

CHAPTER NINE

Specification of Timberwork

THIS chapter is primarily concerned with the specifying of the large structural timbers used in the construction of jetties, wharves and similar structures, and of their associated labours. Civil engineering jobs do, on occasion, contain subsidiary items of timberwork, such as scumboards on sewage disposal works, wooden steps and footbridges. Some contracts include a small amount of building work, such as pumping stations which can incorporate a number of joinery items like windows and doors.

The type, form and extent of specification clauses relating to timberwork will accordingly vary considerably from job to job. Nevertheless, in all cases a logical sequence of items should be secured. For instance, with a timber wharf or jetty the following specification clause headings would probably be appropriate:

- (1) Quality of timber
- (2) Workmanship generally
- (3) Fender piles
- (4) Rubbing pieces
- (5) Walings and braces
- (6) Guardrails, decking, etc.
- (7) Tarring or creosoting
- (8) Bolts, etc.
- (9) Measurement
- (10) Equipment

Subsidiary carpentry items are best taken under appropriate headings covering the function of the timberwork, e.g. steps or footbridge.

Joinery work could be conveniently covered under the following headings:

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- (1) Quality of timber
- (2) Workmanship
- (3) Windows
- (4) Doors
- (5) Miscellaneous work
- (6) Painting

The typical joinery specification clauses will be kept as brief as possible, as this is essentially building work. A selection of typical timberwork specification clauses follows.

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TIMBERWORK IN WHARVES AND JETTIES

Quality of timber

The timber for fender piles, walings and braces shall be greenheart, rubbing pieces shall be of elm, and Columbian pine shall be used for all other timbers. Timbers in elm shall be creosoted under pressure to absorb 180 kg/m^3 (10 lb/ft^3), while all Columbian pine timbers shall absorb 125 kg/m^3 (7 lb/ft^3) of creosote.

All timber shall be of merchantable grade and shall be straight, sound, square cut and free from injuries, waney edges, decay, shakes, large and dead knots, insect attack and other serious defects. Any baulks of timber showing more than 15 per cent sapwood on one end section or more than 10 per cent on average of both end sections shall not be accepted.

All timbers shall be of the scantlings shown on the Drawings, with an allowance of 3 mm ($\frac{1}{8}$ in.) for each wrot face. The moisture content of timbers shall not exceed 22 per cent of the dry weight at time of use. Softwood shall, unless otherwise specified, comply with B.S. Code of Practice 112 (Table 1, Group 1)

The type and grade of timber required must be stated as precisely as possible. Timbers must be free from all defects which would impair their suitability for the function which they have to perform.

Adequate seasoning of timber can be ensured by specifying the maximum permissible moisture content.

Note the use of a British Standard and a Code of Practice: The Structural Use of Timber in Buildings to assist in ensuring the use of timbers of satisfactory quality.

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and the measurable characteristics and moisture content shall be assessed in accordance with B.S. 1860: Structural Timber: Measurement of Characteristics affecting Strength.

Workmanship generally

Fender piles shall each be in one piece and no joints will be permitted. Joints in walings and braces shall be properly scarfed for a minimum length of 450 mm (18 in.).

All labours on timbers shall be accurately executed and finished in a first-class manner. All tenons, mortices, scarves, rebates and other joints shall be accurately cut and well fitted together in accordance with the best class of workmanship with mild steel bolts, coachscrews, straps, nails, oak pins, wedges, etc., as shown on the Drawings or as directed by the Engineer.

Holes for bolts, etc., shall be accurately drilled in the required positions and be of the correct sizes to secure a tight fit. The holes shall be countersunk where shown to receive the heads of bolts, nuts, etc.

The final completed timber shall be in full accordance with the details shown on the Drawings, with wrought faces where required.

Prices shall include for any nails or screws required for fixing purposes and these shall comply with B.S. 1202 and B.S. 1210 respectively.

