

PATENT APPLICATION FORM (CONVENTION AND NON-CONVENTION)

COMMONWEALTH OF AUSTRALIA

Patents Act 1990

26849/88
Regulation 9

594595

APPLICATION FOR A STANDARD PATENT OR
A STANDARD PATENT OF ADDITION

APPLICATION ACCEPTED AND AMENDMENTS

ALLOWED 3-1-90

(a) Insert full
name(s) of
applicant(s)

X We (a) SHO-BOND CONSTRUCTION CO., LIMITED

(b) Insert
address(es) of
applicant(s)

of (b) 3-23 ICHIGAYAHONMURACHO, SHINJUKU-KU, TOKYO, JAPAN

(c) Delete as
appropriate

hereby apply for the grant of a (c) Standard Patent for an invention entitled (d) EXPANSION JOINT

(d) Insert title
of invention

FOR ROADS AND BRIDGES.

which is described in the accompanying (c) ~~provisional~~ complete specification.

(e) For a Convention application — details of basic application(s) —

(e) for Convention
cases only

NUMBER	COUNTRY	DATE OF APPLICATION
62,290/1988	JAPAN	12th MAY, 1988

(f) For Patents of
Addition only.(f) ~~For Patents of Addition (Section 72).~~

I/We request that the Patent may be granted as a Patent of Addition

(g) Insert number
of 'parent/main'
application/or
patent as
appropriate.

this Patent applied for on Application No. (g)

to Patent No. (g) In the name of (h)

(h) Insert name of
applicant/patentee
of 'parent/main'
application/or
patent as ap-
propriate.

I/We request that the term of the Patent Addition be the same as that for the main invention or so much of the term of the patent for the main invention as is unexpired.

My/Our address for service is ARTHUR S. CAVE & CO., Patent and Trade Mark Attorneys, 1 Alfred Street, Sydney, New South Wales, Australia 2000.

(i) Insert day,
month and
year form
signed.

Dated this (i) 5th day of December 1988.

SHO-BOND CONSTRUCTION CO., LTD.

(j) Signature
of applicant or
Australian
attorney.

(j)

Akira Ueda
(Signature)

(k) Seal, if any.

(k)

Akira UEDA, President

To:

Commissioner of Patents

ARTHUR S. CAVE & CO.

PATENT AND TRADE MARK ATTORNEYS
SYDNEY

PATENT DECLARATION FORM (CONVENTION)
COMMONWEALTH OF AUSTRALIA

Patents Act 1952

Regulation
12 (2)

DECLARATION IN SUPPORT OF A CONVENTION APPLICATION
FOR A PATENT

To be signed by the applicant(s) or in the case of a body corporate to be
signed by a person authorised by the body corporate.

In support of the Convention application made for a patent for an invention entitled

(a) Insert title
of invention.

(a) EXPANSION JOINT FOR ROADS AND BRIDGES

(b) Insert full
name(s) of
declarant(s).

I/We (b) AKIRA UEDA

(c) Insert
address(es) of
declarant(s).

of (c) 3-23 ICHIGAYAHONMURACHO, SHINJUKU, TOKYO, JAPAN

do solemnly and sincerely declare as follows:—

1. I am/We are the applicant(s) for the patent

(OR, IN THE CASE OF AN APPLICATION BY A BODY CORPORATE.)

1. I am/We are authorised by SHO-BOND CONSTRUCTION CO, LTD

the applicant for the patent to make this declaration on its behalf.

2. The basic application(s) as defined by Section 141 of the Act was/were made in the following
country or countries on the following date(s) namely:—

(d) Insert
country in
which basic
application(s)
was/were
filed.
(e) Insert date
of basic
application(s).
(f) Insert full
names of basic
applicant(s).

in (d) JAPAN on (e) 12 MAY, 1988

by (f) SHO-BOND CONSTRUCTION CO, LTD

in (d) on (e)

by (f)

in (d) on (e)

by (f)

3. I am/We are the actual inventor(s) of the invention referred to in the basic application.

(OR, WHERE A PERSON OTHER THAN THE INVENTOR IS THE APPLICANT)

3. (g) NAOTAKE ANDO, TAIZO MATSUKAMI AND HIROSHI SAITO

(g) Insert full
name(s) of
actual
inventor(s)

