COMBINED WALL PILING SYSTEM

Cross-Reference to Related Applications

[0001] This application is a non-provisional application which claims priority from U.S. provisional application number 62/748,074, filed October 19, 2018.

Technical Field/Field of the Disclosure

[0002] The present disclosure relates generally to construction piling, and specifically to king pilings for combined wall piling systems.

Background of the Disclosure

[0003] A pile or piling is a structural member that is driven into the ground in order to serve as a foundation for a structure or to reinforce land or earthworks. Sheet pilings have been used for earth retention and support of excavation projects. Sheet pilings may be used to stabilize the ground or provide a solid barrier wall. Traditional sheet pilings include interlocking sheets of steel that form a continuous wall once installed into the ground. Later sheet piling installations, known as combi-walls, incorporated H-beams interspersed between the sheets and interlocking thereto to increase strength and weight efficiency. Typically, the H-beams, also known as king piles, are coupled to the sheets with a metal interlock connector that is welded to the hot-rolled H-beam at each interlock between the H-beam and an adjacent sheet. However, each interlock connector runs the entire length of the H-beam, both adding weight to the H-beam and complexity to the fabrication of the king pile.

Summary

[0003a] In an aspect, the present disclosure refers to a king pile for a combined wall system

comprising: a first flange, the first flange having: a first flange body, the first flange body being a generally rectangular plate having a length and a width, the first flange body having a first edge, a second edge, and a face; a drop nose, the drop nose being an extension from the face of the first flange body that runs along the length of the first flange, the drop nose formed integrally with the first flange body such that the thickness of the first flange body is greater at a region of the first flange body aligned with the drop nose than a region of the first flange body that is not aligned with the drop nose; a first king pile interlock positioned at the first edge of the first flange body and formed integrally therewith; and a second king pile interlock positioned at the second edge of the first flange body and formed integrally therewith; a second flange, the second flange having a second flange body, the second flange body being a generally rectangular plate having a face; and a web, the web being a generally rectangular plate, the web coupled to the drop nose of the first flange body and the face of the second flange body.

[0003b] In another aspect, the present disclosure refers to a method of forming a king pile comprising: forming a first flange, wherein forming the first flange comprises: forming a first flange body, the first flange body being a generally rectangular plate having a length and a width, the first flange body having a first edge, a second edge, and a face; forming a first king pile interlock positioned at the first edge of the first flange body; forming a second king pile interlock positioned at the second edge of the first flange body; and forming a drop nose, the drop nose being an extension from the face of the first flange body that runs along the length of the first flange; the first flange formed such that the first king pile interlock, and second king pile interlock, and drop nose are formed integrally with the first flange body such that the thickness of the first flange body is greater at a region of the first flange body aligned with the drop nose than a region of the first flange body that is not aligned with the drop nose; providing a second

flange, the second flange having a second flange body, the second flange body being a generally rectangular plate having a face; providing a web, the web being a generally rectangular plate; coupling the web to the drop nose of the first flange body; and coupling the web to the face of the second flange body.

[0003c] In another aspect, the present disclosure refers to a combined wall system comprising: a king pile, the king pile including: a first flange, the first flange having: a first flange body, the first flange body being a generally rectangular plate having a length and a width, the first flange body having a first edge, a second edge, and a face; a drop nose, the drop nose being an extension from the face of the first flange body that runs along the length of the first flange, the drop nose formed integrally with the first flange body such that the thickness of the first flange body is greater at a region of the first flange body aligned with the drop nose than a region of the first flange body that is not aligned with the drop nose; a first king pile interlock positioned at the first edge of the first flange body and formed integrally therewith; and a second king pile interlock positioned at the second edge of the first flange body and formed integrally therewith; a second flange, the second flange having a second flange body, the second flange body being a generally rectangular plate having a face; and a web, the web being a generally rectangular plate, the web coupled to the drop nose of the first flange body and the face of the second flange body; and a sheet piling, the sheet piling including an interlock connector, the interlock connector coupled to the first king pile interlock.

