

# "Korabel"

## Viking Ship - KL-03-001

### Prototype - "Oseberg"

#### Recommendations on assembling:

1. Get ready: Before starting work, fully review and read the instructions, understand the sequence of assembly steps and what needs to be done, study the drawings, develop your internal work plan, prepare the necessary tools, materials and chemistry - then start building the model.

2. Please take your time, be careful, use force to fix the parts only when you make sure that all the grooves are aligned and can not be damaged.

3. Be careful - the set contains similar in appearance parts, but with different grooves and shapes, compare the parts that you install with those shown in the instructions, drawings and installation location.

4. A full 3D model of the prototype was used to create the illustrations of the step-by-step instructions, so parts from later assembly stages may be displayed in some figures. Do not hurry to install these parts on the model earlier than the assembly sequence requires, even if you saw them in the figure. First of all, install what the figure directly points to. However, if you are confident and have experience in building models of sailboats, it is allowed to break the sequence of assembly and painting at your discretion. In this case, you assume all responsibility for the correct assembly, ease of use and sequence errors.

5. While working on the model according to the step-by-step instructions, do not forget to use and check the drawings. Many drawings allow you to better see and understand the design and location of some parts. Also in the drawings, in contrast to the instructions, the parts are shown with appropriate dimensions or scaled, which allows you to control the dimensions and parameters of the parts.

6. In the explanations for the assembly steps, the plate on which the necessary parts are located is indicated at the beginning.

7. The peculiarity of laser-cut wooden parts is that coffee-colored wood resin appears at the ends of the cut. It is advisable to wash it off with a cloth soaked in warm water or alcohol, and grind off the remainder. Please note that this is not carbon deposits (if it is carbon, then the cutting parameters were incorrect), the resin will affect the coating of the wood in this place with varnish, oil, wax or stain. It is not necessary to grind the internal surfaces of the parts, pay attention to what will be visible after the assembling of the model is completed.

8. Remove excess adhesive. While the adhesive is fresh, it is easier to remove it, but there is a possibility of smearing a thin layer of glue over the surface and this part of the wood will be less easy to cover with wood stain. Already dried glue is more difficult to remove, but it will not smudge. It's up to you to choose.

## **Recommendations for toning and painting of the model, which we used when building test models.**

We do not deny that this is just one of the many ways to coat a sailboat model (perhaps not the best and correct one) and take these recommendations as hints if you are a specialist. If you are not an experienced modeler and want to get a color scheme similar to ours, try to follow the recommendations as closely as possible.

The main color idea for this model is an old dark gray oak plank that has been worn from use on the deck and corners.

In principle, if you split the technology into successive steps, there is nothing complicated:

1. Surface tinting. Using stains (usually dark walnut or ebony is more suitable), apply 2-3 coats with a brush along the grain of the wood. Wait until it dries well. We use alcohol stains.  
However, the best tinting option is a paint gun, it will ensure a smoother and thinner layer.
2. Between the stages of tinting, you can grind the protruding peaks (as if lightening them). A soft sponge with a fine grain size of 800-1500 is suitable for this. This stage creates the texture of the model, it should be carried out at your discretion and taste.
3. The main thing is to develop a standard for the saturation of the tone, because this process will need to be repeated at different stages and on different parts many times. You must know how to reproduce the same color and tone over and over again.
4. After the body or individual part has passed the stage of coating with color (tone), the stage of varnishing or oil-wax begins. We recommend using a colorless matt varnish or oil (oil-wax). When working with a brush, the consumption increases, but 100 grams should be enough for the entire model.
5. The varnish is applied with a brush or spray gun, it is advisable to process separate parts (where possible), this will keep the joints neat.  
Oil (oil-wax) can be applied with a piece of foam rubber 15x15x15 mm tied with masking tape to a stick or holding it in your hands. It is applied in two or three layers, the drying time of the layer is from 10 hours (check with napkins). Layers 1 and 2 are carefully sanded with an emery sponge, if necessary, you should also develop the edges.
6. The most frequently used areas on the ship (deck aisles, steering oar knob, cleats, etc.) are recommended to be sanded or scraped more thoroughly after coating to achieve the effect of being wiped down to a fresh clean wood.
7. In any case, the tinting and painting process is very flexible (number of layers, sanding, choice of stain tone). To obtain a result that you will be satisfied with, we strongly recommend that you conduct the entire tinting process on wood from waste (trimmings, frames of parts). You can run several parallel tests at once to choose. And at this time, engage in the assembling of the base of the model before the painting stage. You should not immediately paint the details of the model, before you are convinced that the result will suit you.
8. When covering parts with oil or varnish before installing on the model, try to avoid the places that will be glued. This can prevent the parts from sticking together properly.

We recommend to apply toning or painting the model sails, if you leave the fabric untreated, the sails will not look harmonious with the model. We recommend choosing the way of toning the sails at your discretion, since there are a lot of them for every taste, budget and skill. The easiest is at the stage of preparing the fabric, toning it with tea.

## Explanations for the assembly steps:

1. Plate - **B3**.  
Assembling the stand with keel-blocks. Use glue, press well and fix the parts.
2. Plate - **B1 B2 B4 B5**.  
Keel gluing. Apply glue and try to hold the parts on a flat surface until dry to reduce bending along the keel. Assembly of mortise and tenon joint can be done by pressing or tapping the part to fit into the groove. In order not to damage the surface of the part when tapping, put something on its surface (a piece of plywood from a plate with parts).
3. Keel appearance after assembling.
4. Plates **C1 C2 C3 C4**, **C2 C3 C4** and **B1 B2 B4 B5**.  
All frame timbers, except foremost frame timber (bow) and after frame timber (stern), consist of several parts. You have to glue two main parts together for each frame timber. In total there are 17 frame timbers in the set: middle (mid-frame timber No.0), foremost frame timber and after frame timber (No.8) and the rest frame timbers from No.1 to No.7 (two sets). On each frame timber, a solid piece (beam) is installed in the groove. Each beam has a serial number, according to the frame timber, glue them so that the number on the frame timber and the beam is on the same side.  
Drill the frame timber No.1 and No.3 as shown in the figure in the corners of the beam.
5. Most of the frame timbers on the front (side with the number) have engraved grooves (on beams as well). Sometimes it is very small and inconspicuous, but it is not advisable to ignore it. It is best seen on the example of frame timbers No.8. You need to cut or grind off the grooves on the frame timbers along this line from the front side so that the outline of the frame timber remains intact on the back side.
6. The figure shows how the grooves on the frame timber should look like. There are teeth on the front side, on the back there is the original contour of the frame timber. The quality and convenience of laying the sheathing, as well as its appearance, depends on the quality and accuracy of the performance of this operation. Please take your time at this stage and be very careful.
7. Plate **E1 E2**.  
You need to glue the ledges on beams of frame timbers (imitation of the selected quarter) except for frame timbers No.0 and No.8, the deck will fit on this ledge. Each strip has a number corresponding to the frame timber and the index F or R - the first means the front side of the frame timber, the second - the opposite (rear) side. The ledge should be 1.5-1.7 mm below the top edge of the beam, as shown in the following figure.
8. External view of the frame timber with glued ledges on the beam.
9. Plate **C2 C3 C4** and frame timber **No.0**.  
Midship frame No.0 has a non-standard, reinforced beam shape, as it supports the mast. Stick the additional part of the beam of this frame timber so that there is an outline coincidence.
10. External view of frame timber No.0 with glued-in beams thickening.
11. The set includes three paper templates to facilitate and control the processing of parts. Gently glue (not hard to easily remove it) the narrowest paper template on the top edge of the reinforced beam of the frame timber No.0 as shown on the right side of figure 11.

12. **Frame timber No.0.**

Sand vertically those parts of the reinforced beam on frame timber No.0 that protrude beyond the paper template. As shown on the right side of figure 12 (don't forget the cylindrical mast slot in the middle. For this work, files, sandpaper are suitable, but a drill with an emery nozzle is best (with a drill, work will take much less time). Try to leave the finished surface flat and smooth, with the same gentle curve as on the template.

13. **Plate E1 E2.**

It's time to glue the beams on the midship frame. The principle of location is the same. To make it easier to bend and fix the ledge on an uneven surface, slightly moisten it. Clamp with pegs should be sufficient at the edges and inner corners of the bend. Allow the glue and wet ledge to dry well before removing the clamping pegs.

14. **Frame timber No.0.**

When the ledges are completely dry, cut out the part of the strip that overlaps the mast slot as shown in figure 14.

15. **Frame timbers No.8.**

Sticking ledge strips on frame timbers No.8. Front ledge (F) is glued like the others. The rear one is glued to the frame timber much lower. The distance from the upper edge of the beam to the upper edge of the ledge should be 14.5-15.0 mm. Figure 15 shows what result you should get.

16. **All frame timbers.**

Cut or grind off all the protruding ends of the ledges on the frame timber beams, according to the contour of these frame timbers.

17. **Frame timber No.8.**

The ship's body is almost completely symmetrical, so frames 1-7 are identical. However, the after frame timber No.8 has one difference from the foremost frame timber. You have to cut or grind off the upper right (when looking at it from the front) tooth on this frame timber, so that a common surface with the lower tooth appears, as shown in figure 17. Please note that the figure shows the frame from the rear.

18. **Installing the eyebolts in the keel. It is easier to accomplish it at this stage. The location of the eyebolt can be seen on the drawing sheet No.1 - the image of the section of the body, index A1 and A2.**

Also, at this stage, it is necessary to grind the stemposts in the bow and stern for narrowing in two planes. Using the images in **drawing 3**, first narrow the top edge. Then bring the front end to an acute angle. Moreover, the leading edge of the stempost should be reduced to 0 both from above and from the front, smoothly expanding to a standard width approximately to the center. Be careful not to grind the engraved part of the stempost.

19. **Keel and frame timbers glued together.**

It's time to assemble the base of the ship body. Glue the frame timbers sequentially into the keel. Be careful not to confuse the frame timbers in places and directions (in bow or in stern). Midship frame No.0 is glued exactly into the central groove (there is another mast groove next to it). The side of the keel with which the mast groove is located from the midship frame is aft (after frame or stern), the opposite side is bow (or foremost), so it turns out that the mast is slightly displaced aft from the center. All other frame timbers are divided into two sets. The stern set is glued in with the face towards the stern (do not forget that you have already prepared frame timber No.8 for the stern), the bow set is facing towards the bow and all of them together are turned back to the midship frame. Try to glue in the frame timbers exactly perpendicular to the keel in both planes, it is possible to use additional fixing tools and perpendicular stops.

20. **Plates F4 and F4 F8 F9 x2.**

The second stage of assembling begins with the keel sheathing. For the keel sheathing, you will need 10 slats from the specified part plates. The keel is sheathed symmetrically

on both sides. The relative position of the parts is shown in figure 21, as well as on drawing sheet **No.3** - a side view on a scale of 1 to 1. Pay attention to the picture in the circle in the figure of instruction No.21, try to glue the pins on the sternposts (front and back section of the keel) as much as possible in accordance with this figure.

