

(A)

## Specification for Bridge Materials.

(Attached to the Contract No. ....)

Imperial Government Railways of Japan, December, 1901.

### Steel.

The steel shall be of the Siemens-Martin or open hearth process and be of mild and tough quality.

The steel must be uniform in character for each specified kind. The bars and plates must be free from cracks on the faces or corners and have a clean, smooth finish.

The steel when tested shall have an ultimate strength of 60,000 to 68,000 lbs. square inch, an elastic limit of not less than one half of the ultimate strength, and a minimum elongation of 22 per cent in the original length of 8 inches.

Before or after heating to a low cherry red and cooling in water at 82 degrees Fah., this steel must stand bending to a curve whose inner radius is one and a half times the thickness of the sample without cracking.

Several of the rolled I beams will also be tested with such distributed load as the Inspector or Consulting Engineer shall direct.

Rivet steel shall have an ultimate strength of 50,000 to 58,000 lbs. per square inch and an elongation of 26 per cent.

Before or after heating to a light yellow heat and quenching in cold water, this steel must stand closing solidly together without any sign of fracture.

### Wrought Iron.

The wrought iron must be tough, ductile, fibrous and uniform in character.

The bars and plates must be free from injurious seams, blisters, buckles, cinder spots, or imperfect edges, and have a clean smooth finish.

The test pieces must stand a minimum test of 47,000 lbs. tenacity per square inch measured on the original area of section before contraction, and shall have an elastic limit of not less than one half of the ultimate strength and a minimum elongation of 12 per cent. in the original length of 8 inches.

Bending test shall be made as may be directed by the Inspector or Consulting Engineer, if he deems it necessary.

Variation in cross section of rolled materials of more than  $2\frac{1}{2}$  per cent. from that specified may be cause for rejection.

Each piece must be well and efficiently coated with oil paint to protect it from corrosion during voyage to Japan. Coating must not be applied, before inspection has been made by the Inspector or Consulting Engineer.

N.B.—The Inspector or Consulting Engineer is to be appointed by the Japanese Government.