CLAIMS

[Claim 1] A steel sheet pile comprising:

a chemical composition containing, in mass%,

C: 0.05 % to 0.18 %,

Si: 0.05 % to 0.55 %,

Mn: 1.00 % to 1.65 %,

sol.Al: 0.080 % or less,

V: 0.050 % to 0.300 %, and

N: 0.0010 % to 0.0060 %

with a balance consisting of Fe and inevitable impurities, where contents of P, S, and B as the inevitable impurities are P: 0.025 % or less, S: 0.020 % or less, and B: 0.0003 % or less respectively;

a microstructure of a web that is a ferrite-based microstructure having an area ratio of 70 % or more and in which an average grain size of ferrite is 15 μm or less, a maximum grain size of ferrite is 40 μm or less, and an area ratio of martensite-austenite constituents with respect to the microstructure is 1.0 % or less;

a yield stress of the web of 440 MPa or more; and

vTrs of the web of -10 °C or less.

[Claim 2] The steel sheet pile according to claim 1, wherein the chemical composition further contains, in mass%, one or more selected from the group consisting of

Cu: 0.50 % or less,

Ni: 0.50 % or less,

Cr: 0.50 % or less,

Mo: 0.30 % or less,

Ca: 0.0050 % or less,

Nb: 0.005 % or less,

Ti: 0.025 % or less, and

REM: 0.005 % or less.

[Claim 3] A production method for a steel sheet pile having: a microstructure of a web that is a ferrite-based microstructure having an area ratio of ferrite of 70% or more and in which an average grain size of ferrite is

15 μm or less, a maximum grain size of ferrite is 40 μm or less, and an area ratio of martensite-austenite constituents with respect to the microstructure is 1.0 % or less; a yield stress of the web of 440 MPa or more; and vTrs of the web of -10 °C or less, the production method comprising:

heating a steel material to 1200 °C to 1350 °C, the steel material having a chemical composition containing, in mass%,

C: 0.05 % to 0.18 %,

Si: 0.05 % to 0.55 %,

Mn: 1.00 % to 1.65 %,

sol.Al: 0.080 % or less,

V: 0.050 % to 0.300 %, and

N: 0.0010 % to 0.0060 %

with a balance consisting of Fe and inevitable impurities, where contents of P, S, and B as the inevitable impurities are P: 0.025 % or less, S: 0.020 % or less, and B: 0.0003 % or less respectively; and

subjecting the steel material to hot rolling in which an average rolling reduction ratio per pass in a range of 900 °C to 1150 °C is 10 % or more, an cumulative rolling reduction ratio in a range of 800 °C to 1150 °C is 60 % or more, and a finish temperature of intermediate rolling is 650 °C to 900 °C.

[Claim 4] The production method for a steel sheet pile according to claim 3, wherein the chemical composition further contains, in mass%, one or more selected from the group consisting of

Cu: 0.50 % or less,

Ni: 0.50 % or less,

Cr: 0.50 % or less,

Mo: 0.30 % or less,

Ca: 0.0050 % or less,

Nb: 0.005 % or less,

Ti: 0.025 % or less, and

REM: 0.005 % or less.