21. View of a sheathed keel.

22. Plates **F10-1, F10-2, F10-3, F10-4, F10-5, F10-6.**

The first sheathing belt, like all subsequent ones, consists of 6 strips cut in the desired shape. On each strip of the sheathing there is a serial number of the belt, in the order of installation, as well as *an arrow on the central strip indicating the direction from the keel* to the top of the ship side.

On sheets of drawings **No.2 and 3** there are three clarifying figures.

- The first "Bevel" from the lower edge of the first sheathing belt from the plane adjoining to the sternpost to almost perpendicular to the keel at the midship frame. It shows how to grind off the bottom edge of the first sheathing belt so that it fits snugly against the keel.

- The second "cross-section of the hull" on sheet **No.3** Shows a cross-section of the hull along the midship frame to understand the logic of mutual laying of boards and indicates the need to remove a very small bevel on the upper edge of some belts for a better (tighter) fit of the next sheathing belt.

- The third figure "Tapering the edge of the sheathing boards" on sheet **No.2** indicates the need to sand the end of the slat in the bow (which is turned up), the next belt of the sheathing will lie on it, so that in the bow and stern the belts of the sheathing (No. 1-9) lay more tightly.

For convenient positioning of the sheathing slat, use drawing sheet **No.3** with a drawing - side view, where the joints of the sheathing boards are shown. The sheathing is made "in three boards", the joints of the first belt on frame timbers No.4, the second belt on frame timbers No.3, the third belt on frame timbers No.2, the fourth belt on frame timbers No.4 and so on. All belts except No.10 cover each other by about 1.5 mm along their entire length.

Based on these recommendations and guided by the drawings with the sheathing, start laying the slats. For fixing the sheathing slats on the frame timbers while the glue dries, you can use the parts from the plate **B1 B2 B4 B5**. In the upper left corner of the figure of instruction **No.22** it is shown that you need to insert two pieces of a round blank into them and how to apply them to the sheathing slat. You can get the cuts of a round blank by following point of instruction **No.61**, when calibrating round blanks to the size required for the oar.

When gluing the sheathing slats, try to do it symmetrically and simultaneously along both sides of the drakkar, and also watch the keel bends, if at the time of gluing the first belts the keel bend is not leveled, then the slats will only fix the curvature of the hull.

23. Plates **F10-1, F10-2, F10-3, F10-4, F10-5, F10-6.**

Fitting and gluing the sheathing belt No. 2. Follow the recommendations from article 22.

24. Plates **F10-1, F10-2, F10-3, F10-4, F10-5, F10-6.**

Fitting and gluing the sheathing belt No. 3. Follow the recommendations from article 22.

25. Plates **F10-1, F10-2, F10-3, F10-4, F10-5, F10-6.**

Fitting and gluing belts No. 4-5-6. Follow the recommendations from article 22.

26. Plates **F10-1, F10-2, F10-3, F10-4, F10-5, F10-6.**

Fitting and gluing belts No. 7-8-9. Follow the recommendations from article 22.

27. Plates **F10-1, F10-2, F10-3, F10-4, F10-5, F10-6.**

Fitting and gluing belt No. 10. Follow the recommendations from article 22. However, this belt is special. Belt No. 10 is the last to be glued to the keel sternposts and must complete and fit snugly along the groove geometry to the keel lining, according to the side view drawing, pay special attention to it. Also, due to the fact that nothing is glued

to the upper edge of the belt, it does not need to be narrowed. Moreover, the adjoining to the plane of the sternpost and to the frame timber No.8 horizontally will require bending the rail 90 degrees along the axis from the sternpost to the frame timber No.8. Therefore, on this segment for a snug adjoining, the lower end can be prepared in the same way as for the first sheathing belt. After gluing the belt along the entire length of the body, grind off the protruding part of the slat flush with the contour of the frame timber, so that they form a single plane for the next belt No.11.

**28. Plates F10-1, F10-2, F10-3, F10-4, F10-5, F10-6.**

Fitting and gluing belt No. 11. Follow the recommendations from article 22. Installing the central part first, and then the stern frame timbers and bow frame timbers will help you to position the slat, the top edge of the slat should rest against the step on the frame timbers, and the ends overlap the previous belt by 1.5 mm. After gluing sheathing belt No.11, if necessary, grind off the frame ledges protruding beyond the board of the 11<sup>th</sup> belt so that they form a single plane.

**29. Plate F10-3.**

Preparing 12th sheathing belt for installation. You need to glue the thickening of the sheathing board at the place where the steering oar is attached. Glue the parts as shown in figure No.29, and then sand the corners of the outer overlay as shown in the same place in the lower right corner.

**30. Plates F10-1, F10-2, F10-3, F10-4, F10-5, F10-6.**

Fitting and gluing belt No.12. Follow the recommendations from article 22. Installing the central part first, and then the stern frame timbers and bow frame timbers will help you to position the slat, the slat should overlap the previous belt by 1.5 mm. A part of the slat with a thickening for the steering oar should be installed on the aft frame timber No.8 in which you removed the extra protrusion in advance.

**31. Plates F4 F8 F9 x2.**

Installation of decks is one of the simplest steps. Do not remove all decks from the plates at once, so as not to confuse them or sign them on the back. Numbers from 1 to 9 are decks from the midship frame to the stern, numbers from -1 to -9 are the deck from midship frame to the bow of the Drakkar.

If you have managed to maintain the geometry of the hull and prevent bends or "screws", then the decks should be installed "dry" in their seats. If necessary, simply trim the decks in place with a little sanding of the ends.

To add aesthetics "to your taste", in addition to engraving the boards, you can also scrub these cuts in order to arrange bevel and increase the gap. Such manipulation can add texture to the model and improve the imitation of separate boards, but this is not necessary, they are already quite separated.

After you have made sure that everything is neat and coincides, start gluing the decks, try to glue the deck piece along the entire frame timber, so that there are no protruding bumps.

Perhaps it will be more convenient for someone to paint the deck and hull separately, before gluing. Especially if a different color scheme or approach is assumed.

**32. Plate F1 F2 F3 F5 F6 F7.**

Above each oar port, a 13<sup>th</sup> sheathing belt support must be installed, approximately halfway between the upper edge of the port and the upper edge of the 12<sup>th</sup> sheathing belt.

After that, the 13<sup>th</sup> sheathing belt is glued to these supports. Start, traditionally, from the central slat. Position it so that it is centered on the hull with both ends resting in the middle of the glued supports. Adjust the size if necessary. Then, resting on its ends, glue the rest of the sheathing boards. All 4 ends of this belt are glued to the board of the 12<sup>th</sup> sheathing belt, drawing sheet **No.1** - top view.

**33. Plates C1 C2 C7 and F10-3 (parts can be separated from plates)**

Gluing the steering oar stop. Position parts along the cut hole and outside contour. After the glue is completely dry, sand all corners and steps, sand to get smooth and level contours of the part as in figure No.33.

**34. Plate C1 C2 C7.**

It is necessary to round off the protruding corners and sand the steering parts clean, as shown in figure 34.

**35. Prepared steering oar support and three parts from article 34.**

It is necessary to glue a stiffener to the steering oar and glue the handle on the same side. The stiffener must be drilled (0.7-1.0 mm) through the hole in the steering oar. After the glue dries, sand the steering oar surface again for better smoothness of the surfaces along with the stiffener. The oar is installed in support on the stud attached to the model, in this case gluing is not necessary. This stage of attaching the oar to the support can be postponed.

**36. Assembled support and steering oar.**

Fit and glue the steering oar support to the hull (more convenient without an oar). Refer to Drawing Sheet **No.3** for positioning the support on the ship's sheathing. It may be best not to install the oar at this stage to avoid accidental damage during operation. It is best to install and tie the oar when working with rigging.

**37. Cleat parts are not supplied with the plate.**

Place all 10 cleats on the inner sheathing of the drakkar. For correct calculations of the installation site, consider drawing sheet **No.1** - section of the hull. It is also allowed to drill holes in the cleats and installation places for additional fastening of the cleat to the axle, which will increase the rigidity of the structure for loads when pulling the rigging, and will also allow you to additionally create several textured little things on the hull using studs as bolts for fastening the cleats. Round caps can be sanded down to square caps for realism.

**38. Details of the bow and stern figure - the head and tail of the snake (can be supplied without a plate)**

Glue the bow and stern figures with planes to each other, try not to allow displacement.

**39. Plates C1 C2 C3 C4 and C2 C3 C4.**

Round and sand the corners of the "forked sticks" to lay down oars.

**40. Plate D1 D2.**

Round and sand the corners of the blocks and deadeyes (in this case of presence a doubled cleat) as shown in figure 40.

**41. Plate C1.**

The two parts of the mast stop are engraved with two vertical lines. This is a marking of the place through which the mast passes. We recommend that you make a hollowing with an arc within these lines, as shown in figure 41. Hollowing depth up to 3 mm. After complete gluing, you can finish the hole when assembled.

**42. Plate C1.**

The third stage of assembling is equipping the ship. Before gluing the package from the parts of the mast stop. We recommend that you grind the contact surfaces of each part, this will ensure a tight fit and minimize the visible seam, since the part should look like a solid block. It is most convenient to perform such grinding on a "lapping table" - lay the emery sheet on a flat surface and fix it, drive the part with the desired plane over the surface of the emery paper until a smooth surface of the part is obtained.

The assembly sequence of the parts package is shown in figure 42. A reference for mutual positioning can be a groove or an outer contour of each part. The more accurately and tightly you glue these parts, the easier and better the further work will be.

**43. Glued blank of the mast stop.**

Before proceeding with further work, process the resulting package of parts. On the lapping table, level the plane of the entire package. Using grinding tools, level the surface of the groove from below and the arc with which the groove intersects. Remove any glue that has come out from the seams and lightly sand the top surface with an emery sponge.

**44. Glued blank of the mast stop and paper template.**

Time to use a second paper template. You will need a wider one. Also stick it on a small amount of glue so that later it will be easy to remove it. Position the template to the hole in the mast.

**45. Glued blank of the mast stop and paper template.**

The result obtained after fixing the template on the stop blank. The entire array of wood protruding beyond the template must be sanded perpendicular to the plane of the base of the stop; in this case, a drill with emery nozzles will again be most effective.

**46. Glued blank of the mast stop.**

Remove the paper template from the part. What you should get is shown in figure 46.

**47. Blank of the mast stop and paper template.**

Glue the third and last paper template onto the mast stop, it is narrower than the previous one. It will also need to be removed, do not use a lot of glue.

**48. Blank of the mast stop and paper template.**

This is the result after applying the third template. Start sanding the corners of the mast stop protruding beyond the template. Instead of a right angle along the entire template, you should have a radial fillet with a variable radius, depending on the height of the stop body at a particular location. Try to arrange a fillet symmetrically on both sides, aim for the result shown in figure 49. A small part of the sidewalls of the stop must remain level and at a right angle to the plane of the base of the stop.