Fender piles

Fender piles shall be 300 mm × 300 mm (12 in. × 12 in.) in size and shall

These clauses are concerned primarily with the jointing of the structural members. Failure of a timber structure often results from poorly constructed joints. Load-bearing timbers are normally extended by means of scarfed joints, when the tapered ends of adjoining lengths of timber are bolted together. On occasions the lengthening of certain timbers, such as piles, is not permitted.

Intersections of main structural timbers in jetties and wharves, e.g. piles and walings, are almost invariably formed with bolted joints.

More detailed clauses covering timber piles are

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be driven not less than 3 m (10 ft) into the river bed. Twin fender piles shall be notched on adjoining surfaces to receive 150 mm × 100 mm (6 in. × 4 in.) teak shear pins, which shall be driven into position after the twin piles have been securely bolted together. Twin fender piles shall be driven as a single pile, 600 mm × 300 mm (24 in. × 12 in.) in size.

The tops of fender piles shall be cut off at the levels indicated on the Drawings. The fender piles to the wharf shall be tied back to the concrete structure with wrought iron straps and steel bolts. The 300 mm × 300 mm (12 in. × 12 in.) fender piles shall be fitted with cast iron shoes weighing not less than 12.5 kg (28 lb) each and the twin piles with shoes weighing not less than 70 kg (160 lb) each, inclusive of straps.

Rubbing pieces

Rubbing pieces shall be 300 mm × 150 mm (12 in. × 6 in.) in size and shall fit tightly against the fender piles, to which they shall be fixed vertically with ragged spikes. The top and bottom ends of rubbing pieces shall be bull-nosed.

Walings and braces

Walings shall be 300 mm × 300 mm (12 in. × 12 in.) in size, except the top waling to the wharf which shall be 300 mm × 150 mm (12 in. × 6 in.). Diagonal braces shall be 300 mm × 150 mm (12 in. × 6 in.) with bolted connections to walings and piles, and splay cut ends.

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given in Chapter VII. This clause is concerned with the provision of fender piles to protect the sides of jetties and wharves from the impact of vessels.

Twin piles are also included to extend the scope of the clause. Two 300 mm × 300 mm (12 in. × 12 in.) piles are bolted and pinned together, and driven as a single unit with an enlarged shoe at the base.

Rubbing pieces are spiked to the outer face of fender piles to protect the latter from damage. The spiking permits reasonably easy replacement.

This clause describes the various horizontal and diagonal members and also the packing and distance pieces, which complete the timber framework to the sides of wharves and jetties.

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Walings shall be fixed to the concrete structure with wrought iron plates and steel bolts as shown on the Drawings. All packing pieces and distance pieces shall be of Columbian pine creosoted under pressure as previously specified.

Guardrails

Construct guardrail of Columbian pine creosoted under pressure as previously specified. The top of the guardrail shall be 1.25 m (4 ft) above jetty deck level and shall consist of three rails, twice chamfered, 100 mm × 100 mm (4 in. × 4 in.) in size, halved and dowelled to 100 mm × 100 mm (4 in. × 4 in.) posts at 2 m (6 ft) centres. The posts and bottom rail shall be bolted to the jetty members with 15 mm ($\frac{1}{2}$ in.) diameter mild steel bolts as shown on the Drawings.

Constructional features of this type are best described complete in single items. Guardrails are more usually constructed of steel standards supporting tubular steel handrailing (see Chapter VIII for details) but a timber guardrail has been taken here to show the approach.

Jetty decking

The jetty decking shall be constructed of greenheart in 175 mm (7 in.) widths × 50 mm (2 in.) thick, with 15 mm ($\frac{1}{2}$ in.) gaps between the boards. The deck boards shall be spiked with 90 mm ($3\frac{1}{2}$ in.) nails to 150 mm × 75 mm (6 in. × 3 in.) greenheart bearers, spaced at 450 mm (18 in.) centres.

