

ENDEAVOUR

***Captain Cook's vessel for his
First Pacific Voyage 1768 –1771***

Art. 774

ASSEMBLY INSTRUCTIONS ***English Version***

*Newly translated and improved by
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For the

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HISTORICAL BACKGROUND

In August 1768, Lieutenant James Cook left England in the *Endeavour* on his first Pacific voyage. His vessel was not the usual naval sloop or frigate but (for him) a familiar Whitby collier chosen for strength, shallow draught, and storage capacity. The *Endeavour*, when purchased by the Navy Board, was valued at about £2300.

The voyage - the first of three such expeditions – was a collaborative venture by the Admiralty and the Royal Society, and its original objective was to set up an astronomical station at Tahiti to observe the transit of Venus across the face of the Sun in 1769. With Cook sailed the young and wealthy botanist Joseph Banks, accompanied by a library, much scientific equipment and four assistants: the Swedish naturalist Solander, secretary and draughtsman Spöring, and the artists Buchan and Parkinson. For many in England, the voyage was 'Mr. Banks's' rather than that of the unknown lieutenant, but as the months passed Cook and Banks – so different in social standing and upbringing – developed a close working relationship in which each learned much from the other.

The astronomical observations completed, Cook left Tahiti and sailed south where, his secret instructions told him; 'there is reason to imagine a Continent or Land of great extent, may be found'. But he reached latitude 40° South without sighting land and turned west to New Zealand whose coasts he charted in a little over six months by means of a superb running survey from the sea which showed that the two islands were not part of any continent. From New Zealand Cook pointed the *Endeavour* across the Tasman Sea towards that region of mystery, the unexplored eastern parts of New Holland. Cook coasted north along the shores of New South Wales and Queensland, stopping at Botany Bay and then at Endeavour River after narrowly escaping shipwreck on the Great Barrier Reef.

Geographically the voyage was an outstanding achievement. With only one ship, and without the loss of a single man from scurvy*, Cook had put more than 5000 miles of previously unknown coastline on the map. The twin islands of New Zealand, the east coast of Australia and Torres Strait had emerged from the mists of uncertainty. Cook returned to England in the much-repaired *Endeavour* in 1771.

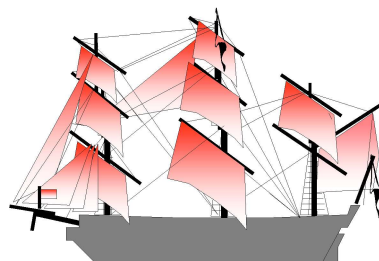
For the second Voyage, Captain Cook used the *Resolution*, built in the same shipyard as the *Endeavour*. It was of course, on the third voyage (in the *Resolution*) on February 14th 1779, that Captain Cook met his death at the hands of the natives of Hawaii in a fracas on the beach.

Extracted from *Captain Cook's Voyages 1768-1779*.

Selected and Introduced by Glyndwr Williams.

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* Scurvy was a common and often fatal disease caused by a deficiency in Vitamin C in the sailor's diet, particularly on a long voyage. Cook pioneered the use of limes to overcome this terrible condition, and over the three voyages, lost not a single man to scurvy. Thereafter, to many, English sailors were known as 'limeys'.



ASSEMBLY INSTRUCTIONS

General notes:

- All dimensions given are in millimetres. The symbol \varnothing means diameter
- Component numbers (n.11, etc) refer to the numbered plywood parts on Plan 1.
- Figure numbers given below (Fig.1, etc) refer to the numbered figures on the plans.
- Part numbers (P.2 etc.) refer to the detailed or exploded drawings on Plan 3.
- The sequence given here is the recommended order for completing the model.

PLAN NUMBER 1

The plan shows the plywood component parts drawn to scale (Tavola.1 to Tavola.6) and can be used to identify a component once removed from a panel. Provide yourself with six numbered boxes or trays to hold components. On the plywood panels, mark the part number on each laser-cut, plywood component with a soft lead pencil before removing the parts with a craft knife (see fig.1). Smooth all the edges of each piece with fine sandpaper, taking care not to damage the laser-cut profiles of the pieces. Put the components in the storage boxes for safekeeping.

Note: Ship's Cradle. Whilst the kit contains a display cradle (plywood parts n.31-33), this should not be used during the construction process as it might break. It is useful to hold the keel in a strong vise or cradle along its bottom edge while the model is being built. Keel vice Manta Model Art. 8155 is ideal for this purpose (not supplied in this kit). If you do not have a suitable vice, make up a working cradle by screwing two 5x5 wooden runners 200mm long onto a 300 mm long wooden base plank, leaving a 5mm gap between the runners so that the keel n.10 can be held between them. The material for the working cradle is not supplied in the kit.

Figure 4 – Deck planking. Using a soft pencil, mark the dummy planking on decks n.19, n.14 and n.18, noting that the planks alternate and are 109mm long by 4mm wide. The scale drawing in Tavola 4 shows the layout of the deck planking. Varnish the decks with a protective coat of clear matt varnish when the planking is completed, and put aside to dry.

PLAN NUMBER 2

The plan shows:

- Fig. 2: scale side sectional view through the hull structure showing keel and frames;
- Fig. 8: scale side sectional view showing the items assembled above deck (fig. 3)
- Fig. 9: scale overhead view of the deck and the items assembled upon it;
- These scale drawings refer out (using references such as **Fig.6** or **F16**, etc.) to the detailed sketches on Plan 2 and Plan 3. **Caution: detail drawings are not to scale.**

Hull Structure

Trial Assembly. Using Fig. 2 as a guide, and without glue, test that the frames n.1 to n.9 can be inserted correctly into the keel n.10, and that the false-deck plate n.11 can be inserted fully to seat down onto the frames. Trim the pieces as necessary to get a good sliding fit. Insert decks n.114, n.18 and n.19 onto the frames and check that all aligns well.