**49. Mast stop.**

Compare the result of your work with the figure. This is one of the most time consuming and demanding stages of work, try to take your time and work evenly and smoothly.



50. Mast stop and overlay on the stop (plate **F1 F2 F3 F5 F6 F7**)  
Glue an overlay on the stop that simulates an insert that blocks the mast. The presence of a slight bend on the stop is not a problem, slightly moisten the part of the overlay and glue it in the same way as you glued the beam ledge on the midship frame.
51. Prepared mast stop.  
Perhaps at this stage it will be more convenient for you to do the toning or coloring of the stop before installing it on the deck.
52. Details of decor (supplied separately or on plate **F4 F8 F9**)  
Installation of decorative overlays in the bow and stern taper of the sheathing, as shown in figure 52. Most likely you will need a necessary fit in place, the details have a sanding gap for a snug fit.
53. Bow and stern figures, mast stop and "forked sticks" for oars.  
Glue the bow and stern figures into the corresponding grooves as in the drawings. Install and glue the mast stop on the deck, find the appropriate position depending on the hole in the deck and in the stop. It is important to install the stop with a pad in the stern.
54. Plate **F1 F2 F3 F5 F6 F7**.  
Prepare all 30 shield handles, round the central part as shown in the left corner of figure 54. Sand round "bosses" from shields to get a smooth and even surface. At this stage, if you plan to paint shields, it may be more convenient for you to paint the parts separately from each other for accuracy, and then glue them together.  
Glue the shields together as shown in figure 54. The two circles of the shield are glued together by nailing and stripes outward, but so that the strips of boards run perpendicular to each other. When the parts are impregnated with glue and get dry, the shields can be "twisted", it is advisable to leave them under pressure. Even if they do bend afterwards, knead them slightly in the opposite direction, it will help to align them. Then glue shield bosses on one side of the shield hole, neatly, in the center, and on the other side glue the handles, also in the center.
55. Finished shields.  
At this stage, you can try on and install the shields, but it is better to remove them before the end of all work, so that they do not interfere the assembling and accidentally get spoiled.
56. Plate **F1 F2 F3 F5 F6 F7** and **E1 E2**.  
Gluing the ship ladder is quite simple, glue the transverse boards to the ship ladder in steps as shown in the engraving.
57. Plate **F11 F12**.  
Assembling a conductor for seaman's chests (stools, small chests)
58. Plate **F11 F12**.  
Using the conductor, assemble all the seaman's chests one by one, try not to glue the seaman's chest you are assembling to the conductor. After gluing all four walls, it is advisable to grind the upper end of the structure for a snug and neat fit of the lid.
59. Plate **F11 F12**.  
Glue the seaman's chest lid after sanding the top edge.
60. Plate **F11 F12**.  
Remove the seaman's chest from the conductor. After all 30 pieces are ready, you can start toning / staining / coating with chemistry.
61. Round blanks 3 mm.  
Cut off the necessary blanks for making oars. The length of the pole must be 150 mm.
62. Round blanks 3 mm.  
Grind off each oar pole from one side to 1-1.5 mm in diameter and 10-15 mm in length. It is important that you can make them as similar as possible.
63. Round blanks 3 mm and plate **F1 F2 F3 F5 F6 F7**.

Glue the prepared polo into the blade of the oar. Try to work smoothly and neatly, remove any glue that has come out.

**64. Blanks for oars.**

Sand off the protruding corners of the polos so that they come smoothly into the surface of the blade, as shown in figure 64. Then round the end of the blade along the contour, and slightly reduce the thickness of the blade towards the end.

Once the oars are finished, they can be chemically coated / tinted.

**65. Seaman's chest, oars, ship ladder.**

You can install / glue finished and painted seaman's chests, oars, ship ladders. Or postpone it until the end of the work with ship rigging, so that fewer items interfere with your work.

The ship ladder is laid at your discretion, as in the figure, under the ship side, etc.

Installation of seaman's chests (benches - stools for rowers) can be done in different ways as well. These are freely movable objects. During rowing, they were located near each oar port along the axis of the hull (so they are more stable). If the crew is not complete, then not all were used. They could be put all together on deck, removed to the under-deck space, etc.

The oars can be stowed along the ship sides in the forked sticks intended for this, or inserted into the holes, it is up to you to decide.

**66. Glue the Decorative Carving Plates to the strips of the sternpost and the plank of the sheathing of the 10th belt, for convenience the decor is marked with engraving.**

**67. Mast blank and plate F1 F2 F3 F5 F6 F7.**

Use drawing sheet **No.3** to specify the dimensions of the mast shaft and yard. Use the blanks from the set, grind off the excess on a taper and round off the ends. Drill holes at the top of the mast and glue two stops on the sides of this hole. At this stage, you can paint / tint the mast and the yard.

The mast can be rigidly glued into the stop seat or not glued, and you can leave the possibility to disassemble the model mast and spars - it's up to you.

**68. Sheets of drawings.**

All major work on the model has been completed. The fourth, final stage of assembling the model begins: rigging, installation of fittings on the model.

The following points of the instruction are recommendations and explanations for the rigging wiring diagrams. In this issue, a clear sequence of work is not required.

1. The main diameters of the used ropes are 0.5 mm, 0.7 mm and 1.0 mm. On the diagrams, the ropes are marked with these diameters for your convenience. There are many repeating lashing nodes in the drawing, these nodes are made with a 0.5 mm thread and signed in several places, the rest of the lashing is performed in the same way, but not signed in order to avoid overloading the drawing with inscriptions.
2. The points of attachment and binding of the ends of the rigging are indexed in black bold text.
3. The ends of the ropes, which are depicted in an unbound state, are signed with a white index with a black outline corresponding to the index of the attachment point for orienting which rope to knit where.
4. It is desirable to fix the rigging nodes with glue (for example, cyanoacrylate). But be careful, instant adhesives are sometimes highly fluid and will easily saturate wood and stain. Use the minimum necessary to secure the knot itself.
5. You can calculate the lengths of the ropes directly from the diagrams and applying to the model. We recommend that you carefully calculate the entire length of the rigging and do not make too large gaps for knotting, although the threads of the rigging are given in an extensive quantity.
6. Drakkar's rigging is quite simple. For self-control, you just need to calculate: the sail on the yard is knitted at 6 points and has 8 ends, the yard is knitted at 3 points and has 6 ends, the mast is knitted at 5 points (in fact, in one) and has 5 ends.
7. The main methods of knitting the rigging are shown in drawing No.1, this is our version, you are free to do it your own way.
8. The free ends of the ropes of the running rigging, remaining near the cleats, can also be decorated with coils lying or hanging near. For the convenience of forming a coil, it is better to perform it separately, then bring the free end of the rope into the coil using a needle and fix it with glue.
9. According to drawing No.1 tie the steering oar through the holes in the sheathing board with 1 mm thread.
10. It is desirable that the blocks of the shrouds (deadeyes) are on the same horizontal line, both lower blocks and upper blocks.
11. It is assumed that the sail must be made independently using the attached drawing (sheet No.2). A sail is a rather complex and work consuming element. Don't overlook the importance of sailing in the overall look of the finished model. Try to devote enough time and attention to the sail and the result will not disappoint you. Moreover, this model has only one sail.

Use a roll-up sail pattern to prepare a piece of fabric that fits the dimensions. Some modelers pre-prepare the fabric itself for work, impregnating it with a weak PVA solution, starch it, iron, etc. A tougher piece of material is easier to work with.

After cutting out and then tucking the sail fabric along the contour, the entire sail must be stitched. The entire sail is stitched along the fold and vertically as in the figure - this simulates the fact that it consists of separate stripes that correspond to the width of the loom (it is believed that the Viking sail could be made of wool, but we suggest a more classic version).

After the main stitching, you can paint the sail in white and red along the canvases using a can of paint and masking tape (painting is not an obligatory step, since the very fact of the historicity of this approach to drakkar models is disputed).

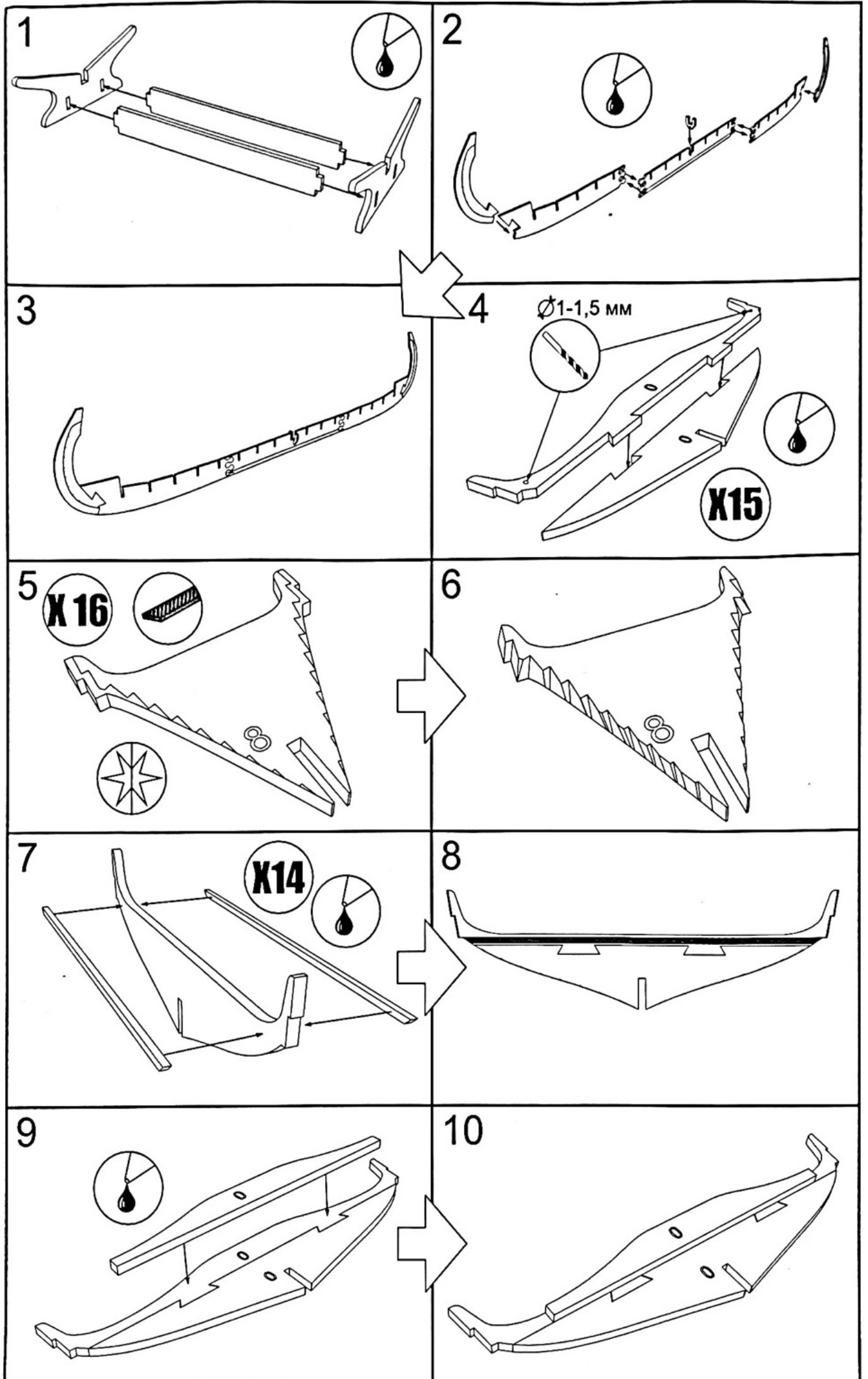
Then, along the contour of the sail, it is necessary to sew a leechrope, while it is advisable to pass the thread through the body of the rope itself, piercing it with a needle, this is more difficult, but more correct. Remember to shape the corners of the sail with leechrope loops.