[0004] In an example, the present disclosure provides for a king pile for a combined wall system. The king pile may include a first flange. The first flange may include a first flange body, the first flange body

being a generally rectangular plate having a length and a width. The first flange body may have a first edge, a second edge, and a face. The first flange may include a first king pile interlock positioned at the first edge of the first flange body and formed integrally therewith. The first flange may include a second king pile interlock positioned at the second edge of the first flange body and formed integrally therewith. The king pile may include a second flange. The second flange may have a second flange body, the second flange body being a generally rectangular plate having a face. The king pile may include a web. The web may be a generally rectangular plate. The web may be coupled to the face of the first flange body and the face of the second flange body.

[0005] In another example, the present disclosure also provides for a method of forming a king pile. The method may include forming a first flange. The first flange may include a first flange body, the first flange body being a generally rectangular plate having a length and a width. The first flange body may have a first edge, a second edge, and a face. The first flange may include a first king pile interlock positioned at the first edge of the first flange body. The first flange may include a second king pile interlock positioned at the second edge of the first flange body. the first flange formed such that the first king pile interlock and second king pile interlock are formed integrally with the first flange body. The method may include providing a second flange. The second flange may include a second flange body, the second flange body being a generally rectangular plate having a face. The method may include providing a web, the web being a generally rectangular plate. The method may include coupling the web to the face of the first flange body and coupling the web to the face of the second flange body.

[0006] In another example, the present disclosure also provides for a combined wall system.

The combined wall system may include a king pile. The king pile may include a first flange. The first flange may

Claims:

1. A king pile for a combined wall system comprising:

a first flange, the first flange having:

a first flange body, the first flange body being a generally rectangular plate having a length and a width, the first flange body having a first edge, a second edge, and a face;

a drop nose, the drop nose being an extension from the face of the first flange body that runs along the length of the first flange, the drop nose formed integrally with the first flange body such that the thickness of the first flange body is greater at a region of the first flange body aligned with the drop nose than a region of the first flange body that is not aligned with the drop nose;

a first king pile interlock positioned at the first edge of the first flange body and formed integrally therewith; and

a second king pile interlock positioned at the second edge of the first flange body and formed integrally therewith;

a second flange, the second flange having a second flange body, the second flange body being a generally rectangular plate having a face; and

a web, the web being a generally rectangular plate, the web coupled to the drop nose of the first flange body and the face of the second flange body.

2. The king pile of claim 1, wherein the web is coupled to the face of the first flange body and the face of the second flange body by welding.

3. The king pile of claim 1, wherein the web is coupled to the drop nose by welding.

4. The king pile of claim 1, wherein the first flange is formed by hot-rolling the first flange body such that the first and second king pile interlocks are formed integrally with the first flange body during the hot-rolling operation.

5. The king pile of claim 1, wherein the first and second king pile interlocks are male and female Larssen interlocks.

6. A method of forming a king pile comprising:

forming a first flange, wherein forming the first flange comprises:

forming a first flange body, the first flange body being a generally rectangular plate having a length and a width, the first flange body having a first edge, a second edge, and a face;

forming a first king pile interlock positioned at the first edge of the first flange body;

forming a second king pile interlock positioned at the second edge of the first flange body; and

forming a drop nose, the drop nose being an extension from the face of the first flange body that runs along the length of the first flange;

the first flange formed such that the first king pile interlock, second king pile interlock and drop nose are formed integrally with the first flange body such that the thickness of the first flange body is greater at a region of the first flange body aligned with the drop nose than a region of the first flange body that is not aligned with the drop nose;

providing a second flange, the second flange having a second flange body, the second flange body being a generally rectangular plate having a face;

providing a web, the web being a generally rectangular plate;

coupling the web to the drop nose of the first flange body; and

coupling the web to the face of the second flange body.

7. The method of claim 6, wherein coupling the web to the face of the first flange body comprises welding the web to the face of the first flange body, and wherein coupling the web to the face of the second flange body comprises welding the web to the face of the second flange body.

8. The method of claim 6, wherein coupling the web to the drop nose comprises welding the web to the drop nose.

9. The method of claim 6, wherein forming the first flange comprises hot-rolling such that the first and second king pile interlocks are formed integrally with the first flange body during the hot-rolling operation.