Fig. 3 – Planking Preparation. It is necessary to taper some of the frames so that the hull planking will make a smooth curve around the frames, and to increase the area of adhesion on these frames. Using a 1.5x7x580 hull plank to check the curve against the outside of the frames, measure and taper frames n.1, n.2 and the two side-plates n.17. The fore ends of the hull planking should make a smooth line from the frames to the bow, and the plank should lie tight against the outside edge of the foredeck. Glue the 5x5 triangular strip provided onto the bottom edges of n.9 as shown in the fig.2. Measure and taper parts n.7, n.8 and n.22 (and n.9 if necessary) so that the planking will make a smooth curve to the underside of the stern.

Assembling the Structure.

- Glue frames n.1-n.9 into the keel n.10, and before the glue has set, glue and insert the false-deck plate n.11 down onto the frames to align the frames with the keel. Without glue, trial-fit the three decks: n.14, n.18 and n.19 onto the frames, to ensure that the frames line up with the decks and that the keel is not twisted. Clamp the structure and allow the glue to dry.
- Fit the side-plates n.17 to the bow and n.22 to the stern. Clamp until dry.
- Fit transom supports n.12 and n.13 to the stern, noting that the inner supports, n.12 are slightly longer than the outer supports, n.13. Clamp into place with a rubber band or pins until dry. Fix the inner transom n.20 accurately onto the supports n.12 and n.13 with glue and nails, noting that n.20 should form a curve around the stern.
- Paint the top part of n.20 (where the stern decoration will go) light matt blue.
- Glue the outer transom n.21 onto the curved inner transom n.20 and clamp until dry.
- Fit the decks in the sequence: deck n.14; transoms n.15 and n.16, deck n.18; deck n.19, ensuring that the port and starboard (left and right) edges of the deck plates make contact with, and are glued to the curved top surfaces of the ribs. A close fit with the frames is necessary in order to achieve the desired deck curvature or 'sheer'.

Planking the Hull.

The *Endeavour* is planked with a single layer of 1.5x7x580 planks. These planks form the finished surface of the hull and should be applied with care. The dotted lines on Fig.2 show the position of the first planking strip, which should be positioned level with the top of the frames, n.3 and n.4, and aligned parallel to the bottom edge of the keel.

- As shown in Fig.5, glue the frames and apply a plank to each side of the hull, holding the planks in place using clamps, or pins that can be removed when the glue is dry. Proceed with the planking in the sequence recommended in the specific instructions on planking provided in the last section of this booklet, but noting that only one layer of hull planking is applied to this model. Plank from the top of the hull to the bottom and then add more planks above the first plank to cover the frames. Bring the sides up to the level of the quarterdeck n.19; the level of the main deck n.14; and the top of the frames on the foredeck n.18, respectively. Check the photograph on the kit's box to confirm the planking heights.
- Carefully insert 1.5x7 planks under the stern, following the shape of the transom supports, n.12 and n.13, as shown in Fig.6. Carefully trim the hull planks around the stern to make a neat joint with the transom and the stern planks.
- When the planking has been completed, remove all pins and clamps. Brush-coat the hull planking with diluted PVA wood glue, to fill any gaps between planks and to bond the hull into a continuous shell. When dry, finish the planking with a scraper and carefully smooth with a fine grade of sandpaper, ensuring that no spots of glue are left on the surface that could show through the varnish. Ensure that the bulwarks (the parapet wall around the foredeck) are also scraped and sanded.

Superstructure Items

Ribs. On the inside face of the foredeck bulwarks, place eight 1x2 strips to simulate the ribs that would protrude through the deck (see the plan view Fig.9 for positions).

Handrails – Glue the foredeck handrails plywood parts n.23 onto the bow bulwarks as shown in Fig.9, having first sanded the top edges of the parapet walls level to take the handrails. Make the stern handrails from 2x6 planks and the handrail supports from 4x4 planks, taking the dimensions from Fig.8 and Fig.9. Pin and glue in place; clamp until dry. Fit the stern bulwarks plywood part n.24 in place on supports made from 3x2 plank. Pin and glue in place; clamp until dry.

Rubbing strakes. These are timbers fitted along the length of the hull to protect the sides of the ship from damage. The three strakes are fitted to *Endeavour* once the hull and stern planking are completed.

Before gluing the rubbing strakes to the sides of the hull, mark their positions using the scale side-view Fig.7 on Plan 4 and the illustration on the kit's box as guides. Check that they are at the same height either side, and that they align with the stern features (see Fig. 6).

Wet the strakes for easier bending, glue and pin these strakes into position as follows:

- The first strake is fitted at the level of the main deck, contiguous with the lower handrail, and is made from 2x2 plank;
- The second strake is made from 1.5x6 plank and is fitted with its top edge set 26mm below the bottom edge of the first strake;
- The third strake is made from 1.5x5 plank and is fitted with its top edge set 52mm below the bottom edge of the first strake.

Fig. 6 – Stern Fittings.

- Paint the stern decoration n.28 matt gold. When dry, glue n.28 into place in the transom head.
- Cut three pieces from the 2x3 Walnut cornice supplied with a fine hacksaw and smooth the ends. Insert the cornice strips across the stern as shown in Fig.6.
- Stern windows: Paint the photo-etched brass plate with matt pale blue paint. When dry, and on a flat surface, lightly sand the plate with 600-grade sandpaper to reveal the brass detailing against a pale blue background. Cut the stern windows from the plate using tin-snips or scissors. Glue the windows in place in the outer transom n.21.
- Side cabin windows: Using the side ornaments n.27 as a template, carefully mark and cut away a section of the rubbing strake so that they will sit against the hull side. Paint the side ornaments matt gold and glue in place on the hull. Cut the two side windows from the photoengraved plate using tin-snips or scissors. Glue the windows in place in the side ornaments.