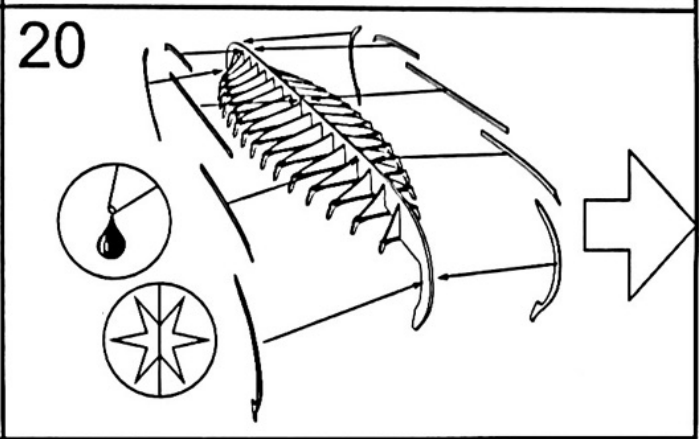
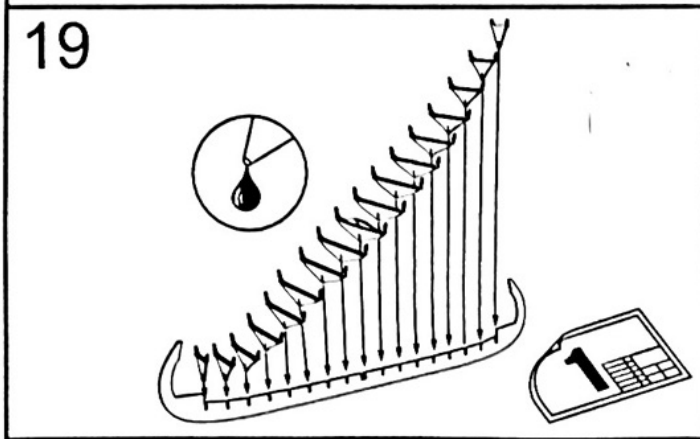
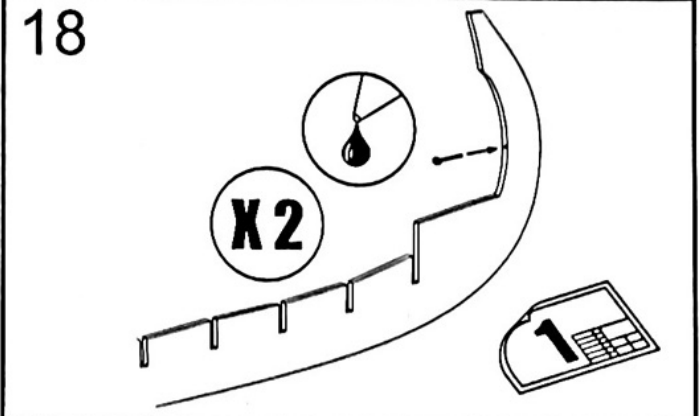
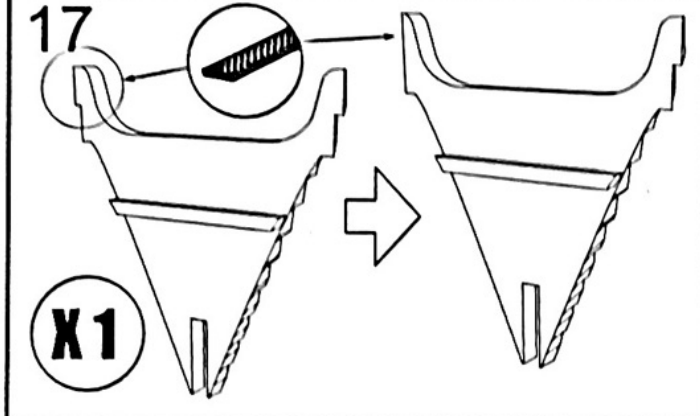
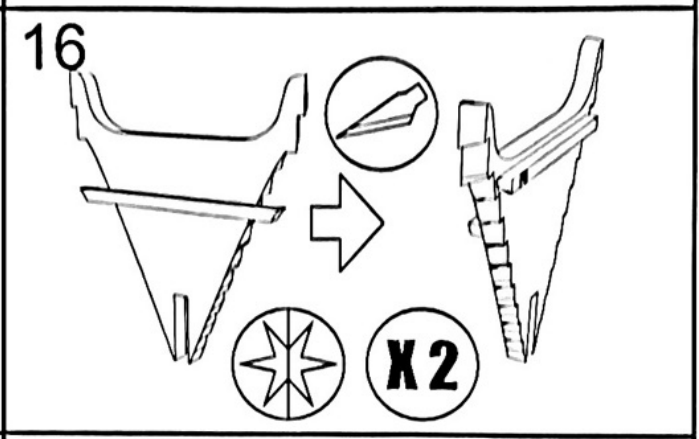
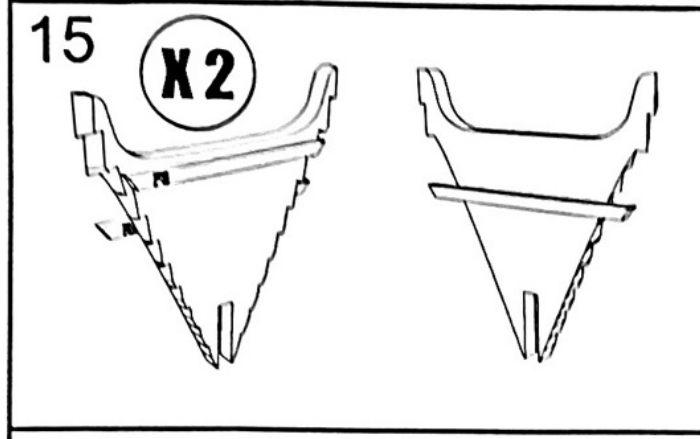
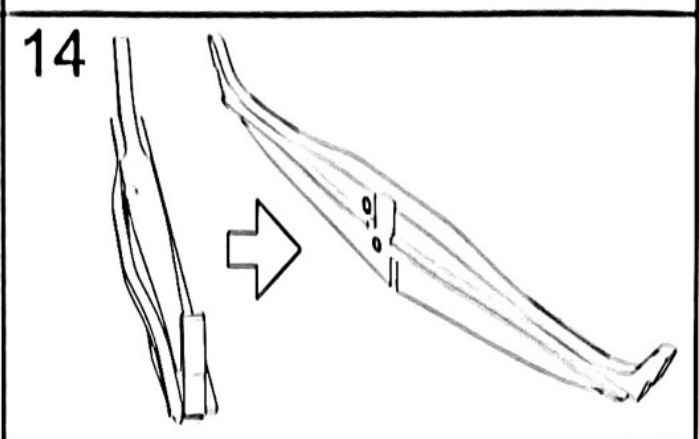
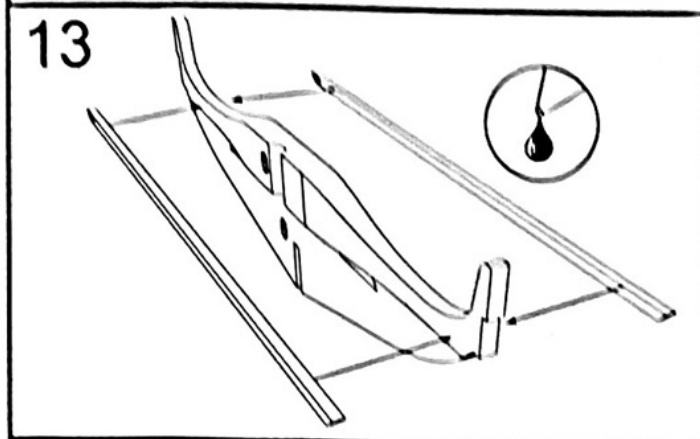
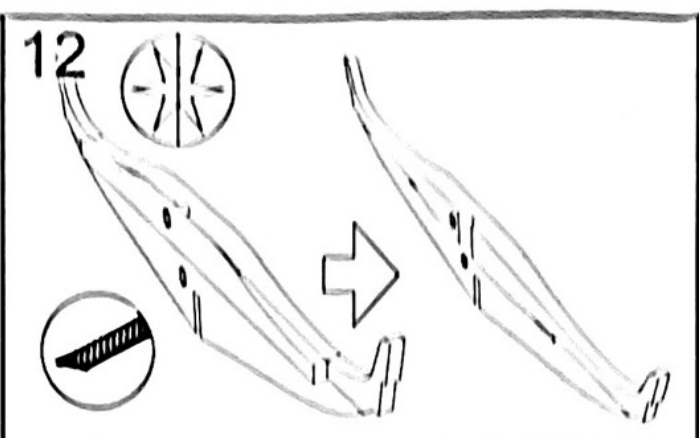
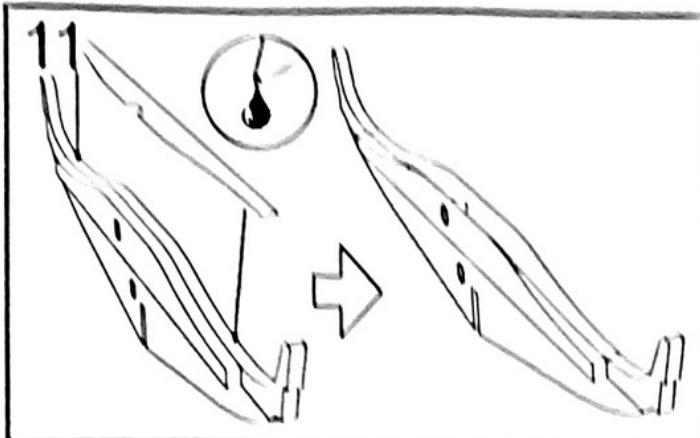
The last stage of preparing the sail is attaching it to the sailyard, carry out the stitching according to the drawing. Please note that in the drawing the sail is not sewn tightly to the yard, this is done for a better view; in fact, there should be no gap between the leechrope and the yard. Also, when sewing the sail to the yard, pass the thread not behind the leechrope itself, but slightly into the fabric of the sail, 1-2 mm deep from the leechrope.