10. The method of claim 6, wherein the first and second king pile interlocks are male and female Larssen interlocks.

11. A combined wall system comprising:

a king pile, the king pile including:

a first flange, the first flange having:

a first flange body, the first flange body being a generally rectangular plate having a length and a width, the first flange body having a first edge, a second edge, and a face;

a drop nose, the drop nose being an extension from the face of the first flange body that runs along the length of the first flange, the drop nose formed integrally with the first flange body such that the thickness of the first flange body is greater at a region of the first flange body aligned with the drop nose than a region of the first flange body that is not aligned with the drop nose;

a first king pile interlock positioned at the first edge of the first flange body and formed integrally therewith; and

a second king pile interlock positioned at the second edge of the first flange body and formed integrally therewith;

a second flange, the second flange having a second flange body, the second flange body being a generally rectangular plate having a face; and

a web, the web being a generally rectangular plate, the web coupled to the drop nose of the first flange body and the face of the second flange body; and

a sheet piling, the sheet piling including an interlock connector, the interlock connector coupled to the first king pile interlock.

12. The combined wall system of claim 11, wherein the web is coupled to the face of the first flange body and the face of the second flange body by welding.

13. The combined wall system of claim 11, wherein the web is coupled to the drop nose by welding.

14. The combined wall system of claim 11, wherein the first flange is formed by hot-rolling the first flange body such that the first and second king pile interlocks are formed integrally with the first flange body during the hot-rolling operation.

15. The combined wall system of claim 11, wherein the first king pile interlock and the interlock connector are male and female Larssen interlocks.

16. The king pile of claim 1, wherein the second flange further comprises:

a second drop nose, the drop nose being an extension from the face of the second flange body that runs along the length of the second flange, the second drop nose formed integrally with the second flange body;

a third king pile interlock positioned at a first edge of the second flange body and formed integrally therewith; and

a fourth king pile interlock positioned at a second edge of the second flange body and formed integrally therewith.

17. The method of claim 6, wherein providing a second flange further comprises:

forming the second flange body;

forming a third king pile interlock positioned at a first edge of the second flange body;

forming a fourth king pile interlock positioned at a second edge of the second flange body;

forming a second drop nose, the second drop nose being an extension from the face of the second flange body that runs along the length of the second flange;

the second flange formed such that the first king pile interlock, second king pile interlock, and drop nose are formed integrally with the second flange body; and

wherein coupling the web to the face of the second flange body comprises coupling the web to the second drop nose of the second flange.

18. The combined wall system of claim 11, wherein the second flange further comprises:

a second drop nose, the drop nose being an extension from the face of the second flange body that runs along the length of the second flange, the second drop nose formed integrally with the second flange body;

a third king pile interlock positioned at a first edge of the second flange body and formed integrally therewith; and

a fourth king pile interlock positioned at a second edge of the second flange body and formed integrally therewith.

19. The combined wall system of claim 18, further comprising:

a second king pile, the second king pile including:

a third flange, the third flange having:

a third flange body, the third flange body being a generally rectangular plate having a length and a width;

a third drop nose, the third drop nose being an extension from the face of the third flange body that runs along the length of the third flange, the third drop nose formed integrally with the third flange body;

a fifth king pile interlock positioned at a first edge of the third flange body and formed integrally therewith; and

a sixth king pile interlock positioned at a second edge of the third flange body and formed integrally therewith;

a fourth flange, the fourth flange having:

a fourth flange body, the fourth flange body being a generally rectangular plate having a length and a width;

a fourth drop nose, the fourth drop nose being an extension from the face of the fourth flange body that runs along the length of the fourth flange, the fourth drop nose formed integrally with the fourth flange body;

a seventh king pile interlock positioned at a first edge of the fourth flange body and formed integrally therewith; and

an eighth king pile interlock positioned at a second edge of the fourth flange body and formed integrally therewith; and

a second web, the second web being a generally rectangular plate, the second web coupled to the third drop nose of the third flange body and the fourth drop nose of fourth flange body;

wherein the second king pile interlock is coupled to the fifth king pile interlock and the fourth king pile interlock is coupled to the seventh king pile interlock.