder portion 12 at the front side of the front bracket 10.

2. In a guardrail in which a waveform shape guardrail is fixedly installed at a front side or front or rear side of a column vertically installed on the ground of a road, with an impact buffering bracket made by bending a metallic plate being interposed, a road guardrail having an impact buffering bracket characterized in that a rectangular tube shaped body 11a is formed at a rear side of the impact buffering bracket 2 with an arc portion 5 being formed thereat while corresponding to the rounded surface of the column 1; and an engaging shoulder portion 12 made by bending a steel plate of the body 11a is formed at a front upper side of the body 11a; and a weak portion 19 having a plurality of holes is formed at both sides of the body 11a; and a fixing engaging portion 16 supporting the plane portion 8 of the rear surface of the guardrail 4 and upper and lower inclination surfaces of the groove portion 9 at both front sides of the
body 11a; and the plane engaging portion 14 and the inclination engaging portion 15 are bent and formed at the center and upper and lower sides of the fixing engaging portion 16; and a bolt hole 17 is formed at the engaging portions 14 and 15.
### A. CLASSIFICATION OF SUBJECT MATTER

*E01F 15/00(2006.01)*

According to International Patent Classification (IPC) or to both national classification and IPC

### B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC8 : E01F 15/00, 15/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

KR, JP : IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKIPASS (KIPO internal) & keywords: "guardrail", "bracket"

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>JP 05-263406 A (METALMECCANICA FRACASSO S.P.A) 12 October 1993 See claims 1 to 9 and figures 1 to 3.</td>
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Further documents are listed in the continuation of Box C. See patent family annex.

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Name and mailing address of the ISA/KR

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