Gaps must be left between the deck boards to permit rain or sea water to pass between them instead of lying on the top surface of the boards and eventually rotting them away. The length of nails or brads is usually taken as the thickness of the boards + 40 mm ($1\frac{1}{2}$ in.).

Tarring

The beds of all intersecting timbers, scarf joints and cut ends of timbers shall have two coats of hot coal tar applied to them before the fastenings

The meeting surfaces of adjoining timbers and cut ends need to be treated with preservatives. Tar must be

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are secured. The whole of the timber-work on completion shall be cleaned down and painted with two substantial coats of hot coal tar. The coal tar shall comply with the requirements of B.S. 3051: Coal Tar Oil Types of Wood Preservatives.

Creosoting

All timbers shall be cleaned of mud and dirt and incised to assist penetration of creosote, and all labours shall be executed on the timber as far as practicable prior to creosoting. The timbers shall be creosoted under pressure in accordance with B.S. 913: Pressure Creosoting of Timber, and the creosote shall conform to B.S. 144: Coal Tar Creosote for the Preservation of Timber.

Bolts, nuts, etc.

All bolts shall have square heads and nuts and clean-cut Whitworth threads. Heads shall be solidly forged with the shanks of the bolts perfectly square to the axis of the bolt, and with the under sides of heads in a true plane to take an even bearing all over the steel washers, on which both the heads and nuts of every bolt shall be bedded. Every head and nut on the water face shall be countersunk and no portion of the shank shall come within 25 mm (1 in.) of the surface of the timber.

Plates shall be of the dimensions shown on the Drawings and shall be evenly bedded on timber or concrete throughout their entire area.

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applied hot and should comply with the appropriate British Standard.

This is an alternative to the application of hot coal tar. An essential difference is that the creosote is applied under pressure, whilst the tar treatment was specified as a brush application.

This clause specifies in detail the essential characteristics of the bolts to be used for fixing structural timbers. Note that heads and nuts of bolts must be kept back at least 25 mm (1 in.) from the water face of timbers. It is sometimes specified that the hole shall be filled with hard setting bitumen to render it watertight.

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Wrought iron for straps, etc., shall comply with B.S. 51, and certificates of quality and tests shall be submitted to the Engineer before any iron is used on the job.

Measurement

The measurement of structural timbers shall be taken as the net cubical contents of timber in the finished work actually completed in accordance with the Contract Documents. The prices for timberwork shall include for provision, cutting, shaping and moulding of the timber to the required shapes, sections and dimensions, drilling and counter-sinking for fixings, forming joints of all kinds, creosoting or tarring as specified, and erecting and fixing the timberwork complete in position. Timber prices shall also include all nails, screws, pins and wedges, but separate items will be taken for bolts, coachscrews, straps, etc.

Structural timbers are measured in cubic metres (previously cubic feet), including all labours and joints in accordance with the Standard Method of Measurement. It is difficult for the Contractor to assess the amount of labour involved in a cubic metre or cubic foot of timber. Bolts and metalwork generally are measured separately.

Equipment

(a) *Lighting installation.* The provisional sum of £800 (eight hundred pounds) is included in the Bill of Quantities for builder's work and attendance in connection with the installation of lighting standards, navigation lights and all necessary wiring. This sum shall be expended in whole or in part as the Engineer may direct, or may be deducted if not required.

A provisional sum may be included for the lighting installation if details of the work have not been prepared at the time of drafting the specification.

(b) *Rubber buffers to fender piles.* The prime cost sum of £9000 (nine thousand

In some cases rubber buffers are to be supplied by

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pounds) is provided in the Bill of Quantities for the supply of the following rubber buffers by a firm to be approved by the Engineer:

No. 130 Solid rubber buffers 250 mm (10 in.) in diameter × 250 mm (10 in.) long with a vulcanised rubber sleeve cast in.

No. 60 Ditto, 375 mm (15 in.) in diameter × 450 mm (18 in.) long, ditto.

