

## MATERIALS.

**Materials.** Except where otherwise specified, all the materials used under this Contract shall be of the following kinds and descriptions:—

**Concrete.** 12. Concrete shall be composed of three parts, by measure, of broken stone, two parts of sharp sand, and one part of fresh Portland cement, or two parts of broken stone, two parts of gravel, and one part of sand. The stone may consist of blue stone, schist, or hard limestone, broken to  $2\frac{1}{2}$ -inch gauge. The cement shall be of approved brands, and subject to such tests as the Engineer may from time to time direct.

The concrete shall be laid in 12-inch layers, and well rammed as the work progresses.

**Masonry.** Except at the tunnel fronts, all the masonry on this contract shall be rubble laid in cement or lime mortar, and binded with stones 2 feet long for every superficial yard of face. The stones shall in all cases be laid on their largest bed, which must be at least one-and-a-half times greater than the side. If required by the Engineer, the work is to be levelled every 12 or 18 inches, and well grouted. The stone used shall be sound blue stone, schist, lime stone, or other building stone of equal quality.

**Cement mortar.** Cement mortar shall consist of three parts, by measurement, of sharp clean sand to one part of Portland cement.

**Lime mortar.** Lime mortar shall consist of two parts of sharp clean sand to one part of the best Kakanui Peninsula or Waihola lime, mixed and prepared as may be directed.

**Timber.** All timber in the floor beams and rails strings of bridges must be of black birch or other approved timber. Level crossings and cattle-stops must be of matai or totara, and all other timber work, when not otherwise specified, must be of totara or other timber specially approved. It shall all be heart wood, except as shown on Drawing No. 11, and shall be straight, sound, and free from knots and other imperfections.

**Brickwork.** Bricks shall be of the best quality of hard-burned kiln bricks, and approved by the Engineer.

**Malleable iron.** The whole of the straps and bolts shall be made of BB Crown iron, or other iron of equal quality, of the dimensions shown; the whole to be finished and fixed in a workmanlike manner. The plate-iron in the girders shall be of the best quality, capable of bearing, without injury, a tensile strain of twenty-two tons per square inch.

**Bolts and nuts.** Except in joints of cylinders, all bolts shown or specified shall have a square head, of which the thickness shall be equal to the diameter of the bolt, and the width twice the diameter of the bolt; they are to be tapped with a good clean thread, and shall have a nut equal in size to the head of the bolt, and shall be provided with one or more washers, 3 inches diameter.

**Cast iron.** All castings must be true and exact to shape, and free from air holes and other defects.

**Painting.** All plate and cast iron shall, before shipment, receive one coat of boiled linseed oil laid on hot, and one coat of red lead. In addition to the above, all iron work is to receive in New Zealand two coats of paint, the last to be dark grey colour.

## LEVEL CROSSINGS.

**Level crossings.** 13. Four first and twenty-five second class crossings, with two cattle stops to each crossing, as per Drawing No. 9, shall be constructed at public and private roads where directed. They shall be carefully placed as to line and levels, and finished in strict conformity with the drawing and the notes thereon.

**Metalling.** Each level crossing shall be metalled for a length of 33 feet on each side of the centre line, as above specified for the roads, and tile or timber box drains shall be put in the formation ditches where necessary for the drainage of the line or road.

**Gates.** Fifty pairs of malleable iron tubular or other approved gates, 12 feet wide, hung to strong posts, and furnished with bolts and padlocks, shall be provided and hung at private crossings where directed.