Fig 10 – Ship's Cradle. Glue the sides n.33 into the end plates n.31 and n.32. Clamp onto a flat surface, checking that the ends are square to the sides. When dry, smooth with sandpaper and apply two coats of matt varnish, sanding lightly between coats.

Painting. Paint the hull areas between the bottom two rubbing strakes with blue matt paint. Set aside to allow the paint to dry thoroughly. Suggestion: we recommend the use of an air-brush and 3 coats of matt paint diluted to 3:1 with appropriate thinners. Alternatively, paint by hand using matt paint, a good quality sable brush and employing light longitudinal brush strokes.

Varnishing. Coat all unpainted areas with two coats of matt varnish, sanding lightly between coats.

Fig.11 – Portholes. Taking the positions from Fig.7 on Plan 4, draw the four dummy portholes on each side of the ship using a hard, sharp pencil and template n.26. Assemble the brass hinges onto hinge pins made from $\varnothing 0.8$ brass wire. Glue in place as shown in Fig 11. *General note: The brass wire is provided as a rolled-up hank. To straighten it, clamp one end in a vice and with pliers, pull from the other end, stretching the wire slightly.*

Fig 12 – Cat Davits. Make the cat davits from 6x6 plank and cut a square hole in either side of the bow, level with the deck as shown. Drill two $\varnothing 1.5$ holes in the head of the davits to take the securing rope. Drill a $\varnothing 1$ hole and fit a brass eyelet in the tail of each davit. Apply two coats of varnish, sanding lightly between coats Glue the davits to the deck in the positions shown in Fig.9.

Fig.12 – Hawse Holes. Glue the hawse hole plates n.25 on the bow, and drill through carefully with a $\varnothing 3$ drill to take the anchor ropes. Apply two coats of varnish, sanding lightly between coats

Bits. Varnish the six bits (plywood parts n.38). Taking the positions from Fig 9, glue the bits in place in the maindeck and quarterdeck bulwarks.

Fig.13 - Rudder.

- Using a soft pencil, draw dummy joints at 5mm intervals on the rudder n.29 as shown in Fig.13. Drill a $\varnothing 1$ hole in the heel of the rudder and tap in a brass pintle (to take the restraining chain). Apply two coats of varnish, sanding lightly between coats.
- Line the rudder up underneath the stern and mark around the top of the rudder stem post. Carefully cut a small round hole in the underside of the stern planking so that the rudder slides up into the stern and through the hole in the deck n.19.
- Fit three hinges to the back edge of the keel using brass nails. Slide the rudder into position and mark the position of the hinges. Fit three hinges to the rudder with brass nails. Position the rudder against the keel and slide a $\varnothing 0.8$ brass wire pin through all three hinges. Position the rudder in line with the centre-line of the ship and glue the pin in place with instant glue.
- Drill a $\varnothing 1$ hole in each side of the stern and fit a brass pintle on each side (see fig.6). Connect the restraining chain between these pintles and the pintle on the rudder.
- Paint the two parts of the tiller n.30 matt black and glue in place on the rudder stem post aligned with the centre-line of the ship.

Ship's Steering Wheel. Drill a $\varnothing 0.8$ hole in the wheel support column and fix the ship's wheel to it with a brass nail as a pivot. Varnish, and glue the assembly to the deck in front of the tiller as shown in fig 9.

Capstan. Varnish and fit the capstan to the quarterdeck as shown in fig 9.

PLAN NUMBER 3

The numbered detailed views in this plan show the details for completing the superstructure. Refer to the scale side-view Fig.8 and the overhead view Fig.9 on Plan 2 for the numbered detail parts. **Caution: the detail drawings are not to scale.**

Fig.14 - Channels. These use plywood parts n.34, n.35 and n.36. Drill two $\varnothing 0.8$ holes 0.5mm deep into the inside edges of each channel and glue a headless nail in each to act as a tenon. Draw on the 5mm-wide dummy planking using a soft pencil, and apply two coats of varnish, sanding lightly between coats. Fit each channel into position under the rubbing strakes along the sides of the ship as shown in Fig.9 on Plan 2, drilling two $\varnothing 0.8$ holes to take the channel nails and gluing the channel edges to the strakes. Take care to position the channels accurately in relation to the mast holes and fit the right channel for each mast. Note that the channels should slope upwards slightly when viewed from the bow or stern of the ship.

Fig.15 – Hatchway. Glue covers n.37 together and frame with 2x6 plank. Drill $\varnothing 0.7$ holes and insert brass eyelets with a brass ring in each to simulate the hatch handles. Assemble the brass hinges onto hinge pins made from $\varnothing 0.8$ brass wire. Apply two coats of varnish, sanding lightly between coats. Glue in place on the deck as shown in Fig 9 on Plan 2.

Fig 16 – Gratings. Assemble the four gratings using instant glue and the method shown in Fig.16, framing the grating strips with 2x6 plank. Use Fig.9 on Plan 2 as a guide to the sizes and positions of the gratings. Round the underside of the gratings with a rounded file to allow them to sit snugly against the curved deck. Apply two coats of varnish, sanding lightly between coats. Glue in place on the deck as shown in Fig 9 on Plan 2.

Hull ladder. Make the eight 13mm-long ladder treads on each side of the hull from the 4x4 'L' profile strip provided. Use Fig 7 on Plan 4 as a guide. Glue the treads to the hull and varnish over.