The Contractor shall take delivery of the rubber buffers at site, and unload, get in, store and fix in the positions indicated on the Drawings.

(c) *Bollards.* The following prime cost sums are provided in the Bill of Quantities for the supply of coated bollards for the wharf, jetty and dolphins, complete with all necessary holding-down bolts, by a firm to be approved by the Engineer.

P.C. sum of £160 (one hundred and sixty pounds) for 8 no. bollards type X to wharf.

P.C. sum of £1200 (one thousand, two hundred pounds) for 12 no. bollards type Y to jetty.

P.C. sum of £200 (two hundred pounds) for 2 no. bollards type Z to dolphins.

The Contractor shall take delivery of the bollards at site, and shall unload, get in, store prior to fixing, transport, hoist, sling and lower into position, and fix true and level on the wharf, jetty and dolphins in the positions shown on the Drawings and in accordance with the manufacturer's instructions and, after fixing, shall fill the bollards solid with fine graded concrete (class B).

a nominated firm and the main contractor is instructed to fix them in the required positions. It is necessary to provide the Contractor with sufficient information to enable him to price the fixing work. The P.C. sum will be based on a quotation obtained from the supplier.

Further prime cost items are provided to cover the supply of three types of bollard by a nominated firm. The main contractor is required to fix the bollards and fill them with concrete after they have been fixed in the correct positions. In this case the Contractor will be able to obtain sufficient particulars of the bollards from the manufacturer's catalogue.

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(d) *Motorised capstans.* The prime cost sum of £9500 (nine thousand, five hundred pounds) is provided in the Bill of Quantities for 3 no. motorised capstans supplied, delivered and fixed on the wharf by a firm to be approved by the Engineer.

The Contractor shall allow for all necessary attendance upon the Sub-contractor and shall assist in unloading materials at site, and shall get in, transport on site, provide free storage accommodation and free use of plant, hoist and lower to required positions, perform all general builder's work, and provide all other facilities required by the specialist workmen fixing the motorised capstans.

(e) *Rescue chains.* The following prime cost sums are provided in the Bill of Quantities for rescue chains and fittings, each 2.5 m (8 ft) long, supplied and delivered to site, painted with two coats of bituminous paint, and fixed complete by a firm to be approved by the Engineer:

P.C. sum of £100 (one hundred pounds) for 5 no. rescue chains to wharf.

P.C. sum of £200 (two hundred pounds) for supply of 10 no. rescue chains to jetty.

The Contractor shall allow for all necessary attendance upon the Sub-contractor in a similar manner to that described for motorised capstans.

(f) *Mooring rings.* The prime cost sum of £85 (eighty five pounds) is provided in the Bill of Quantities for 12 no. mooring rings to the wharf, each consisting of a 100 mm (4 in.) diameter ring

With this example the nominated subcontractor both supplies and fixes the equipment. The main contractor has to allow in his price for ancillary functions such as handling materials on site and making storage and plant available.

As with the motorised capstans, the nominated subcontractor is both supplying and fixing the equipment, and the main contractor's responsibilities follow a similar pattern.

This is another example of a prime cost item covering the supply of equipment by a nominated firm and the fixing of the equipment, in this case

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bolt with a 100 mm × 100 mm × 5 mm (4 in. × 4 in. × $\frac{1}{4}$ in.) flat plate washer and nut, for fixing the ring bolt to a timber waling, and a 225 mm (9 in.) diameter loose ring.

These shall be supplied and delivered to the site, painted with two coats of bituminous paint, by a firm to be approved by the Engineer.

The Contractor shall take delivery of the mooring rings at site, unload, get in, store and subsequently fix to greenheart walings on the wharf in the positions shown on the Drawings.

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mooring rings, by the main contractor. The Contractor has to insert a price in the Bill of Quantities to cover all labour associated with handling and fixing of the rings.