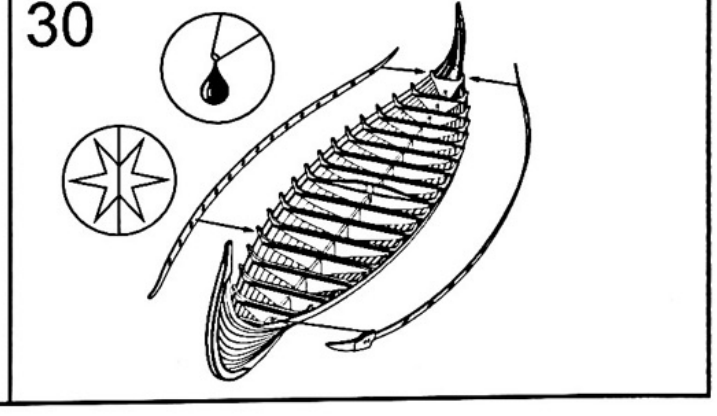
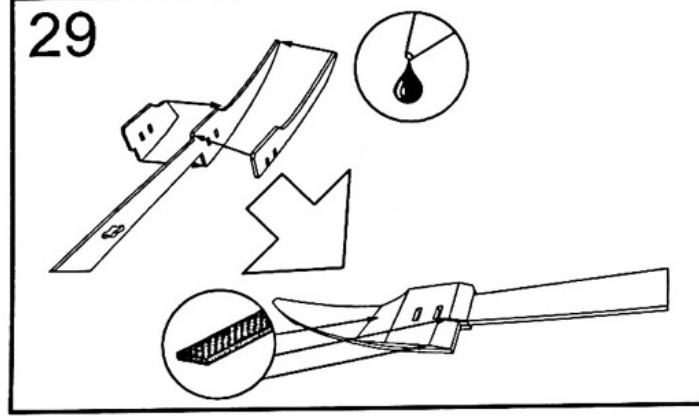
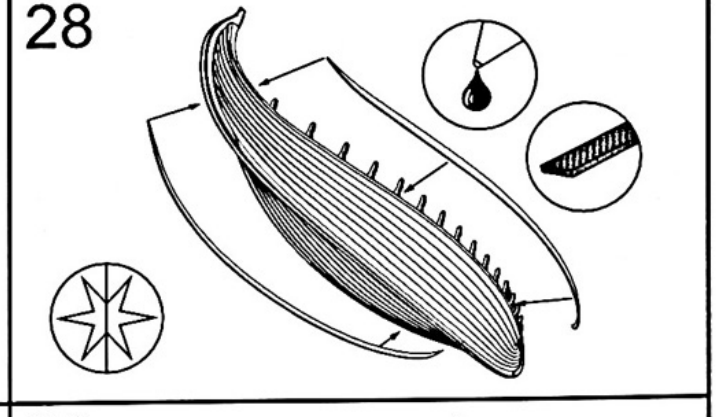
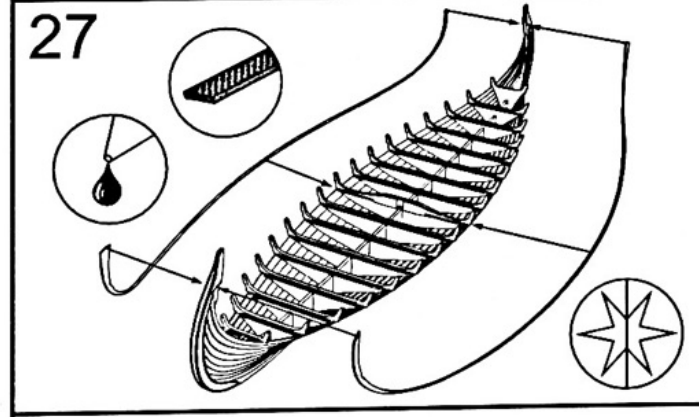
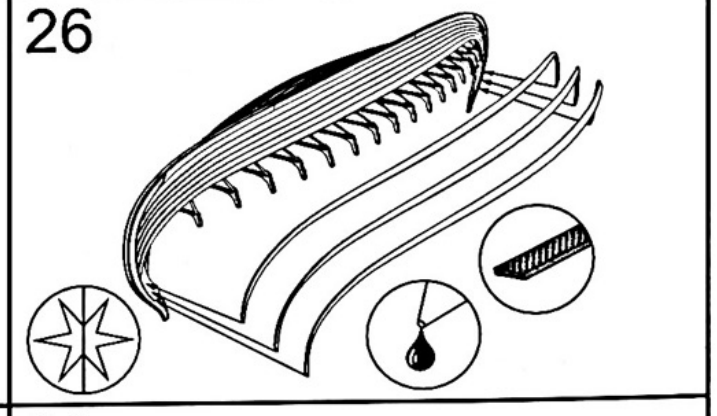
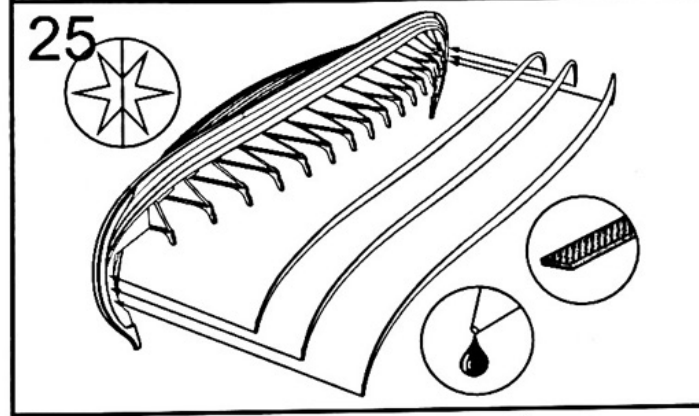
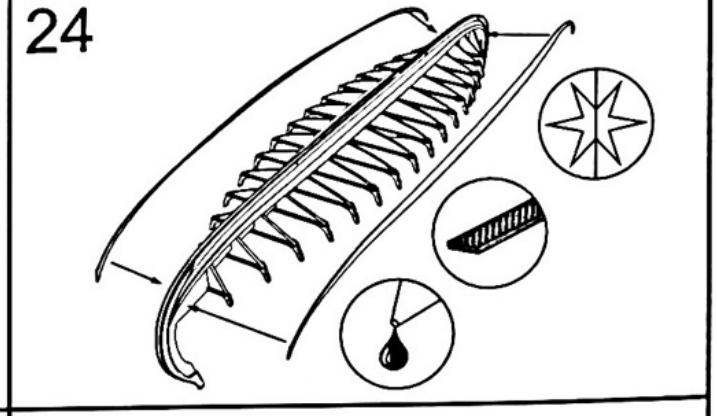
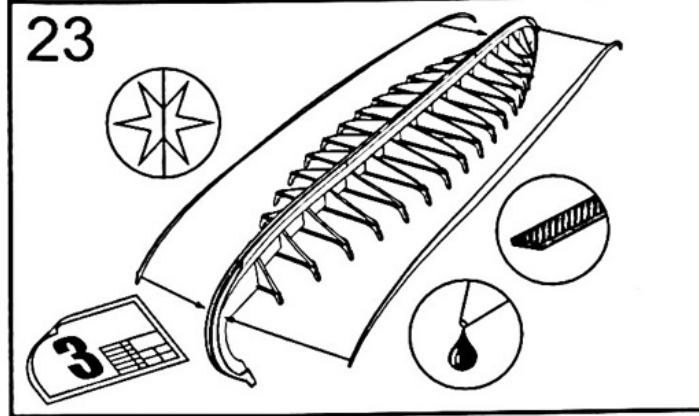
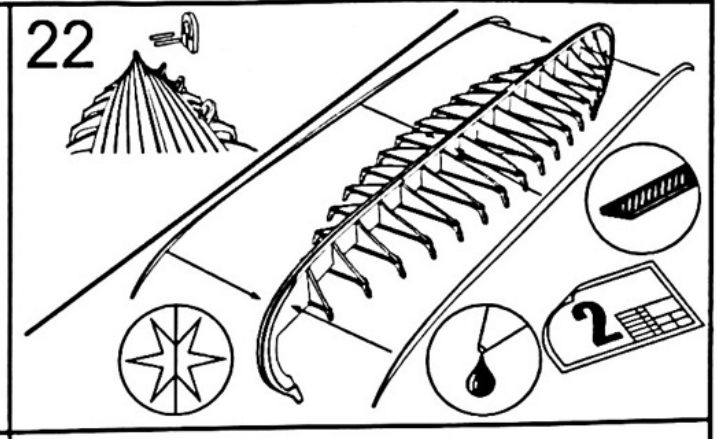
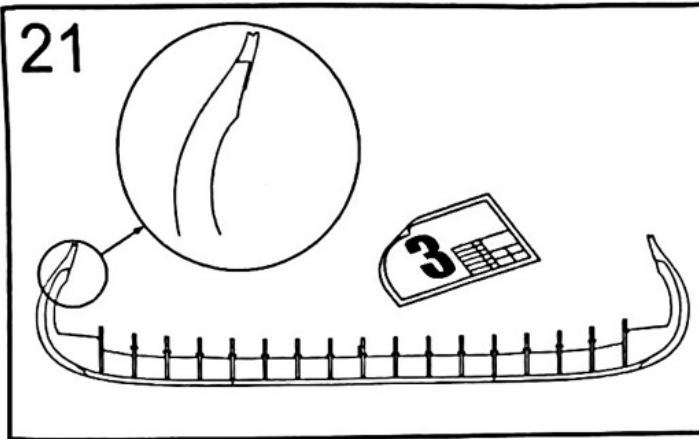
After the sail and yard have been sewn together, you can form a fullness or leave the fabric hanging as it is. In order to form the natural fullness of the sail, we offer the following method:

- i. Before starting sewing work, we do not recommend ironing the fabric, it is better to wrinkle it even more with moisture. This will give the unfolded sail a realistic dented texture after dense folding.
- ii. After the sail has been completed with all the elements, fix it to the yard according to the drawing. Attach it tightly, the sailyard should not turn round.
- iii. The sail fixed to the yard must be suspended horizontally. For example, hang it between two slats or blocks by the yard and the bottom loops (clew corners). Do not pull it tight, it should have slack to form a bump from the wind.
- iv. Moisten the entire surface of the sail (try not to moisten the yard, better cover it with masking tape).
- v. Look at pictures of inflated sails on the Internet or in books. Form your understanding of the physics of the process, what shape one or another type of sail has when exposed to wind. Using the knowledge gained, shape the sag of the suspended sail at your discretion using sandbags, bags of water, bags of granules, etc. Let it dry.
- vi. After the fabric is completely dry, it will "remember" its shape. Now you need to fix it. You can use transparent matte varnish in spray cans, hairspray, we use NC varnish and a spray. It is better to put several thin layers and let them dry completely.
- vii. After fixing the shape of the sail, glue the leechrope with cyanoacrylate glue in 3 layers, except for the segment that adjoins the yard. The sail will receive a reliable springy frame. Be careful with the glue, try not to put it anywhere other than the leechrope, otherwise you can ruin the appearance of the sail.

