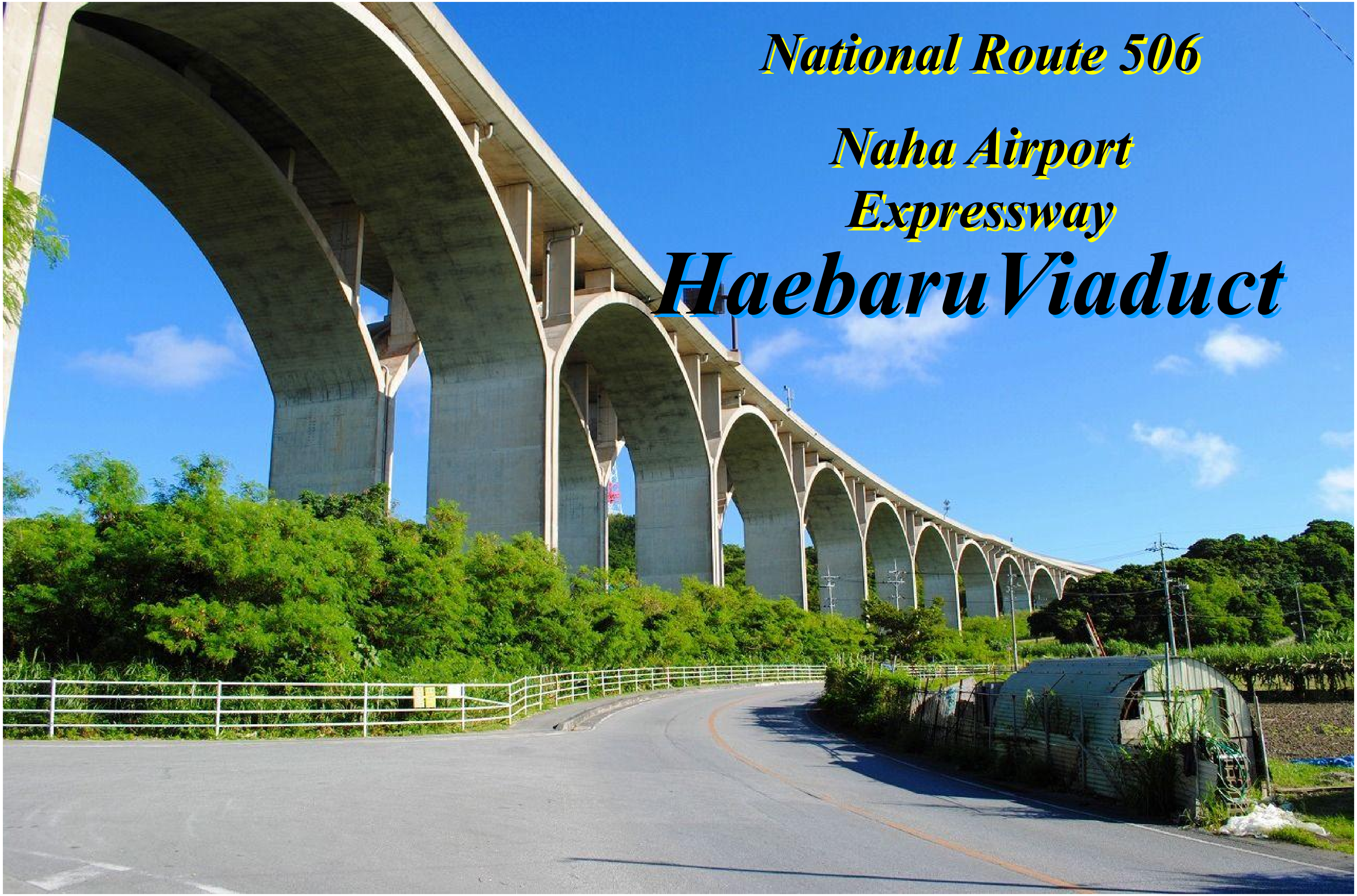
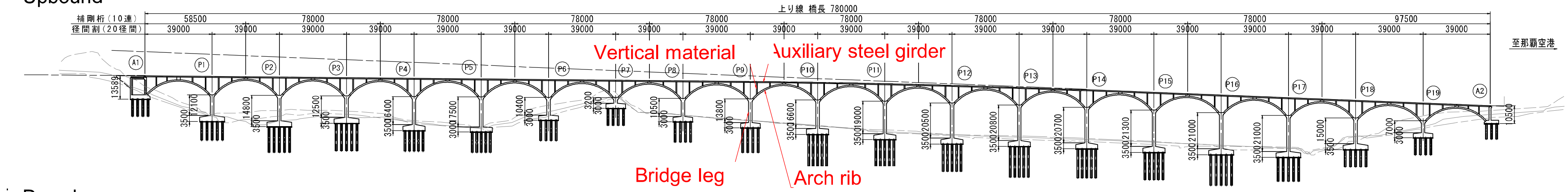