SUBSIDIARY CARPENTRY ITEMS

Steps

Creosoted redwood steps, 1.25 m (4 ft) wide overall, shall be constructed where shown on the Drawings with 225 mm × 40 mm (9 in. × $1\frac{1}{2}$ in.) treads housed to 275 mm × 50 mm (11 in. × 2 in.) string boards housed and dowelled to 100 mm × 100 mm (4 in. × 4 in.) posts.

Short lengths of open timber steps are sometimes provided to give access to tanks, filters, etc.

Footbridge

A creosoted redwood footbridge shall be constructed across the brook in the position shown on the Drawings and shall be supported on concrete walls and foundations at each end, of the dimensions indicated on the Drawings.

Two stringers shall be used consisting of two 225 mm × 75 mm (9 in. × 3 in.) timbers 4.5 m (15 ft) long, spiked and bolted together and supported on and securely spiked to 200 mm × 75 mm

A small timber footbridge of stringers, bearer blocks, boards, handrail and upright supports, is described in a single comprehensive item. The dimensions of all the timbers are stated, together with their method of fixing.

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(8 in. × 3 in.) hardwood bearer blocks 450 mm (18 in.) long, bolted to concrete walls.

The footwalk shall consist of 150 mm × 50 mm (6 in. × 2 in.) boards 1.25 m (4 ft) long, with 25 mm (1 in.) spaces between them, nailed to stringers, together with 75 mm (3 in.) diameter half-round handrails, each supported on three 75 mm × 75 mm (3 in. × 3 in.) posts fixed to stringers with coach bolts.

Scumboards to sewage works

Scumboards shall be constructed of creosoted redwood 300 mm × 40 mm (12 in. × 1½ in.), formed of two 150 mm × 40 mm (6 in. × 1½ in.) boards, close cramped and connected by 100 mm × 40 mm (4 in. × 1½ in.) cross battens, 300 mm (12 in.) long, at 1 m (3 ft) centres, each bolted on with two 15 mm (½ in.) diameter galvanised mild steel bolts 100 mm (4 in.) long, with nuts and washers.

Scumboards are invariably provided to settling, storm-water and humus tanks on sewage disposal works. Timber is, however, gradually being displaced by asbestos cement and fibre glass.

JOINERY

Quality of timber

The softwood for joinery shall be unsorted joinery quality Scandinavian redwood complying with B.S. 1186, Part I and amendments.

B.S. 1186, Part I: Quality of Timber in Joinery, covers such matters as moisture content, straightness of grain, sapwood, checks, splits, shakes and knots. It is accordingly unnecessary to detail the requirements in connection with these defects.

Quality of workmanship

The quality of joiner's workmanship shall comply with B.S. 1186, Part 2.

The thicknesses specified for joiner's wrought timbers are, unless otherwise specified, prior to planing and 3 mm ($\frac{3}{8}$ in.) will be allowed from the thickness stated for each wrought face.

All joinery shall be wrought on all faces and finished off by hand with glass paper, with slightly rounded arrises. All doors and other framed work shall be put together immediately on commencement of the general work, but shall not be glued or wedged up until joinery is prepared in readiness for fixing.

The word 'framed' as applied to woodwork is to be understood as including all the best known methods of joining woodwork together by mortice and tenon, draw-pinning with hardwood pins, or other method. The backs of door frames, skirtings and other similar items of joinery shall be painted with one coat of wood primer before fixing. This priming shall be performed on the site but not before the Engineer has approved the joinery, and the prices for the respective items of joinery shall include for this priming.

Clinker concrete fixing bricks shall be used wherever possible for fixing timber frames, etc.; otherwise they shall be securely plugged to walls or fixed to proper grounds where required.

The prices of all joinery work are to include for nails and screws for fixing, complying with B.S. 1202 and B.S. 1210 respectively.