Fig.17 – Belaying Pin Racks. Assemble the five belaying pin racks (two medium, two large and one small) with posts n.39 and the racks n.40, n.41 and n.42 respectively. Drill $\varnothing 0.8$ holes in the feet of the posts and insert $\varnothing 0.8$ brass wire to act as tenons. Paint the assemblies matt black. When dry, glue in the belaying pins with a drop of instant glue. Drill $\varnothing 0.8$ holes in the deck and glue the racks in place on the deck taking the positions from Fig.9 on Plan 2.

Fig.18 – Windlass. Assemble the windlass body to the sides n.43. Varnish and glue in position in the fore end of the maindeck, taking the position from Fig.8 and Fig.9, Plan 2. Drill two $\varnothing 2$ holes in the deck for the passage of the anchor rope. Glue a ring made from $\varnothing 0.8$ brass wire around each hole.

Fig.19 – Falconets. Make the eight falconet supports from 5x5 plank and fit and glue to the quarterdeck railings as shown in Fig.9, Plan 2. Varnish over. Drill $\varnothing 0.8$ holes and fix the falconet pivots onto the top of the supports with brass nails. With a pair of pliers, bend the grips up 30° . Assemble the falconets to the pivots with brass nails, clenched to prevent them falling out.

Fig 20 – Lifeboat Gantry. Make this from parts n.47 and n.48 and 4x4 plank. Paint the assembly matt black, and when dry, position on the deck as shown in Fig.9, Plan2.

Fig 21 – Cannons. Assemble the cannons from the plywood parts in Tavola 6. Drill a $\varnothing 1$ hole in each side and in the rear end of the base of each cannon, and glue in three brass eyelets. Varnish the cannons and glue the wheels to the deck. Drill $\varnothing 0.8$ holes in the deck and handrails, fit brass eyelets, and rig the cannons with thin rope as shown in Fig.9, Plan2.

Fig 22 – Deck Ladders. Assemble the two deck ladders from the sidepieces provided, and making the 16mm-long treads from 1x3 plank. Varnish, and fix them to the maindeck.

Fig 23 - Anchors.

Warning. The anchor castings are brittle and will snap if put under stress.

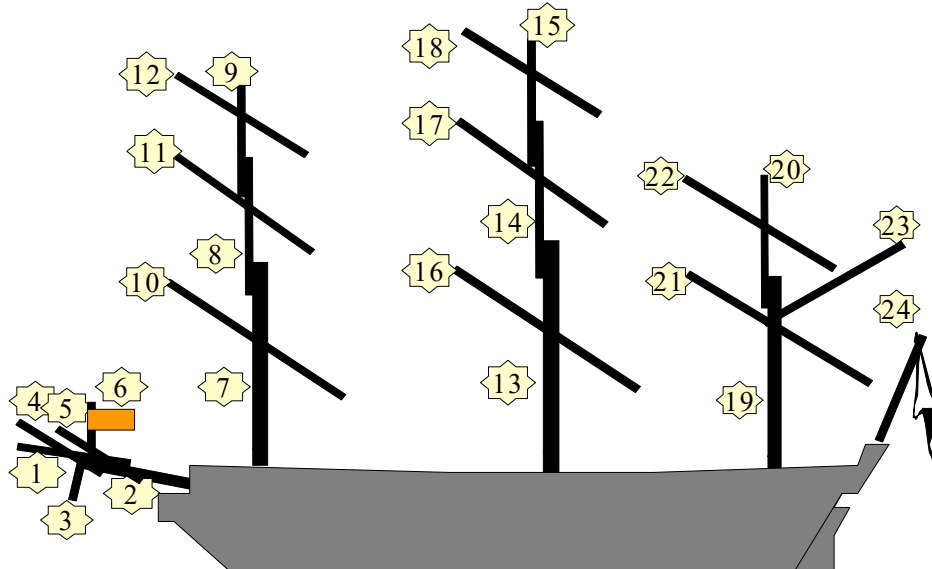
- Use the plywood parts n.49 for the stocks and taper the undersides as shown in Fig.23. Use a small file to square off the aperture in the stock and insert the square head of the anchor casting.
- Secure the stock on the anchor with instant glue, and paint the whole assembly matt black.
- When dry, wind 5 or 6 turns of fine thread in four places on each stock as shown, fixing the thread with a little glue.
- Insert a brass ring on each anchor. Tie a 200mm length of large thread to each anchor ring and bind it with thin thread as shown in Fig.7, Plan 4.

Fig 24 and Fig 25 – Lifeboat.

- Assemble the structure using parts n.1S to 12S. Taper the side plates 9S to take the ends of the planking and commence planking from the top of the frames towards the keel. Use 1x5 plank for the first plank and then continue using 0.5x3 planks.
- Cut the rowlock slots in the gunwales with a small square file.
- Make the bilge boards from 1x3 planks and fit in the bottom of the boat.
- Make the transverse seats from 1x5 planks and glue on top of the frames.
- Sand smooth and apply two coats of varnish, sanding lightly between coats.
- Place the lifeboat on the lifeboat gantry and lash in place with thin rope, securing the knots with a drop of instant glue.

MASTS AND SPARS

The diagram below identifies the various masts and spars used on the *Endeavour*. Cut and taper the dowels provided to the dimensions stated in the cutting table below. Taper the masts and spars using a drill and sandpaper, or using a hand plane and sandpaper, or preferably, using a lathe such as Mantua Model Art. 8160. Smooth and apply two coats of matt varnish to all masts and spars, sanding lightly between coats. Label the parts temporarily with masking tape.