National Route 506
Naha Airport
Expressway
HaebaruViaduct

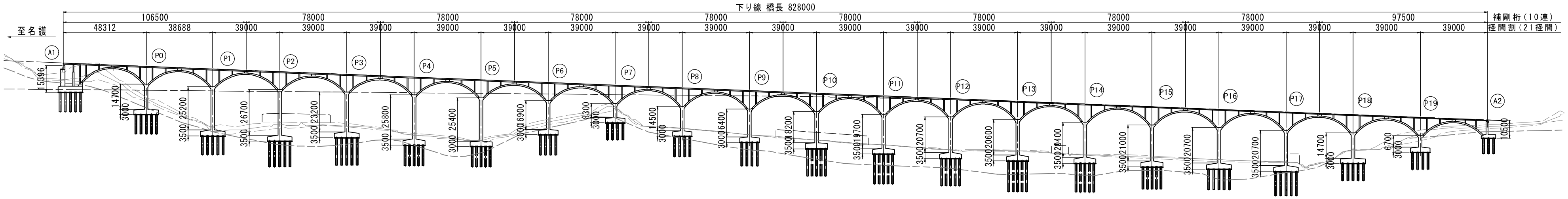
① Bridge location

② Structual overview

Upbound

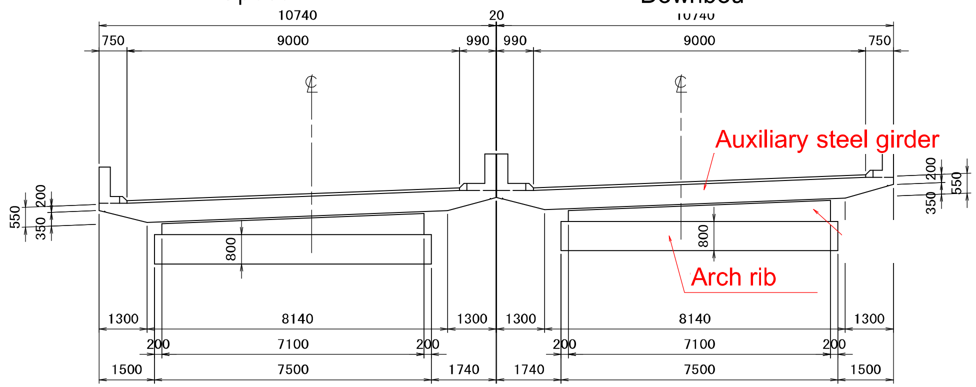


Downbou



Standard cross-sectional drawing of superstructure

Upbound Downbou



【Structure Overview】

・Bridge type: RC multi-diameter continuous balanced arch bridge

・Upbound: Bridge length 780m, 20 spans,

・Downbound: Bridge length 828m, 21 diameter spans

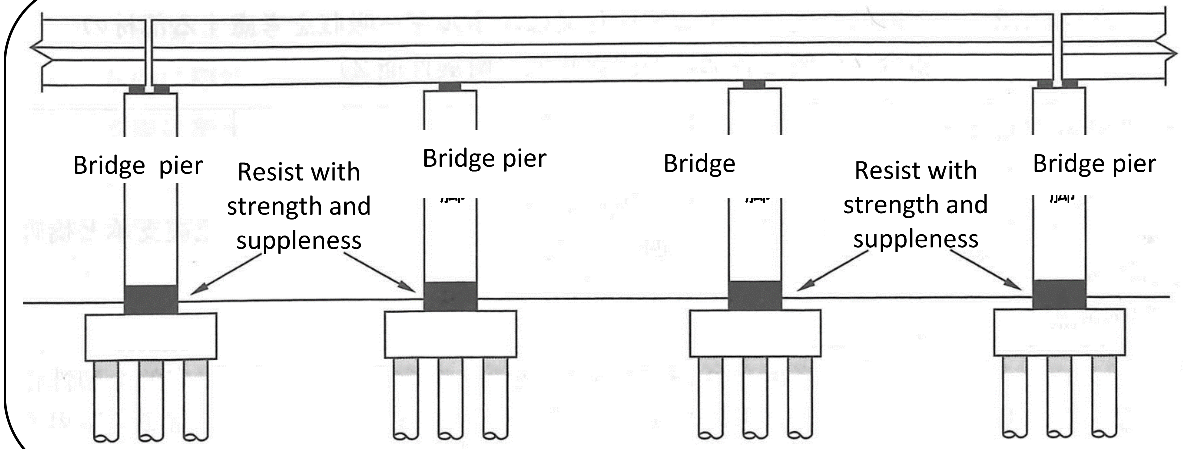
➔ The largest balanced arch format in Japan

・The bridge is composed of rigid girders (floor slabs), vertical members, arch ribs, and piers. The arch ribs are continuous in all.

[Necessity of seismic reinforcement]