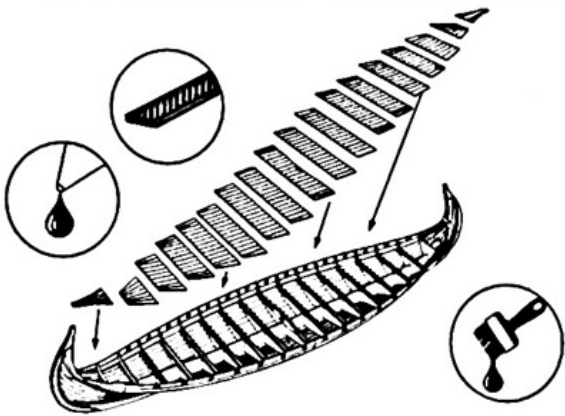
After the leechrope is completely dry, the sail is ready for installation. Provide in advance that the inflated sail should not "hang" on the yards, it has a forward deflection (in the direction of the wind), both from the upper and from the lower yard or deck. The deflection is given by the angle of rotation of the yard on the mast when fastening, in this case the tightness of tying the sail to the yard plays an important role.



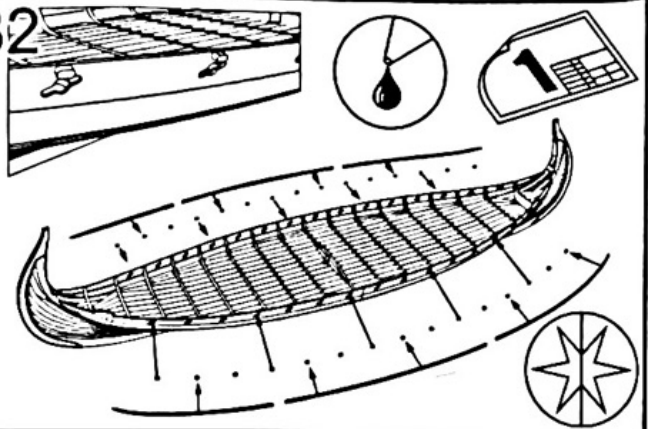




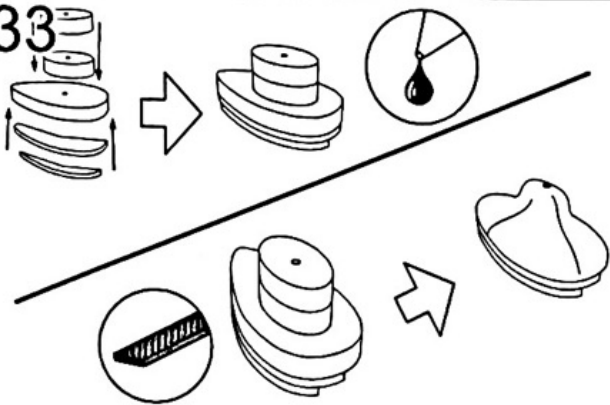
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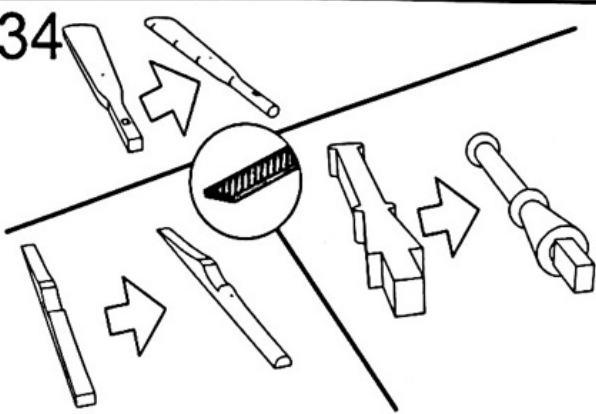
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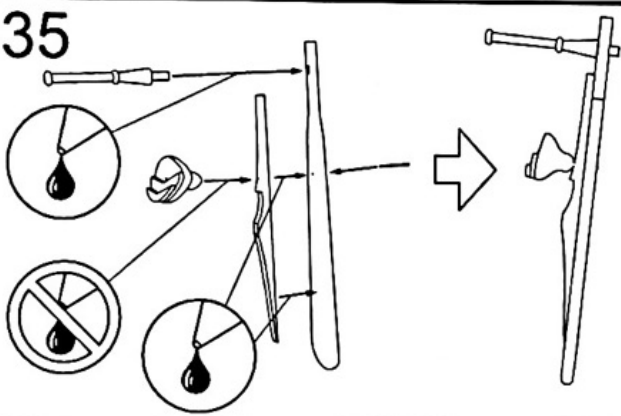
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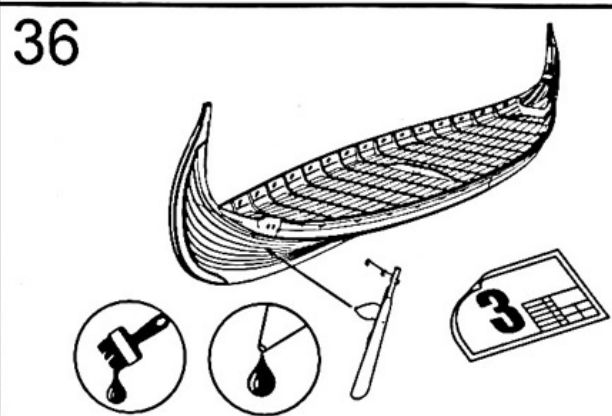
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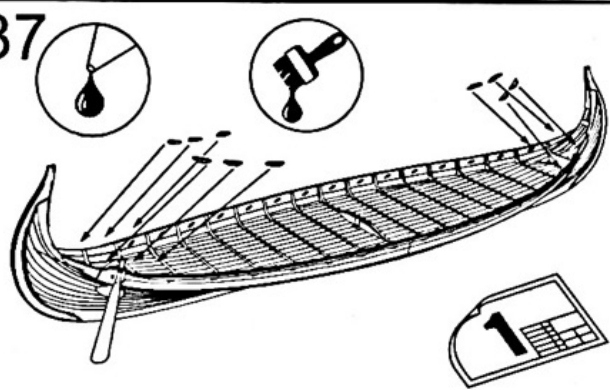
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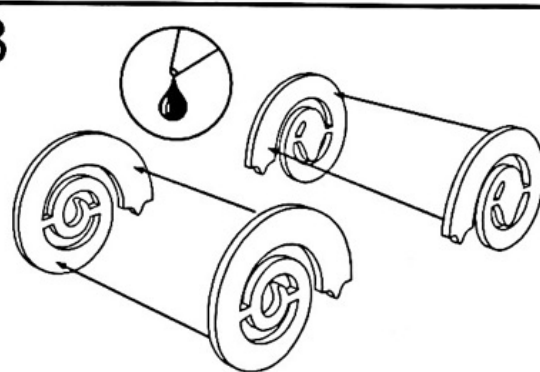
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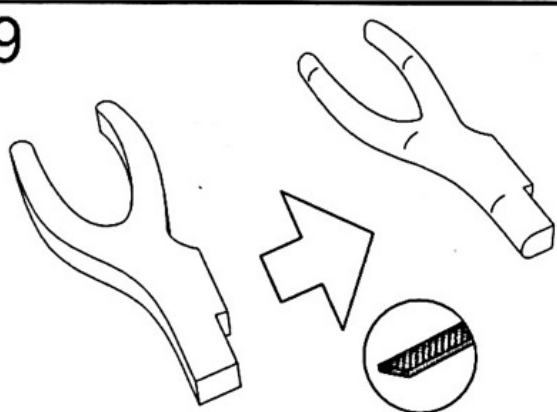
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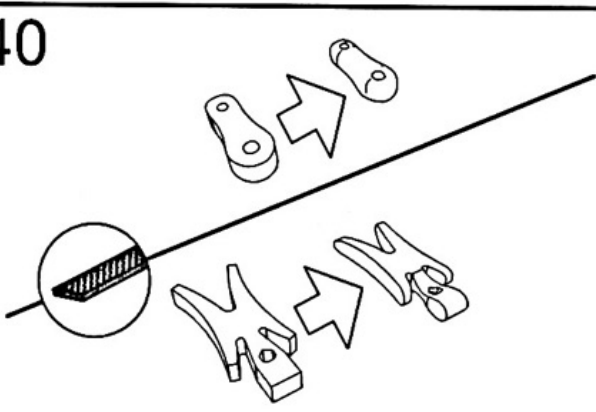
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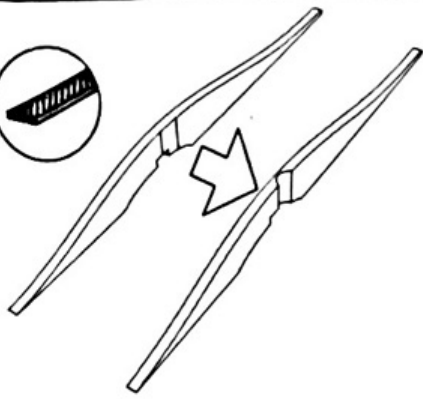


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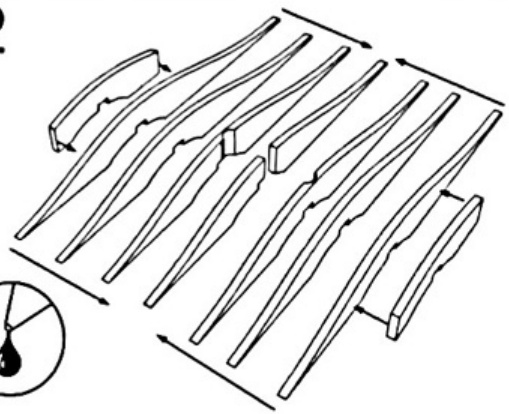