(h) Insert
address(es) of
actual
inventor(s).

of (h) 2-1043, OOWADA-CHO, OMIYA-SHI, SAITAMA-KEN, JAPAN

NISHIAGEO DAINI DANCHI 1-20-301, 77-1 OAZA KOSHIKIYA, AGE0-SHI,

SAITAMA-KEN, JAPAN and 1033-6, KAMIHIDEYA, OKEGAWA-SHI, SAITAMA-KEN, JAPAN

is/are the actual inventor(s) of the invention and the facts upon which the applicant(s) is/are entitled to
make the application are as follows:

(i) Set out how
applicant(s)
derive(s) title
from actual
inventor(s)
i.e., assignee of
the invention
from the actual
inventor(s).

(i) THE APPLICANT IS THE ASSIGNEE OF THE INVENTION FROM THE ACTUAL
INVENTORS

4. The basic application(s) referred to in paragraph 2 of this Declaration was/were the first
application(s) made in a Convention country in respect of the invention the subject of the application.

Attestation or
legalization
not required.

Declared at TOKYO

this 14

day of SEPTEMBER

1988

SHO-BOND CONSTRUCTION CO., LTD.

To:

The Commissioner of Patents

Akira Ueda

Akira UEDA, President

Signature of Declarant(s)

ARTHUR S. CAVE & CO.
PATENT AND TRADE MARK ATTORNEYS
SYDNEY

(12) PATENT ABRIDGMENT (11) Document No. AU-B-26849/88
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 594595

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EXPANSION JOINT FOR ROADS AND BRIDGES

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(56) Prior Art Documents
AU 492624 80923/75 E01D 19/06
AU 454059 17071/70 81.7 81.2 81.3

(57) Claim

1. In an expansion joint for roads and bridges, comprising: a cover member spanning an expansion joint gap defined between two adjacent spaced apart side sections of pavement layers overlaid upon subgrades of the roads and bridges; and a visco-elastic composite material layer so filled in said expansion joint gap on said cover member as to be flush with the track surface of the roads and bridges; the improvement wherein:

an elastomeric layer excellent in deformability is overlaid upon upper surfaces of said subgrades and an upper surface of said cover member, while overlaid with said visco-elastic composite material layer.

AUSTRALIA

594595

PATENTS ACT 1952

COMPLETE SPECIFICATION

(ORIGINAL)

FOR OFFICE USE

Application Number:
Lodged:

Complete Specification Lodged:
Accepted:
Published:

Priority:
Related Art:

TO BE COMPLETED BY APPLICANT

Name of Applicant:

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LIMITED

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Complete Specification for the invention entitled EXPANSION
JOINT FOR ROADS AND BRIDGES.

The following statement is a full description of this invention
including the best method of performing it known to me:-

- 1 -

ASC 49

REPRINT OF RECEIPT

004260 14/12/88

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EXPANSION JOINT FOR ROADS AND BRIDGES

BACKGROUND OF THE INVENTION

Field of the Invention:

5 The present invention relates to an expansion joint for roads or elevated roads and bridges spanning rivers, valleys and the like, and more particularly to a seamless expansion joint for use in joining two adjacent spaced apart side sections of roads and bridges.

Description of the Prior Art:

10

As is typified by a finger joint, in a conventional expansion joint, in order to permit one of two adjacent spaced apart side sections of the road and bridge to horizontally move toward and away from the other, an open gap is provided between the two adjacent spaced apart side sections of the road and bridge, the open gap being generally spanned by a sealing-rubber member which is not flush with a track surface of the road and bridge to form an uncontinuous track surface which impairs smooth ridability for vehicles traveling the road and bridge. In addition, a considerable noise is produced when the vehicle passes through such uncontinuous track surface of the road and bridge. These are problems inherent in the conventional expansion joint.

20

25

In recent years, in order to resolve the above problems, there is provided a conventional seamless expan-

1 sion joint, for example such as one disclosed in Japanese
Patent Laid-Open No. 61-191703, which joint is character-
ized in that: an expansion joint gap formed between two
5 adjacent spaced apart side sections of the road and bridge
is spanned by a cover member disposed in a position hori-
zontally corresponding to a pavement layer of the road
and bridge; and the thus installed cover member is over-
laid with a visco-elastic composite material layer com-
posed of binders and aggregates, so that the top surface
10 of the visco-elastic composite material layer is flush
with the track surface of the road and bridge.