Any joiner's work which shall split,

B.S. 1186, Part 2: Quality of Workmanship in Joinery, describes in detail the method of making the various joints in joinery work and of constructing the moving parts of windows, doors and drawers.

Specification clauses of workmanship should include allowances for planed surfaces, moulded edges, framing, priming non-accessible surfaces, fixing of joinery, and defects.

Joinery specifications vary considerably in practice in their scope and contents, but the attached specification clauses should form a useful guide.

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fracture, shrink, part in the joints, or show flaws or other defects due to unsoundness, inadequate seasoning or bad workmanship, shall be removed and replaced with sound material at the Contractor's expense.

Windows

Wood casements shall be Messrs X type J with built up sill of a 65 mm × 40 mm (2½ in. × 1½ in.) weathered and throated member tongued to a 70 mm × 70 mm (2¾ in. × 2¾ in.) member. Each window frame shall be fixed with 4 no. wrought iron cramps, 40 mm × 3 mm × 300 mm girth (1½ in. × ⅜ in. × 12 in. girth), built into the brickwork, and the frames shall be bedded in cement mortar and sealed all round in mastic.

All glass shall be ordinary glazing quality clear sheet glass in accordance with B.S. 952 and be free from waves, specks, disfigurements or blemishes of any kind. Putty for glazing in wood frames shall conform to B.S. 544.

All glass shall be accurately cut and fitted into the rebates and shall be well sprigged, puttied and back puttied, and neatly trimmed off to the depth of the rebate. All rebates shall be primed before glazing. Glass in panes not exceeding 1 m² (8 ft²) shall be 7 kg/m² (24 oz) glass and that in larger panes shall be 9 kg/m² (32 oz) glass.

Doors

All flush doors shall be of the sizes shown on the Drawings and shall be obtained from an approved manufac-

Windows are frequently mass-produced stock pattern casements in wood or metal, obtained from an approved supplier. It is also useful at this stage to describe the method of fixing and sealing around window frames and to specify the types of glass and putty and the method of glazing. This latter provision obviates the need to include a separate glazing section in the specification.

The majority of doors used on civil engineering jobs will be stock pattern doors. Flush

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turer. Details of construction shall be submitted to and approved by the Engineer before the order is placed. Plywood facing is to be 4 mm ($\frac{3}{16}$ in.) thick for interior use and 6 mm ($\frac{1}{4}$ in.) for exterior use. Plywood is to comply with B.S. 1455. The interior type shall be of first grade, and the exterior type shall be of weatherproof type, first grade. Unless otherwise specified, the outer plies shall be of alder or birch. Synthetic resin adhesives for plywood shall comply with B.S. 1203, and where required to be waterproof shall be of the AX100 type.

All flush doors, except those described as solid flush doors and those having panels for glazing, shall be constructed in accordance with B.S. 459, Part 2, for 43 mm ($1\frac{5}{8}$ in.) stock flush doors, with a 20 mm ($\frac{3}{4}$ in.) continuous birch fillet tongued and grooved to the core and finished flush with the outer faces of the door.

All ironmongery shall be obtained from a firm nominated or approved by the Engineer. Samples of all ironmongery are to be submitted to the Engineer for his approval before ordering. All ironmongery shall be supplied with screws of the same metal and finish as the article with which they are to be used. Each lock is to be provided with two keys and each master key is to be in quadruplicate.

Miscellaneous joinery work

Shelving. The Contractor shall provide 225 mm × 25 mm (9 in. × 1 in.) plain edge wrought softwood shelving supported on 25 mm × 50 mm (1 in. × 2 in.) chamfered bearers plugged to walls.

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doors are becoming increasingly popular. Constant references are made to British Standards where appropriate, e.g. B.S. 1455: Plywood manufactured from tropical Hardwoods; B.S. 1203: Synthetic Resin Adhesives (phenolic and animoplastic) for Plywood; B.S. 459, Part 2: Flush doors. Part 1 of the last standard deals with panelled and glazed doors, Part 3 covers plywood faced fire-check flush doors and wood and metal frames ($\frac{1}{2}$ hour and 1 hour types) and Part 4 deals with matchboarded doors. Ironmongery is generally identified by reference to numbers in a manufacturer's catalogue.