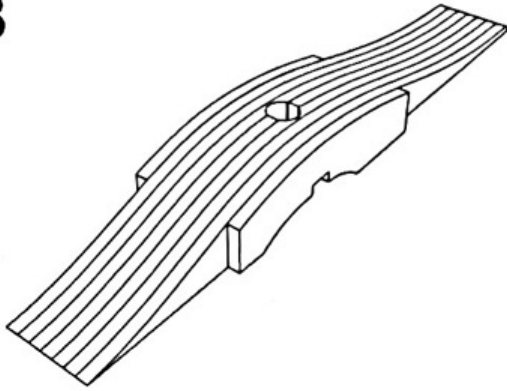
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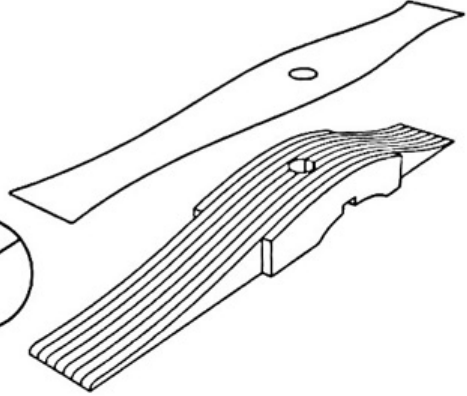
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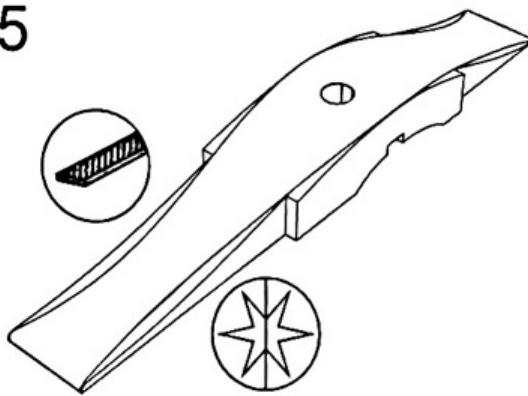
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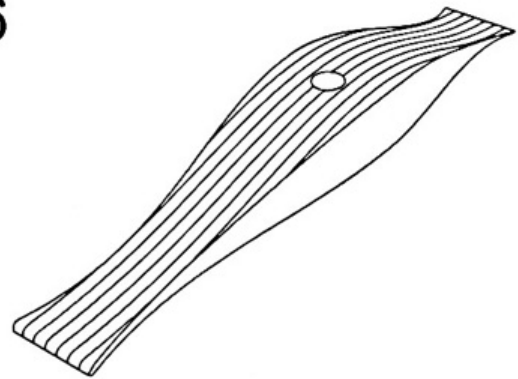
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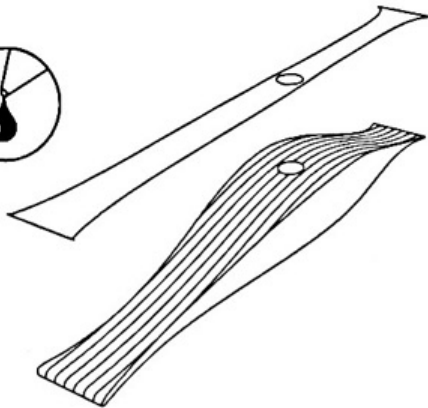
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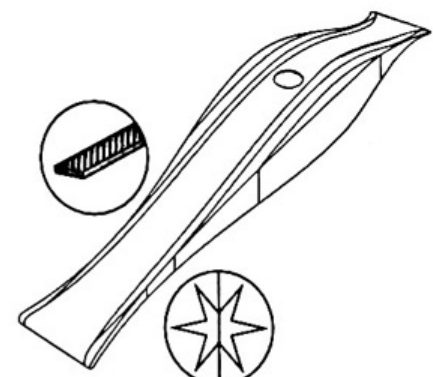
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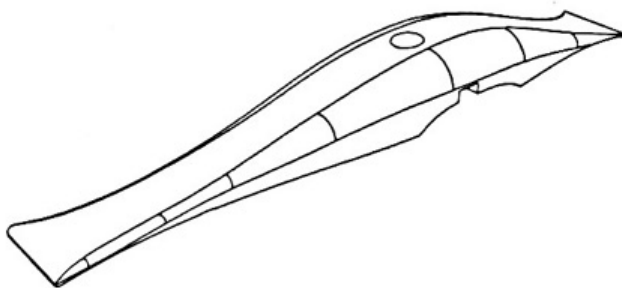
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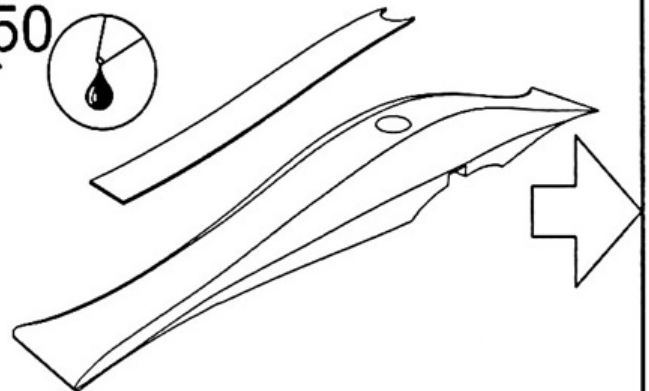
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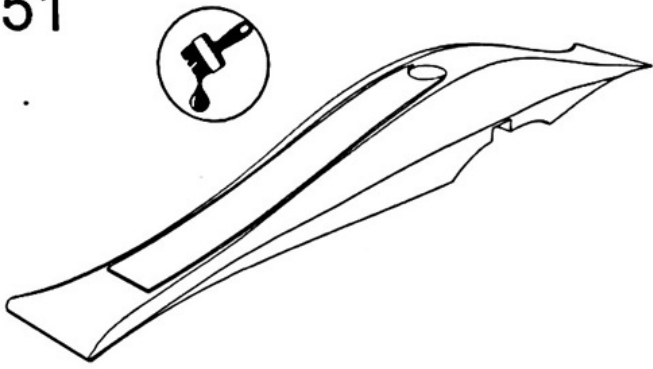
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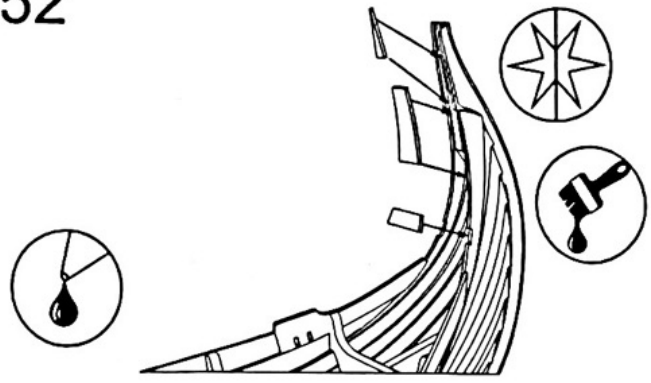
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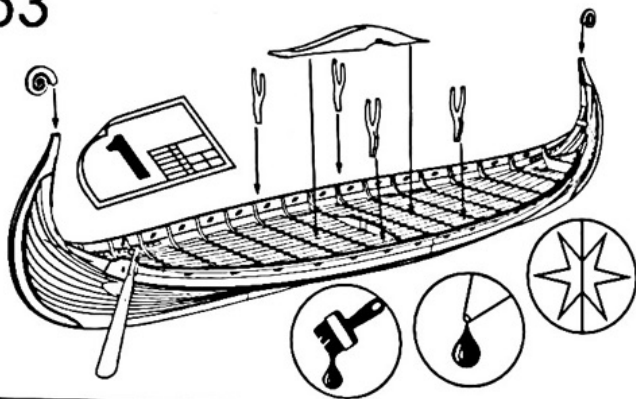
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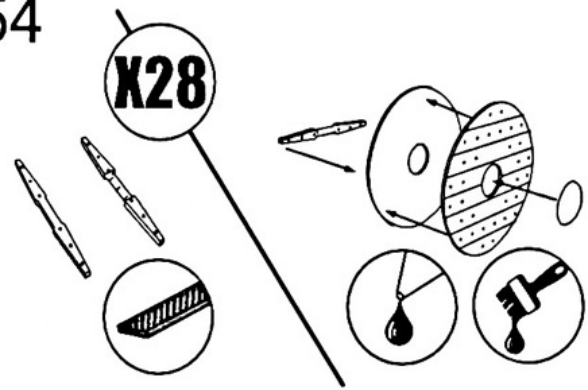
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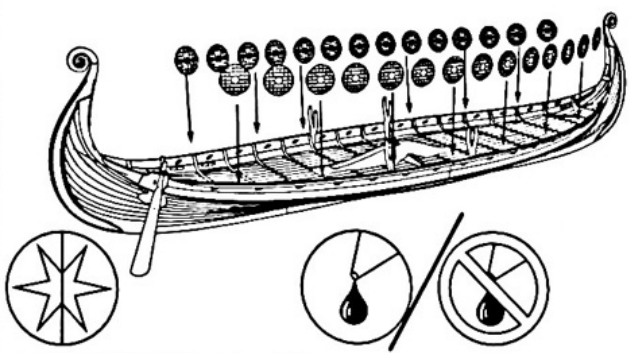
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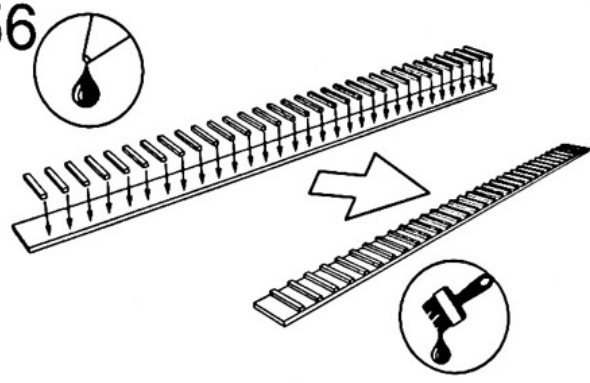
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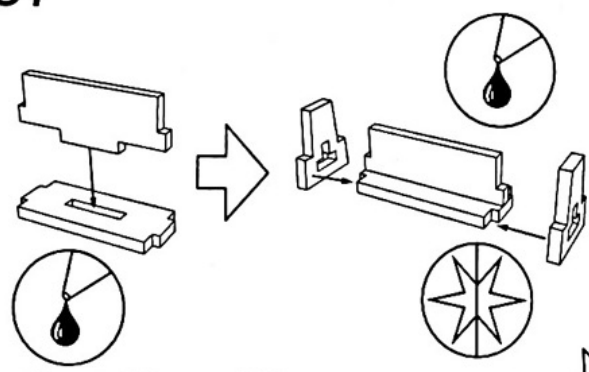
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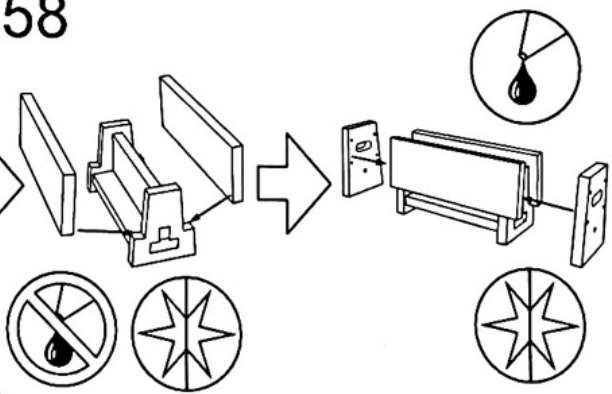
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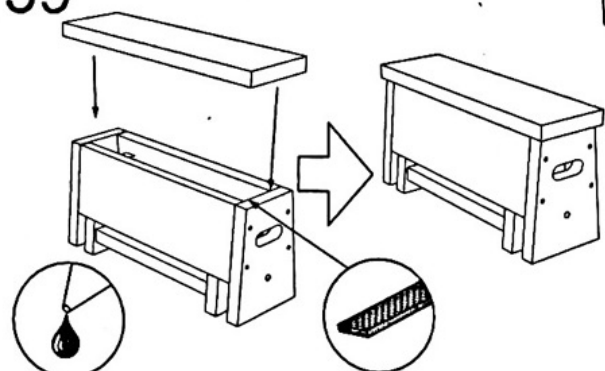
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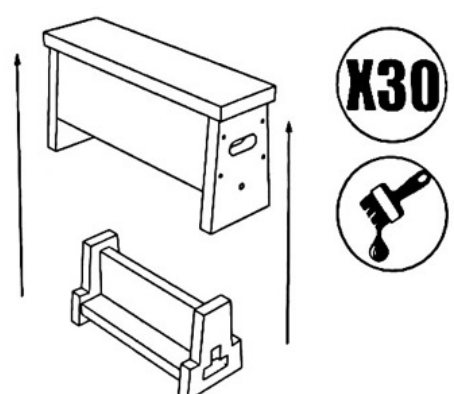
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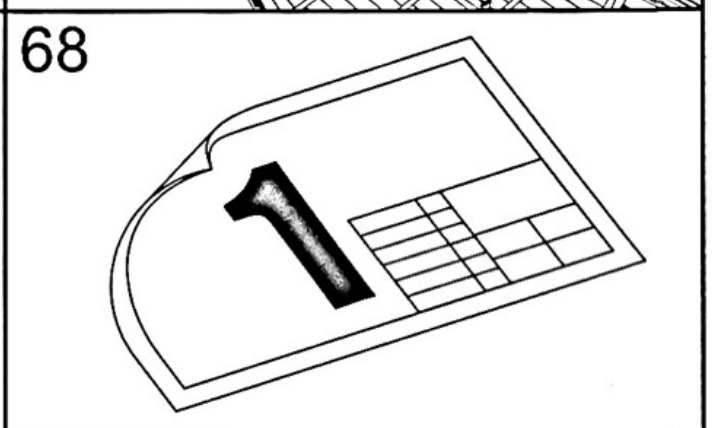
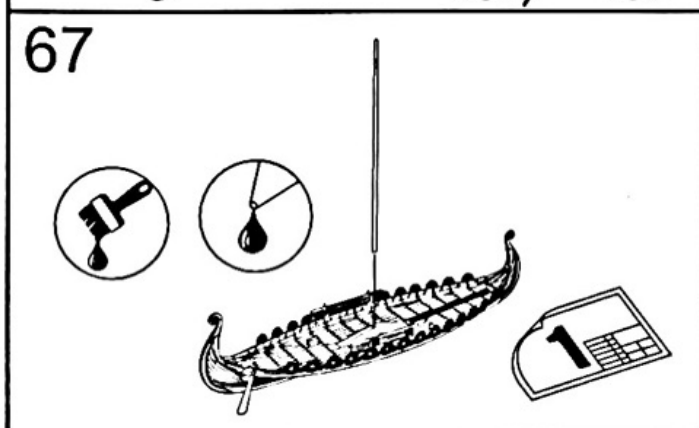
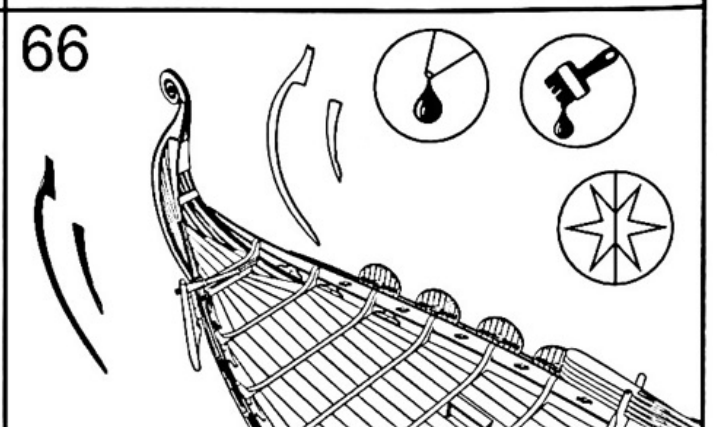
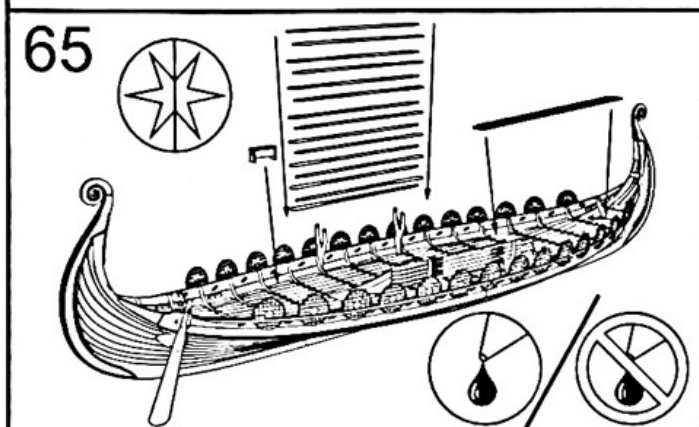
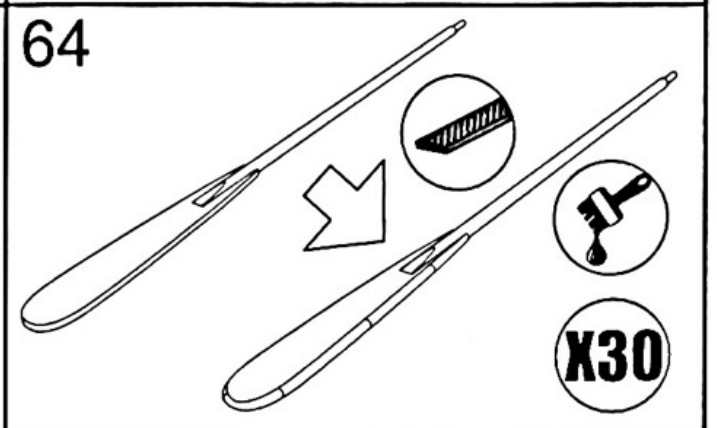
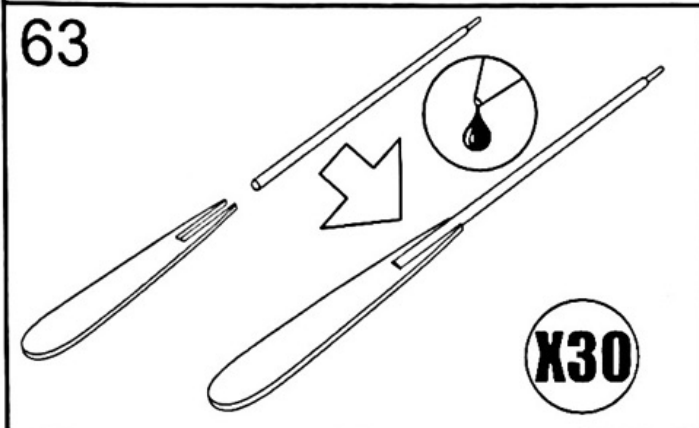
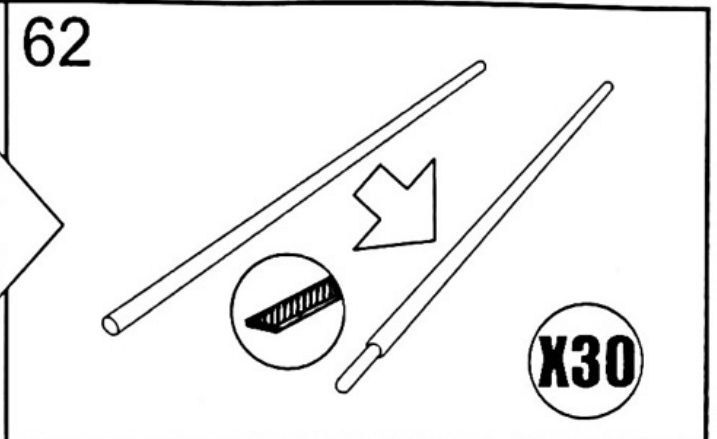
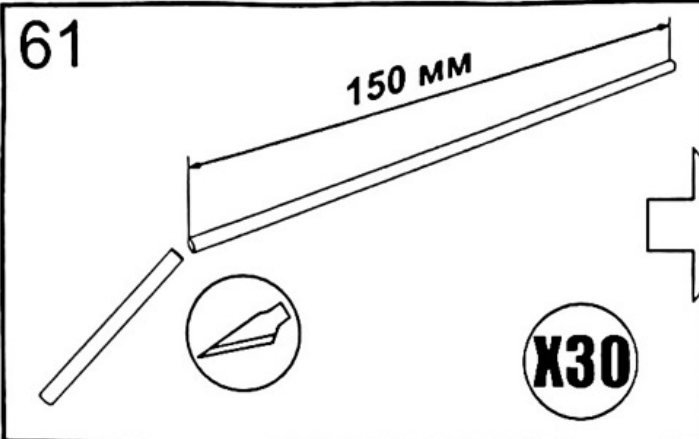