As is clear from its name, such seamless expansion
joint provided with the visco-elastic composite material
layer filling the expansion joint gap provides a continu-
ous track surface flush with the top surface of the road
and bridge. Consequently, the seamless expansion joint
can provide smooth ridability for vehicles. In addition,
since there is no gap in the seamless expansion joint,
noise is substantially not produced when the vehicles
20 pass through the seamless expansion joint.

However, such conventional seamless expansion
joint suffers from its limited amount of expansion. In
such seamless expansion joint, since the visco-elastic
composite material layer is adhesively secured to two
25 adjacent spaced apart side sections of pavement layers

1 overlaid upon subgrades of the road and bridge and par-
ticularly secured to upper surfaces of the subgrades,
local concentrations of stresses will occur between the
subgrades and the visco-elastic composite material layer
5 in case that the visco-elastic composite material layer
is limited in amount of expansion to make it impossible
to expand in response to the movement of the subgrades.
As a result of such local concentrations of the stresses,
cracks are produced in the visco-elastic composite mate-
10 rial layer.

On the other hand, a visco-elastic composite
material layer with a sufficient amount of expansion
is poor in rigidity in use to make it difficult to provide
a continuous surface flush with the track surface of
15 the road. These are problems inherent in the conventional
seamless expansion joint of the roads and bridges.

SUMMARY OF THE INVENTION

It is an object of the present invention to re-
solve the above problems inherent in the conventional
expansion joints by providing a novel seamless expansion
20 joint sufficiently expandable in response to the expansion
of subgrades of the roads and bridges.

In the expansion joint of the present invention
for the roads and bridges, since a visco-elastic composite
25 material layer filling an expansion joint gap of the

1 expansion joint is insulated from subgrades of the roads
and bridges through an elastomeric layer excellent in
deformability, it is possible to permit the composite
material layer to deform on the upper surfaces of the
5 subgrades of the roads and bridges. In addition, since
the visco-elastic composite material layer is secured
only to two adjacent spaced apart side sections of pave-
ment layers overlaid upon the subgrades of the roads
and bridges, it is possible to permit the two adjacent
10 spaced apart side sections of the pavement layers to
move in response to the movement of the subgrades of
the roads and bridges as a whole, whereby a large amount
of expansion is allowed in the seamless expansion joint
of the present invention.

15 According to the present invention, there is
provided:

In an expansion joint for roads and bridges,
comprising: a cover member spanning an expansion joint
gap defined between two adjacent spaced apart side sec-
tions of pavement layers overlaid upon subgrades of the
roads and bridges; and a visco-elastic composite material
layer so filled in the expansion joint gap on the cover
member as to be flush with the track surface of the roads
and bridges; the improvement wherein:

25 an elastomeric layer excellent in deformability

1 is overlaid upon upper surfaces of the subgrades and
an upper surface of the cover member, while overlaid
with the visco-elastic composite material layer.

The elastomeric layer is preferably made of
5 polybutadiene rubbers or silicone rubbers.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a longitudinal sectional view of the
expansion joint of the present invention for the road
and bridges.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Now, an embodiment of the present invention will
be hereinbelow described in detail with reference to
the drawings. It is clear that the present invention
is not limited only to this embodiment.

In the drawings: the reference numeral 1 denotes
a subgrade; 2 a pavement layer; 3 a cover member; 4 a
elastomeric layer; and 5 a visco-elastic composite mate-
rial layer.

An expansion joint gap 6 is formed between two
adjacent spaced apart side sections of the pavement layers
2 overlaid upon the subgrades 1 of the roads and bridges.
If necessary, a joint-sealing material 7 is filled in
the expansion joint gap 6 as shown in Fig. 1.

The cover member 3 is constructed of, for example
such as an aluminum plate and the like. By means of the

1 cover member 3 spanning the expansion joint gap 6 between
two adjacent spaced apart side sections of the subgrades
1 of the roads and bridges, materials of the visco-elastic
composite material layer 5 and the elastomeric layer
5 4 are prevented from falling in the expansion joint gap
6.