Various other joinery items may still remain to be covered, such as shelving, cupboards, skirtings, architraves, linings, pipe casings,

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Cupboards. The Contractor shall provide six Messrs X type 1 double floor combined cupboard and drawer units, without cladding to top, back and one side, overall size 1 m × 450 mm × 1 m (3 ft × 1 ft 6 in. × 3 ft), plugged and screwed to brick walls.

Skirtings. Skirtings shall be of 20 mm × 75 mm ($\frac{3}{4}$ in. × 3 in.) chamfered wrought softwood, nailed to 20 mm × 25 mm ($\frac{3}{4}$ in. × 1 in.) splayed tanalised grounds, plugged and screwed to brickwork.

Painting

Materials. The paint shall be of good quality and shall be obtained from one of the following six manufacturers. All paint shall be delivered to the site in sound and sealed containers, labelled by the manufacturer with the following information:

- (1) Type of product;
- (2) Brand name, if any;
- (3) Use for which it is intended;
- (4) Manufacturer's batch number.

The Engineer's representative may take samples from painters' kettles for analysis and test. No thinners or other materials shall be added to the paint without the consent of the Engineer.

Knotting shall comply with B.S. 1336. Stopping for interior woodwork shall be putty complying with B.S. 544. For exterior woodwork it shall be white lead paste complying with B.S. 2029 with red lead to B.S. 217, type B, and gold size to B.S. 311.

Primers for woodwork shall comply with B.S. 2521, while primers for iron

etc. Specification clauses covering a few of the more common items are included.

As there are many hundreds of paint manufacturers in this country producing paints of varying qualities, it is common practice to give a selected list of from six to twelve manufacturers from whom the Contractor can make his choice.

It is usual to specify that all paint must be delivered to the site in the sealed containers of the manufacturer and that samples may be taken from the painters' kettles with the object of preventing the adulteration or thinning of the paint prior to use.

Extensive use has been made of British Standards in specifying painting materials and the Code of Practice as a guide to the means of applying paint.

It is essential that the paint

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and steelwork shall be one of the following:

- (1) Red lead primer to B.S. 2523;
- (2) Calcium plumbate primer containing not less than 73 per cent calcium plumbate in the pigment and with a pigment/binder ratio of not less than 1:2;
- (3) Approved zinc chromate primer. Zinc chromate primer shall also be used with aluminium.

All materials shall be kept in dry stores protected from frost. All painting materials used on a particular surface shall be obtained from the same manufacturer. Colour schemes will be prepared by the Engineer.

Workmanship. All surfaces shall be thoroughly cleaned down and approved prior to the application of paint. Wood surfaces shall be knotted, primed and stopped, as necessary, before the application of undercoat. Paint shall be applied strictly in accordance with the manufacturer's instructions and Code of Practice CP 231. Painted work shall be rubbed down between coats and at least 24 hours shall elapse between the application of succeeding coats. No painting shall be carried out on exterior work in wet or foggy weather or on surfaces which are not entirely dry.

Painting prices shall include for all necessary scaffolding, cradles and plant; painting of brackets and supports to pipes, fittings, etc.; touching up and bringing forward worn and bare patches and areas which have been stopped or filled; and taking off and refixing small items of ironmongery such as door knobs.

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is applied strictly in accordance with the manufacturer's instructions, that the surfaces are dry and that a sufficient period of time is left between the application of succeeding coats of paint.

Premature failure of paint films frequently arises from unsatisfactory or insufficient preparation work and all surfaces must be properly cleaned down, old paint burnt off or otherwise removed where necessary, knots sealed, priming coat applied and holes and cracks stopped before an undercoat of paint is applied.