at the top by 10 lines of 12-in. by 14-in. stringers, and the lower sills were 12 in. square. The cross braces were 8 by 10 in. and 6 by 12 in. The vertical standards or posts rested on sills, and under each one also at its base was a timber foundation 4 ft. square. Two travelling gantry towers, 22 ft. by 25 ft. and 40 ft. high, mounted on double-flanged wheels, ran on rails at the top of the falsework and carried long derrick booms fitted with pulleys for raising the materials necessary for the bridge. Beside the cranes they carried cars with the power plant, gasoline tank, water tanks and air compressor and apparatus for the pneumatic riveting hammers.

“ Elevated platforms ” are generally used in conducting building operations in towns where the importance of the traffic renders it necessary to keep the footway clear. They consist of two sets of standards, sill and head, one set being erected close to the building and the other about 8 or 10 ft. away. These stages are formed of square timber, framed and braced in a similar manner to gantries designed to support a traveller, but, instead of external shores or braces the uprights are braced across to each other, care being taken to fix the braces at such a height as to allow free passage beneath them. Joists are placed across from head to head, and a double layer of scaffold boards is laid to form the floor, the double thickness being necessary to prevent materials dropping through the joints upon the heads of passers-by. When the gantry abuts on the road, a heavy timber fender splayed at each end should be placed so as to ward off the traffic. Sometimes the scaffold is carried up several stages in this way and is then called “ staging,” but more often the gantry consists of only one stage and forms the foundation upon which light pole or other scaffolding is erected. At the level of the platform a fanguard is often thrown out for a distance of about 6 ft. or more and closely boarded to protect the public from falling materials and the workmen from accident.

Derrick “ gantries ” or “ towers ” (fig. 3) are skeleton towers of timber erected in a central position on a site to support a platform at such a height as to enable an electric or steam power derrick crane placed upon it to clear the highest portions of the building. The crane revolves upon a base through nearly three parts of the circum- ference of a circle, and in addition to this the jib of the crane is capable of an “ up and down ” motion which enables it to command any spot within a radius of three-quarters of the length of the jib. For a single crane, a derrick tower with three legs is built, and the crane is placed over one of these, stayed back to the other two and then counterbalanced by heavy weights. Each leg is usually from 6 ft. to 10 ft. square on plan, the “ king ” leg (that is, the leg supporting the crane) being larger than the “ queen ” legs. The three legs are placed from 20 to 30 ft. apart in the form of an equilateral or isosceles triangle. When two cranes are used, as is the case when important operations are to be conducted over the entire area of a circle, a four-legged square derrick tower is constructed, and a crane set upon a platform over each of two opposite legs. The ground upon which it is proposed to erect the towers must be well chosen for its solidity, and often requires to be well rammed. The foundation usually consists of a platform of 9-in. by 3-in. deals under each leg. The corner posts may be of three 9-in. by 3-in. deals bolted together, but those for the king leg may advantageously be larger. They are connected at every 8 or 10 ft. of their height by means of cross pieces or transoms from 9 by 3 in. to 9 by 6 in. in size, and each bay thus formed is filled in on all four sides with diagonal bracing of the same or slightly smaller timber. Up the centre of the king leg, from the bottom to the top, is carried an extra standard of timber to take the weight of the crane. It may be a balk of whole timber, 12 or 14 in. square, or may consist of deals bolted together up to 16 in. square. This central standard must be well braced and strutted from the four corners to prevent any

tendency to bending.

When the towers have reached the desired height the king leg is connected to each of the queen legs by a trussed girder, the two queen legs may be connected with each other either by a similar trussed girder or by a single balk of timber which can be supported by struts if the span is considerable. For the connecting girders a balk of timber reaching from king to queen legs is placed on each of the two topmost transoms, which may be from 4 to 8 ft. apart, the depth of the top bays often being modified to the required depth of the connecting beams. Upright struts are fixed at intervals of about

5 ft. between the two balks, which are also connected by long iron bolts and cross braces filled into each bay. The top balks project

6 or 10 ft. beyond the king leg and form the support for a working platform of deals. Struts are thrown out from the sides of the leg to support the ends of the balks. Upon the platform are laid two “ sleepers ” of balk timber extending from beneath the bed of the

crane and passing over the centre of each queen leg. The “ mast," a vertical member composed either of a single timber or two pieces strutted and braced, is erected upon the revolving crane bed, and the “ jib,” which is similar in construction to the mast, is attached to the base of the latter by a pivoted hinge. The jib is raised and lowered by a rope fixed near the end of the jib and running to the engine by way of a pulley wheel at the top of the mast. The rope or chain used for lifting the materials passes over a pulley at the end of the jib and thence to the winch over a pulley at the top of the mast. In the operation of lifting it is obvious that a great strain is put upon the mast and a considerable overturning force is exerted by the leverage of the weight lifted at the end of the jib. To counterbalance this, two timber “ stays ” or “ guys ” are taken from the mast head, one to the centre of each queen leg, and there secured. From these points two heavy chains are taken down the centre of

each queen leg and anchored to the platform at their bases, which are each loaded with a quantity of bricks, stone or other heavy material equal in weight to at least twice any load to be lifted by the crane. A coupling screw link should be provided in the length of each anchor chain so that it may be kept at a proper tension, for if allowed to get slack a sudden jerk might cause it to snap. The coupling screws should be placed in an accessible place near the ground, where they may easily be seen and tightened when necessary. The legs of the structure should be cross braced with each other, either by ties of steel bars with tightening screws, or, as is more usual, with scaffold-pole or squared timber-braces crossing each other at right angles and lashed or bolted to the framework.

In the case of a three-towered gantry it is necessary to ballast only the two queen legs. The weighting of the king leg, as is sometimes done, is quite unnecessary, and even injurious, for in soft or moder­ately hard ground the added weight combined with that of the crane engine and load may cause a serious settlement. With a square gantry having four legs, all four should be weighted, and in calculating