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## Условные обозначения:

**12** - порядковый номер этапа сборки;

**1 2 3** - последовательность действий на этапе сборки;



- обрезать лишнее (вырезание, подрезание и т.п.) в нужный размер;



- требуется шлифовка надфилем или наждачной бумагой для точной подгонки деталей по месту;



- на данном этапе сборки проводится склейка элементов;



- на данном этапе сборки склейка деталей не нужна;



- к данному этапу сборки есть пояснения или рекомендации в текстовой части инструкции;



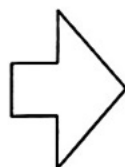
- симметричная установка деталей. Отображенный этап на изображении требует установку аналогичных деталей с противоположной стороны;



- требуется сверление отверстия с заданным или произвольным диаметром;



- номер детали;



- переход от изображения этапа сборки к изображению результата, который должен получиться;



- повторить операцию указанное кол-во раз;



- деталь или участок модели требует окраски (покрытия морилкой, лаком, маслом, воском) на данном этапе сборки для удобства в дальнейшей работе. Это рекомендация разработчиков, если Вы видите более правильный и удобный для себя путь - следуйте ему. Выбор вида покрытия и цвета Вы можете осуществлять исходя из своих собственных предпочтений и вкуса;



- номер листа чертежей, на которых изображена дополнительная информация о габаритах или конструкции нужных деталей.