・The original design was designed to take into account only medium-sized earthquakes. However, large-scale earthquakes such as the Southern Hyogo Prefecture Earthquake led to a review of the seismic design, and seismic reinforcement against large-scale earthquakes considered by current standards became necessary.

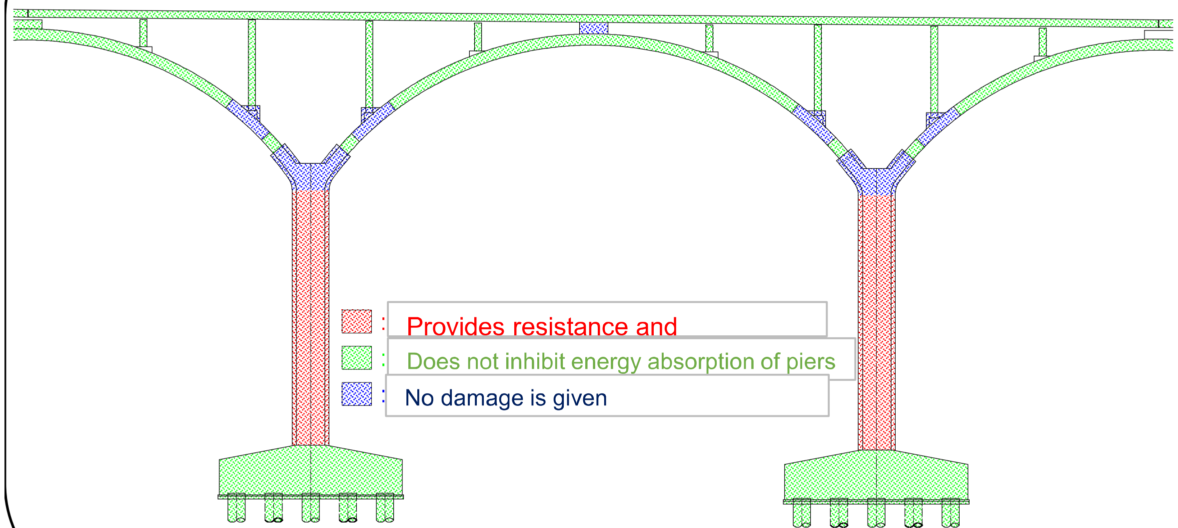
③ Seismic reinforcement overview



[Seismic design of general bridges]

・Dealing with seismic forces with large strength by increasing the bearing capacity of bridges will result in an unreasonable structure and cost.

・For this reason, the bridge piers are designed to absorb the energy of an earthquake by giving them "flexibility" rather than resisting only by bearing capacity.



