CLAIMS:

Claim 1

A welded member comprising:

a first hot dip Zn-based alloy coated steel sheet;

a second hot dip Zn-based alloy coated steel sheet stacked on and arc-welded to a first sheet surface of the first hot dip Zn-based alloy coated steel sheet; and

a weld bead that is provided on the first sheet surface such that the first hot dip Zn-based alloy coated steel sheet and the second hot dip Zn-based alloy coated steel sheet are welded together by the weld bead,

each of the first hot dip Zn-based alloy coated steel sheet and the second hot dip Zn-based alloy coated steel sheet having a coating weight of 15 g/m^2 to 250 g/m^2 per surface,

the weld bead being formed such that a cross-sectional width W satisfies a formula (1) below and a blowhole occupancy Br represented by a formula (2) below becomes not more than 50%, the cross-sectional width W being a width of a cross section from one boundary between a Zn-based coating layer and the weld bead to the other boundary between the Zn-based coating layer and the weld bead on the first sheet surface, and the cross section being obtained by cutting the weld bead by a plane orthogonal to a direction in which the weld bead extends,

the weld bead having at least two protrusion parts each of which protrudes into the first hot dip Zn-based alloy coated steel sheet in the cross section,

a protruding length of each of the at least two protrusion parts in the first hot dip Zn-based alloy coated steel sheet being not less than 0.2 mm, and the protruding length being not greater than a thickness of the first hot dip Zn-based alloy coated steel sheet,

$$2T \leq W \leq 6T \cdots (1)$$

$$Br = (\Sigma di/L) \times 100 \cdots (2)$$

where:

T represents a thickness of any of the first hot dip Zn-based alloy coated steel sheet and the second hot dip Zn-based alloy coated steel sheet and, in a case where a thickness of the first hot dip Zn-based alloy coated steel sheet is different from a thickness of the second hot dip Zn-based alloy coated steel sheet, T represents a smaller one of the thickness of the first hot dip Zn-based alloy coated steel sheet and the thickness of the second hot dip Zn-based alloy coated steel sheet;

di represents a length of an i-th blowhole observed in X-ray radiography; and

L represents a length of the weld bead.

Claim 2

The welded member as set forth in claim 1, wherein:

the Zn-based coating layer of each of the first hot dip Zn-based alloy coated steel sheet and the second hot dip Zn-based alloy coated steel sheet contains Zn as a main component, the Zn-based coating layer containing Al in an amount of not less than 1.0% by mass and not more

than 22.0% by mass.

Claim 3

The welded member as set forth in claim 2, wherein:

the Zn-based coating layer of each of the first hot dip Zn-based alloy coated steel sheet and the second hot dip Zn-based alloy coated steel sheet contains Mg in an amount of not less than 0.05% by mass and not more than 10.0% by mass.

Claim 4

The welded member as set forth in claim 3, wherein:

a composition of the Zn-based coating layer of each of the first hot dip Zn-based alloy coated steel sheet and the second hot dip Zn-based alloy coated steel sheet satisfies one or more conditions selected from the group consisting of: Ti: 0.002% by mass to 0.1% by mass, B: 0.001% by mass to 0.05% by mass, Si: 0% by mass to 2.0% by mass, and Fe: 0% by mass to 2.5% by mass.

Claim 5

A method for manufacturing a welded member by a pulsed arc welding process in which a second hot dip Zn-based alloy coated steel sheet that is stacked on a first sheet surface of a first hot dip Zn-based alloy coated steel sheet is arc-welded to the first hot dip Zn-based alloy coated steel sheet with an arc generated by alternately supplying a peak

current and a base current, said method comprising:

a welding step of forming a weld bead on the first sheet surface such that the first hot dip Zn-based alloy coated steel sheet and the second hot dip Zn-based alloy coated steel sheet are welded together by the weld bead,

each of the first hot dip Zn-based alloy coated steel sheet and the second hot dip Zn-based alloy coated steel sheet having a coating weight of 15 g/m^2 to 250 g/m^2 per surface,

in the welding step, the pulsed arc welding process being carried out by using, as a shielding gas, an Ar-CO_2 gas whose CO_2 concentration is not less than 5% by volume and not more than 20% by volume,

in the welding step,

(i) the weld bead being formed such that a cross-sectional width W satisfies a formula (1) below, the cross-sectional width W being a width of a cross section from one boundary between a Zn-based coating layer and the weld bead to the other boundary between the Zn-based coating layer and the weld bead on the first sheet surface, and the cross section being obtained by cutting the weld bead by a plane orthogonal to a direction in which the weld bead extends,

(ii) the arc welding being carried out such that a blowhole occupancy Br represented by a formula (2) below becomes not more than 50%, and

(iii) the weld bead being formed such that the weld bead has a protrusion part which protrudes into the first hot dip Zn-based alloy

coated steel sheet in the cross section, a protruding length of the protrusion part in the first hot dip Zn-based alloy coated steel sheet being not less than 0.2 mm, and the protruding length being not greater than a thickness of the first hot dip Zn-based alloy coated steel sheet,

$$2T \leq W \leq 6T \cdots (1)$$

$$Br = (\Sigma di/L) \times 100 \cdots (2)$$

where:

T represents a thickness of any of the first hot dip Zn-based alloy coated steel sheet and the second hot dip Zn-based alloy coated steel sheet and, in a case where a thickness of the first hot dip Zn-based alloy coated steel sheet is different from a thickness of the second hot dip Zn-based alloy coated steel sheet, T represents a smaller one of the thickness of the first hot dip Zn-based alloy coated steel sheet and the thickness of the second hot dip Zn-based alloy coated steel sheet;

di represents a length of an i-th blowhole observed in X-ray radiography; and

L represents a length of the weld bead.

Claim 6

The method as set forth in claim 5, wherein:

in the welding step, the weld bead being formed such that the weld bead has at least two protrusion parts in the cross section, each of the at least two protrusion parts being said protrusion part.

Claim 7

The method as set forth in claim 5 or 6, wherein:

the Zn-based coating layer of each of the first hot dip Zn-based alloy coated steel sheet and the second hot dip Zn-based alloy coated steel sheet contains Zn as a main component, the Zn-based coating layer containing Al in an amount of not less than 1.0% by mass and not more than 22.0% by mass.

Claim 8

The method as set forth in claim 7, wherein:

the Zn-based coating layer of each of the first hot dip Zn-based alloy coated steel sheet and the second hot dip Zn-based alloy coated steel sheet contains Mg in an amount of not less than 0.05% by mass and not more than 10.0% by mass.

Claim 9

The method as set forth in claim 8, wherein:

a composition of the Zn-based coating layer of each of the first hot dip Zn-based alloy coated steel sheet and the second hot dip Zn-based alloy coated steel sheet satisfies one or more conditions selected from the group consisting of: Ti: 0.002% by mass to 0.1% by mass, B: 0.001% by mass to 0.05% by mass, Si: 0% by mass to 2.0% by mass, and Fe: 0% by mass to 2.5% by mass.