Mast and Spar Scheme on the Endeavour

Ref	Name	L=Length	ØMax= largest diameter	ØMin= smallest diameter
1	Upper bowsprit	200	5	2.5
2	Lower bowsprit	220	8	6
3	Bowsprit outrigger	70	3	1.5
4	Bowsprit flagpole	70	2	1.5
5	Top bowsprit yard	120	3	1.5 Taper both ends
6	Lower bowsprit yard	180	4	2 Taper both ends
7	Foremast	300	8	5
8	Top foremast	210	5	3
9	Fore topgallant mast	160	3	1.5
10	Fore lower yard	240	5	2.5 Taper both ends
11	Fore top yard	180	4	2 Taper both ends
12	Fore topgallant yard	140	3	1.5 Taper both ends
13	Mainmast	330	10	6
14	Main topmast	215	6	4
15	Main topgallant mast	180	4	2
16	Main lower yard	290	6	3 Taper both ends
17	Main top yard	210	5	2.5 Taper both ends
18	Main topgallant yard	170	3	1.5 Taper both ends
19	Mizzenmast	270	6	4
20	Mizzen topmast	205	4	2
21	Mizzen lower yard	200	4	2 Taper both ends
22	Mizzen top yard	140	3	1.5 Taper both ends
23	Mizzen gaff	130	4	2
24	Stern flagpole	150	3	1,5

Fig.26 - Bowsprit. With a round file, make the two holes in the bowsprit cap n.53 oval so that the cap sits at the correct angle on the sections of bowsprit. Assemble the upper bowsprit to the lower bowsprit through the cap n.53, placing the spacer n.54 between the two bowsprit sections. Glue with epoxy resin for a strong joint. Cut a slot in the end of the lower bowsprit and insert the bowsprit outrigger modified as shown in Fig.26. Secure with epoxy and tape in place until set. Chamfer the end of the bowsprit flagpole and glue it to the back of the bowsprit cap with epoxy resin. Cut out and stick the bowsprit flag to the flagpole. Cut the bowsprit opening in the foredeck, apply epoxy resin to the top of the ram and insert the bowsprit. Fix the bowsprit in place with a copper band nailed to the deck with brass nails (see the side view fig.8 on Plan 2). Fix the bowsprit side pieces n.55 in place with epoxy glue.

Fig. P2- Assembly of chain plates. This shows how the deadeyes and the chain plates are assembled. Fig.7 on Plan 4 shows how these are assembled through the channels and secured to the hull. Fix the chain plates to the hull using the scale side-view as a guide. Note that the chain plate assemblies each slant slightly differently toward the mast to line up the rigging (shrouds) correctly. Secure each chain plate foot with both glue and a brass nail.

Assembling the Main Mast (the central mast).

The process of assembling the mainmast is the same for the foremast and mizzenmast.

- **Mast Reinforcement.** Glue a 155 long piece of 1.5x1.5 plank to the front face of the mainmast and lash in five places with medium thread. The thread is secured with a little glue. Use the side view in Fig.7 and the illustration in Fig.27 as guides.
- **Fig.27 – Tops.** Assemble the lower mast section to the upper mast using the mast cap n.56. Glue the support cheeks n.57 to the sides of the lower mast. Fix the tressle-trees n.59 above the support cheeks and assemble the three crosstrees around the mast sections and glue into the tressle-trees. Before the glue sets, check that the masts are in alignment and that the tressle-trees are at right angles to the centre-line of the ship.
- **Fig.28 - Platforms.** Mark the dummy planking on the platform n.60 with a soft pencil. Drill five $\varnothing 1.5$ holes on each side for the five deadeyes (noting that the foremast platform has 4 holes and the mizzen platform has three). Edge the top with 0.5x3 plank, and glue 1x2 planks onto the top to make footgrips as shown in Fig.28. Varnish and allow to dry. Glue the platform onto the tressle-tees ensuring that the platform is central around the masts, lines up with the centre-line of the ship and has the flat edge to the stern.
- **Fig.29 – Topgallants.** Fit the topgallant mast to the upper mast using the mast cap n.63, cross-tress n.62 and tressle-trees n.63. Before the glue sets, check that the masts are in alignment and that the tressle-trees are at right angles to the centre-line of the ship. Drill $\varnothing 0.7$ holes in each end of the tressle trees to take the upper shroud lines.
- **Trial-fit** the mast into the deck without glue, making small adjustments to the deck holes so that the mast sits vertically from the keel. Remove the mast and slide on the mast foot n.50. Glue the bottom of the mast and re-insert the mast into the deck, using slivers of wood where necessary to wedge the mast in place. Trim off excess slivers and glue the mast foot in place on the deck.

Foremast and Mizzenmast.

- Assemble the foremast using the process described above and parts n.65, n.68, and n.64 to n.71, n.66, n.67, n.69 and n.70. Note that the foremast platform has 4 holes each side.
- Assemble the mizzenmast using the process described above and parts n.73, n.76, and n.74 to n.75, n.72 and n.77. Note that the mizzen platform has 3 holes each side.
- Trial-fit the two masts into the deck, checking alignment with the mainmast. Slide on the mast feet n. 51 and n.52 respectively, and glue the masts in place. Glue the mast feet to the deck.

Stern Flagpole. Glue the flagpole into the hole in the stern bulwark n.24, ensuring that the flagpole tilts backwards as shown in Fig.7.

Figure 30 – Gaff Traveler. Fit the traveler part n.77 into a slot cut in the end of the gaff spar. Drill a $\varnothing 1$ hole in each side of the traveler. Fix the traveler tightly to the mizzenmast using a short loop of rope knotted at each end.