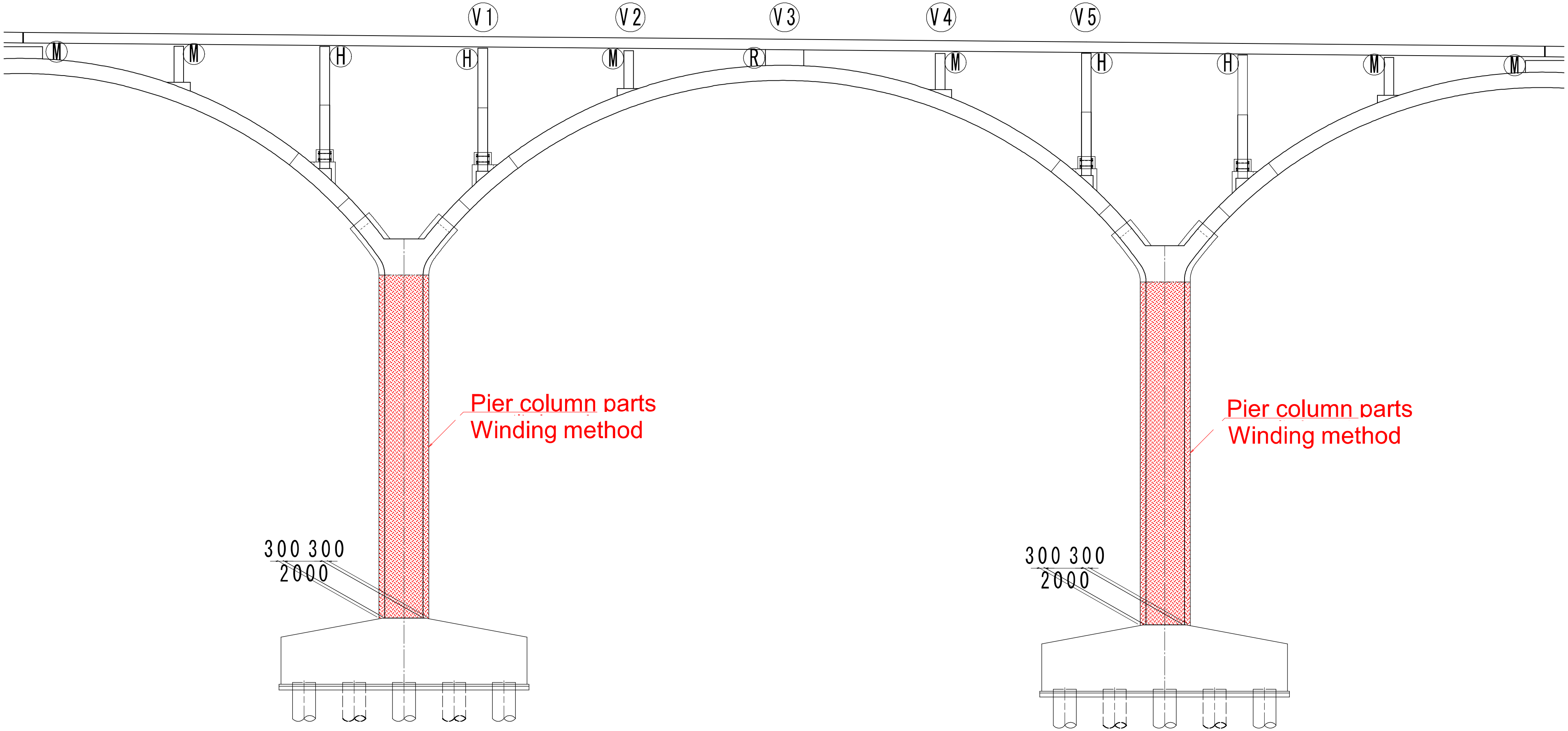
[Seismic reinforcement of this bridge]

・As with ordinary bridges, piers should be reinforced to provide strength and "flexibility" to absorb seismic energy.

・Other members, such as arch ribs and vertical materials, should be reinforced so that they do not interfere with the energy absorption of the piers.

・Reinforce the joints between members so that they will not be damaged.