The elastomeric layer 4 is made of polymers such
as polybutadiene rubbers and silicone rubbers excellent
in expandability so as to have an expansion rate of,
10 for example, about 200 %. The material of the elastomeric
layer 4 is poured into the expansion joint gap 6 on the
cover member 3 so as to form a continuous elastomeric
layer 4 having a thickness of from about 2 to about 5
mm on the cover member 3. In this embodiment of the pre-
15 sent invention, the elastomeric layer 4 is made of
polybutadiene rubbers since the polybutadiene rubbers
are excellent in expandability and are small in tempera-
20 ture sensitivity while good in adhesive properties to
concrete slabs, stone materials, metallic materials and
the like. In addition, the polybutadiene rubbers are
excellent in durability and heat-resisting properties
so as to not produce any foam even when they are brought
into contact with heated aggregates or the binders.

On the other hand, the visco-elastic composite
25 material layer 5 is composed of a composite material

1 prepared from a suitable aggregates such as ceramic materials and the like mixed with a binder which is a composite material or mixture of a rubber-elastomeric material and a liquid-binder material.

5 Any of the aggregates and primers 8 may be made of conventional materials while installed in a conventional manner.

The expansion joint of the present invention for the roads and bridges can be installed in a conventional manner, as follows:

10

First, the pavement layer overlaid upon the subgrades of the roads and bridges is removed in the expansion joint area to expose the two adjacent spaced apart side sections of the subgrades. Between these subgrades is formed the expansion joint gap in which is installed the joint-sealing means covered with the cover member spanning the expansion joint gap. The primer is applied to each of the two adjacent spaced apart side sections of the pavement layers overlaid upon the subgrades of the roads and bridges. After that, the elastomeric material of the elastomeric layer is poured into the expansion joint gap defined between the two adjacent spaced apart side sections of the pavement layers on the cover member and the top surfaces of the subgrades.

20

25 Then, cleaned aggregates are filled in the expansion

1 joint gap on the thus poured elastomeric layer, and the
binders follows the aggregates to form the visco-elastic
composite material layer the top surface of which is
so pressed and finished by means of a roller means and
5 the like as to be flush with the track surface of the
pavement layer of the roads and the bridges.

As described above, the seamless expansion joint
of the present invention is formed as a whole.

The seamless expansion joint of the present inven-
10 tion has the following effects:

In the seamless expansion joint of the present invention:

(1) The elastomeric layer excellent in deformability,
which is interposed between the visco-elastic composite
layer and the subgrades of the roads and bridges, makes
15 the expansions of the subgrades possible;

(2) Since the visco-elastic composite material layer
is insulated from the subgrades through the elastomeric
layer while adhesively secured to the two adjacent spaced
apart side sections of the pavement layers overlaid upon
20 the subgrades, a sufficient expansions of the subgrades
are permitted by the entire length of the visco-elastic
composite material layer;

(3) Since the visco-elastic composite material layer
is insulated from the subgrades of the roads and bridges
25 through the elastomeric layer excellent in deformability,

1 local concentrations of stresses are prevented from occurring in the expansion joint so that the pavement layer is prevented from cracking in its entire track surface; and

5 (4) Since the expansion joint of the present invention is a seamless type joint, it is possible to keep smooth ridability of the vehicles traveling thereon and to reduce a level of noise produced by the vehicle traveling thereon.

The Claims defining the invention are as follows:

1. In an expansion joint for roads and bridges, comprising: a cover member spanning an expansion joint gap defined between two adjacent spaced apart side sections of pavement layers overlaid upon subgrades of the roads and bridges; and a visco-elastic composite material layer so filled in said expansion joint gap on said cover member as to be flush with the track surface of the roads and bridges; the improvement wherein:

an elastomeric layer excellent in deformability is overlaid upon upper surfaces of said subgrades and an upper surface of said cover member, while overlaid with said visco-elastic composite material layer.

2. The expansion joint as set forth in claim 1, wherein:

said elastomeric layer is made of polybutadiene rubbers.

3. The expansion joint as set forth in claim 1, wherein:

said elastomeric layer is made of silicone rubbers.

4. An expansion joint for roads and bridges, substantially as herein described with reference to the drawing.

DATED this 5th day of December, 1988.

SHO-BOND CONSTRUCTION CO.,
LIMITED
By Its Patent Attorneys
ARTHUR S. CAVE & CO.

FIG. 1