Fig.31 – Footropes. Drill the yards with $\varnothing 0.8$ holes and insert brass eyelets. Make the footropes from $\varnothing 1$ rope. Use the side view Fig.7 on Plan 4 as a guide.

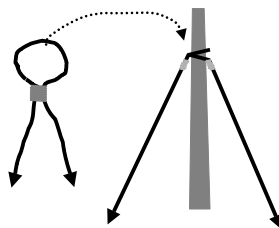
Rigging Points. Drill one $\varnothing 0.8$ hole under the prow for the bowsprit tensioner, and fit a brass eyelet in place with glue. Drill one $\varnothing 0.8$ hole in the rubbing strake below the hull ladder on each side and fit brass eyelets. Drill one $\varnothing 0.8$ hole in the stern side above the window decoration on each side and fit brass eyelets. . Drill one $\varnothing 0.8$ hole in the mizzenmast cap and fit a brass eyelet for the gaff rigging.

RIGGING

The rigging of the ship is shown in Fig.7. Numbered rigging points referred to on Fig.7 are shown on the small overhead view at the top right-hand side of Plan 4. The sizes of the blocks and the thickness of the rigging lines In Fig.7, and in the key at the bottom of the plan, identify the sizes of blocks, ropes and deadeyes to be used.

Fixed Rigging. Working from Bow to stern fit all the permanent fixed rigging - the ropes used to tension and hold the masts and bowsprit in position.

- **Bowsprit.** Fit the bowsprit tensioner ropes through the holes in the outrigger and terminate to the bowsprit. Fit a doubled tensioner between the center of the bowsprit and the rigging point on the bow.
- **Fig. P1 - Shroud lines.** Make these from medium thread and secure them to the masts using a seized loop as shown in the diagram. Attach the terminal ends of the shroud lines onto the deadeyes.
- **Fig. P2 – Rigging the Deadeyes.** Connect the shroud deadeyes to the deadeyes in the channels with thin thread and using the method shown in Fig. P2. Tension the shrouds, but do not distort or bend the masts.
- **Fig. P3 – Top Shroud Deadeyes.** Fit deadeyes through the platforms for the top shrouds using medium thread. Tie the threads off to the lower shroud lines as shown in the diagram.
- **Fig. P4 - Top Shrouds.** Rig the top-shrouds as shown, using medium thread. Terminate the top shrouds to deadeyes and connect the deadeyes to the deadeyes on the platforms using thin rope. Secure the top-shrouds to the top deadeyes as shown in the scale side view.
- **Fig. P4 - Topgallant Stays.** The recommended method for fixing the top-shrouds to the top of the topgallant masts is to make 'seized' loops using thin thread as shown below. The loops should sit snugly on the taper of the mast. Make the lower ends of the stays fast to the top of the upper shroud lines as shown.



- **Fig. P5 – Ratlines.** Make and bind the ratlines to the shrouds using thin thread – once the shrouds are tensioned correctly. Secure the end knots with a drop of instant glue. Rig the ratlines at 7mm intervals.

- **Fig P6 – Mainstays.** Fit the three large mast stays running from the tops as shown in Fig.7. Feed the ropes through the tops as shown in fig. P6 and terminate with large blocks to the anchor points indicated in Fig.7.
- **Stays.** Rig the stays from the mast tops to the channels, connecting the deadeyes. Fit the stays from the upper masts and topgallant masts to the anchor points indicated in Fig.7. Tension the stays but do not distort or bend the masts.

Running Rigging

This is the rigging used to move the yards and spars. To permit work to proceed simply and rapidly, it is recommended that all of the mast components should be prepared apart. After all the spars have been prepared, proceed to fit all of the rigging blocks, both on masts and on yards. Dimensions of small or large blocks are readily distinguished by differences in outlines in the scale side-view drawing Fig.7. When complete, proceed to rig the spars and yards to the masts.

- **Fig. P7** shows how to lash the yards to the masts whilst still allowing them to swivel.
- **Fig. P8** shows how to rig the parrels from the masts to the centre of the yards.
- **Fig. P9** shows how to terminate a rope to a belaying pin. Wrap a length of the excess line around a 10mm former and apply a drop of glue to the roll. Slide the roll off the former and loop it over the belaying pin, holding the loop down while applying glue to the loop. This technique gives the rope the appearance of weight.
- **Fig. P10** shows how to rig the lifts that hold the ends of the yards.
- **Fig. P11** shows the method of securing the rigging that prevents the yards from twisting.

Working from bow to stern, fit the rigging to the numbered rigging points as in the scale side-view. The correct lines (ropes) for the various types of rigging is indicated by the thickness of the lines drawn in the scale side-view. Apply glue to stiffen the tips of the lines to help insertion through block holes. Ensure that rigging is tight, but does not deform masts or spars

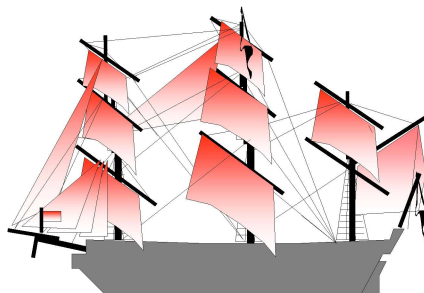
Stow the anchors by securing the flukes to the channels with medium thread. Feed the anchor ropes through the hawse holes, around the windlass and inserting the ends into the deck.

Fig. P 12 on Plan 3 shows how to secure the flag on the hauling line of the flagpole. To give the flag an appearance of weight and droop in the absence of wind, fold and secure the flag in a draped position using some thin pins, and then spray the flag with fixer or transparent hair lacquer.