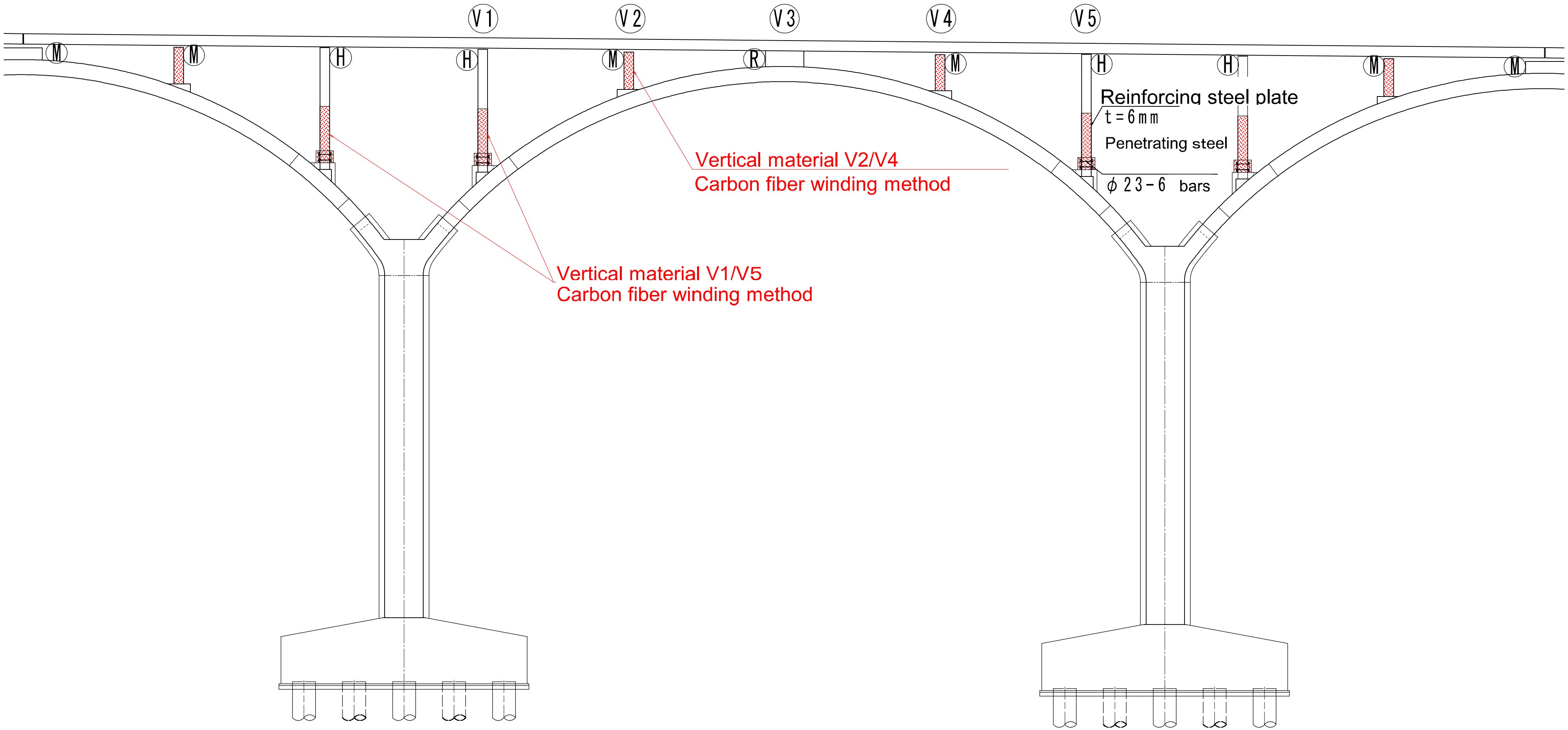
④ Specific features of seismic reinforcement [① Bridge pier]



① Bridge piers

As with general bridges, the piers were reinforced using the RC winding method to give them strength and suppleness so that they could absorb the energy of earthquakes.

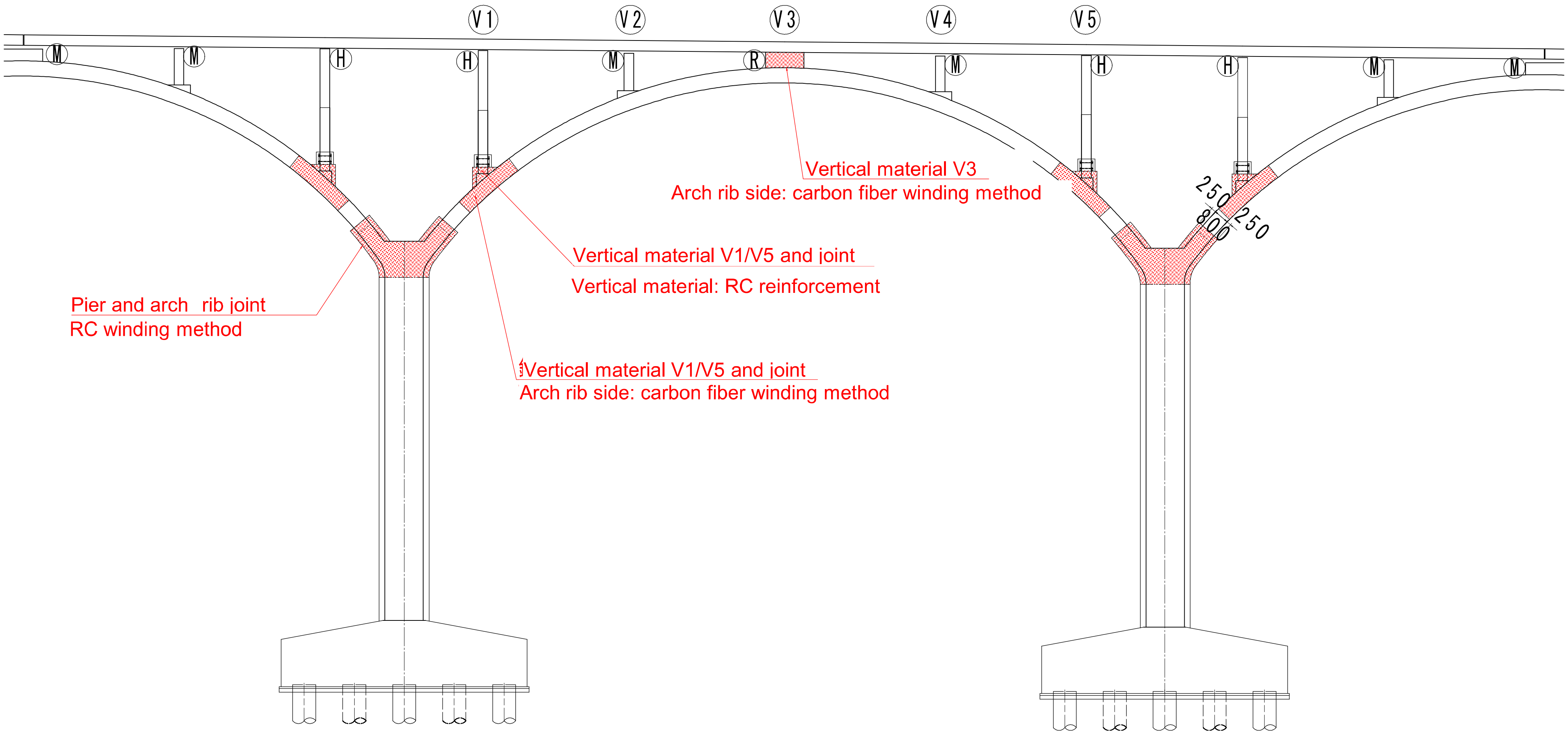
④ Specific features of seismic reinforcement [② Other components]



② Other materials

In order to fully demonstrate the suppleness of the piers, the other components were reinforced using the steel plate winding method and the carbon fiber winding method.

④ Specific features of seismic reinforcement [③ Joints]



③Joints

If the joints that connect the members are damaged, it will be meaningless to reinforce the piers and other members, so the joints were reinforced by the RC winding method and the carbon fiber winding method to make them the strongest.

⑤ Condition after seismic reinforcement (P8-P10 up line)