Mast Top Caps. Make three 2mm deep caps from $\varnothing 4$ dowel. Drill a $\varnothing 0.8$ hole through the caps and into the top of the masts. Fit the caps with brass nails and glue.

Varnishing: Leave all parts their natural colour and varnish them with matt varnish.

Sails: The model is intended to be rigged without sails. An optional set of ready-made sails **Art. 34205** together with rigging instructions may be purchased from Mantua Models.



LIST OF THE MATERIALS CONTAINED IN THE KIT

Boards 1 to 6: Six plywood panels with laser-cut components.

PLANKS AND DOWELS

Planks

8 off	0.5x3x500 mm	56 off	1.5x7x580 mm
2 off	1 x2x500 mm	2 off	2x2x580 mm
1 off	1x3x200 mm	5 off	2x6x500 mm
1 off	1x5x500 mm	4 off	4x4x50 mm
1 off	1.5x1.5x580 mm	1 off	5x5x500 mm
2 off	1.5x5x580 mm	1 off	6x6x500 mm
2 off	1.5x6x580 mm		

Dowels

1 off	Ø2x230 mm	2 off	Ø5x450 mm
1 off	Ø3x450 mm	1 off	Ø6x500 mm
1 off	Ø3x500 mm	1 off	Ø6x30 mm
2 off	Ø4x530 mm	1 off	Ø8x520 mm
1 off	Ø4x200 mm	1 off	Ø10x330 mm

FITTINGS

Thin Rope Pack

60m rope Ø0.50 mm
50m rope Ø0.25 mm

Thick Rope Pack

50m rope Ø1 mm
2m rope Ø1.25 mm
700mm rope Ø1.75 mm

Nail pack.

100 off Brass nails 8 mm

3 mm Block pack.

84 off Blocks 3 mm -1 hole

5-7mm Block pack.

8 off Blocks 5 mm -1 hole
4 off Blocks 7 mm -2 holes

5 mm Block pack.

14 off Blocks 5 mm -2 holes

Eyelet pack

60 off Eyelets Art 33050
18 off Eyelets Art 33040

Grating pack

60 off Gratings 15-slot

7 mm Deadeye pack.

68 off Deadeyes Ø7 mm

5 mm Deadeye pack.

68 off Deadeyes Ø5 mm

Anchor pack.

2 off Anchors
2 off Brass rings Ø8 mm
2 off Brass rings Ø3 mm
1 off Copper band 0.5x2x50 mm
1 off Brass wire hank Ø0.8x2500mm

Windlass pack

1 off 30mm windlass body
1 off Ø20mm rudder wheel
1 off Wheel support pillar
1 off Nail
1 off Capstan
1 off right ladder side – 9 step
1 off left ladder side – 9 step

Hinge Pack

20 off Porthole lid hinges Art. 37360
6 off Rudder hinges
10 off chain 150 mm

Chain-plate pack.

44 off Chain-plates

Belaying-pin pack.

56 off Belaying-pins 12 mm

Cannon pack

10 off Falconets Art. 30670
10 off Falconet Supports
4 off cannon barrels 30 mm
4 off pins Ø1.5x11 mm
8 off Bridges
8 off Gunwheels

Flag pack.

1 off set of flags

Miscellaneous items

1 off Walnut moulding 2x3x30 mm
Walnut profile 4x4x300 mm
1 off Brass photo-engraved sheet
4 off Construction plans
1 off Instruction booklet

Note: Depending on the availability of supplies the Mantua Model Group may from time-to-time, substitute alternative materials to those specified above.

PLANKING INSTRUCTIONS

Newcomers to this fascinating hobby, or those new to the construction of a Mantua Group period ship model, sometimes have questions when they start to work such as: "How big an obstacle is the planking? Is it possible to have something additional in the way of equipment or instructions to help in this most important part? Are there any photographs or diagrams that may help?" To assist you, we have produced this short instruction sheet in an attempt to lessen any problems you may encounter.

PLANKING OR THE APPLICATION OF STRIPS

First, a short note on the background. Each vessel was originally clad with large wooden boards positioned longitudinally or diagonally to the line of the hull, either with one plank overlapping the next (clinker-built), or plank one adjacent to the next (carvel-built), and nailed onto the ship's frames. This covering, in addition to being necessary for buoyancy (after caulking and sealing the joints) also gave considerable strength to the whole vessel.

In the case of our own models, because of the nature of the materials used, the planking will be accomplished using not short planks, but with full strips wherever possible, and doubled up in most cases, as they were in the original vessels. This technique is made possible through the flexibility and quality of the materials provided.

To achieve a high quality finish to the planking, we suggest the following system that we consider is most effective, and which is demonstrated in the diagrams on the last page.

The planking operation begins on plan number 1 of each of our model's instructions. The position of the first plank is shown on a profile of the skeleton structure after assembly. This reference point normally corresponds to the highest point of the two or three central frames and coincides with the lowest point of the curve formed by the extreme tops of the frames themselves. Where required, use a strip bender to curve the plank so that it fits the shape of the hull.

The first strip applied must be perfectly parallel to the line of the keel and should be fitted at the bow, the other end projecting beyond the length of the hull as in Fig.1 below. If the ship is to be double-planked, the initial planks may be glued and lightly pinned to the frames. The pins are to be removed once the assembly has properly set. Please note that where the upper sections of the frames are to be removed later, the planks should be pinned only at these places, i.e. no glue applied.

Proceed in the same manner from the top to bottom, fitting each plank snugly against the other, checking that they can be positioned easily without having to unduly force or twist the plank longitudinally. **Be sure to cover each side of the hull alternately, working three to four planks at a time. This avoids twisting the hull.**

After a number of these 'easy' planks have been fitted, a certain amount of difficulty will be encountered in placing subsequent strips, as the planks will now want to overlap in some places. You will now have arrived at the curve or sheer, of the vessel. Planking now requires a different procedure. All the planks must adhere to, and lie flat against, the frames for their entire width without curling, twisting or forming strange and unwanted 'ears'. We need to overlap the new plank on the previously positioned plank, allowing the strips to guide us in determining at what point the overlapping is to begin at each end. Position this overlapping plank without gluing onto the central two or three frames of the hull (see Fig.2), holding the ends down with your fingertips, mark both ends where they overlap, with a pencil. Cut along the lines drawn, using a sharp craft knife (see Fig.3).

Reposition the cut strip on the hull, fitting it snugly against the preceding plank, making slight adjustments to the angled cut as necessary, to ensure an exact fit.

Now glue and pin the trimmed plank into position. Proceed with this method working towards the bottom of the hull i.e. towards the keel. Note that if this operation is carried out with due care, the planking will create the beauty of a wood inlay as the pieces fit together smoothly.

After proceeding in this manner for a while, we arrive at a point where the strips begin to leave a space (rather than overlapping). Irregular shaped spaces appear at the bow and stern ends of the strips as we position them alongside the preceding strips. Even in this case, let the strip itself guide you. Fix the strip into position, letting it follow its own natural curve. The spaces that are left, normally acute triangles, will be filled later with segments of strip carefully cut to shape (see Fig.4).

After the lower portion of the hull has been completely covered, proceed to cover the upper areas along the upper deck parapets (if this is relevant to your model), leaving the ends of the strips extending beyond the parapet line. This will be trimmed away later to achieve the correct outline when measured against your drawings (see Fig. 5). After the application of the first layer of planking over the entire hull, it will be necessary to smooth down the surface, removing the inevitable remains of excess glue, and leveling off any small imperfections in the planked surface.

Having finished the surface to your satisfaction, if you are working on a kit that is double planked, proceed to apply the second and final layer of planking. This will be the layer that is visible. Having gained the skills carrying out the first level, you should now be well able to ensure that the quality of the second layer is of a high standard.

The second planking will follow the same process, and, assuming a good level of preparation, should be somewhat easier.

In some instances, strakes or rubbing boards that stand proud of the planking should be fitted to the first level of planking, where indicated on the drawings. However the instructions may well direct you to fit them after the second-level planking has been completed.

FINISHING

When the final planking has been completed and the glue is fully set, the next task is to smooth the entire hull. We suggest the use of a scraper, a small wood plane (set fine) and various grades of sandpaper.

At this point, after having trimmed off the excess planking, according to the general profile at the parapet line, proceed to install the handrails and the gunwales, which are those planks that extend beyond the planking.

For the handrails, since they will be placed flat it will be necessary, especially at the bow and stern sections, to cut the strips into small angled (trapezoidal) sections in order to follow the curve of the hull (see Fig 6). The joints between these sections should be carefully sanded to make them as invisible as possible and to achieve a smooth, continuous curve.

For the gunwales, the strips will be fixed "edge on". The thickness of the strips (usually 2mm.) means that it will be necessary to pre-form them to fit the curves. We suggest the following methods to achieve the desired curve. i) If only a slight curve is required, use a standard plier-type plank bender. If a deeper curve is needed, ii) soak the strip in very hot water for a minute or two, then carefully bend and hold the strip in position against the hull or over an object of the right shape until set. Alternatively, iii) wet the strip and use a wheel-type bender.

When the strip dries out it will be stabilized and can be placed into position. If there are a number of these pieces to make, build a jig to save time and increase accuracy.

At this stage, after ensuring the main decks are properly positioned, cut out the sections of the frames that are visible above the decks (extending up to the parapet tops), and smooth them off level with the deck surface. Proceed to plank the inside faces of the bulwarks, covering the inside of the first layer of white planks. Carefully sand this last section of planking smooth using progressively finer grades of sandpaper.

The foregoing briefly describes the subject of planking in an effort to assist the beginner with what appears to be a rather daunting task but which can become a very satisfying achievement. The rest "as they say" is up to you. Take your time; use your own skill and ingenuity to develop your own methods having considered our suggestions.

TOOLS FOR THE JOB

Each individual may have their own idea about how many, or what type of tool to use and what to use them for. We set out below some general advice of modeling tools and their uses for your consideration. These are just some of the tools available. Please ask your supplier for details.

- **Craft Knives.** There are a number of sizes available, the larger handle being the most useful. There are many blades available from straight edge to curved and chisel ends, together with saw blades, etc.
- **Plank Benders.** There are two main types: i) plier-type strip bender for forming dry planks (used in most applications); ii) wheel-type bender suitable for bending wet planks.
- **Strip Clamp.** This is a quick release clamp for holding strips whilst you trim them. This also doubles as a hull clamp allowing you to work with both hands on intricate work.
- **Pin Pusher.** This tool is spring loaded. A pin is inserted headfirst into the barrel then the tool is used to punch the pin into the wood, removing the need to hammer pins in delicate places.
- **Balsa Plane.** A small plane with a razor-type blade, and can be set for a fine cut.
- **Scraper.** A razor-type blade used for finishing flat surfaces.
- **Pin Vise.** A tool that looks like a jeweller's screwdriver but with collets of varying size, and which can take the smallest drill bit and act as a twist drill.
- **Sanding Stick.** A small plastic spring-loaded stick with a tapered end that takes a thin sanding belt, for sanding in tight places.
- **Razor Saw.** There are various grades of miniature saw blade available that all give a very fine cut. They are usually tenon-backed and can be obtained in sets to include the handle, mitre box, or just the blade.

