

Concrete Boat

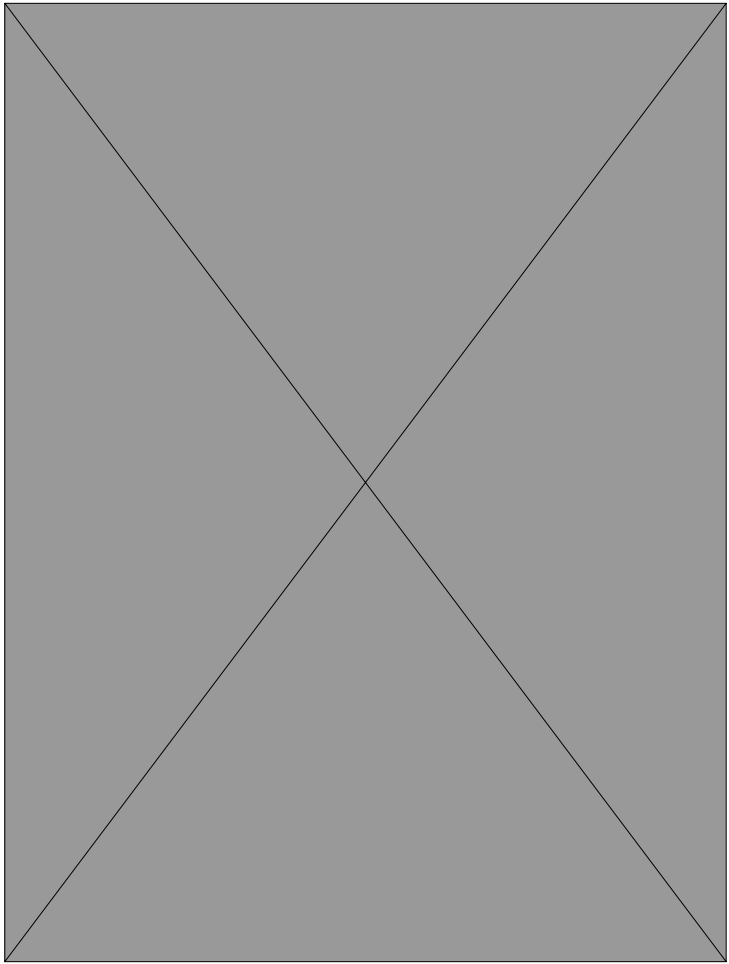
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Brian O'Connell

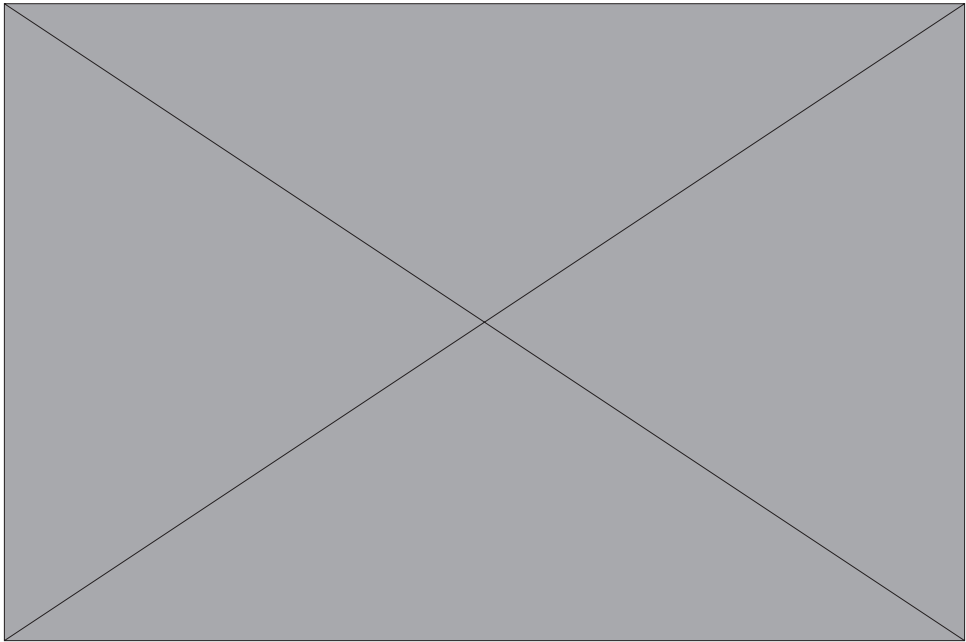
Test boat in the East River,  
New York City, February 2009.



Making a concrete boat using beach sand as both a form and a material is described in the 1971 edition of the The Whole Earth Catalog.



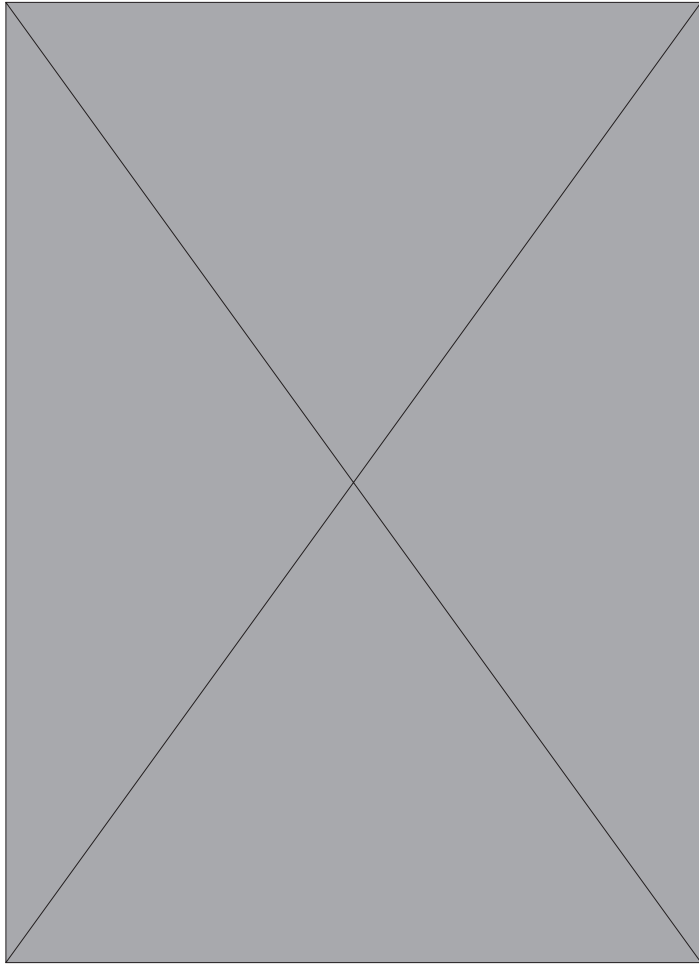
Test boat at the East  
River, New York City,  
February 2009.



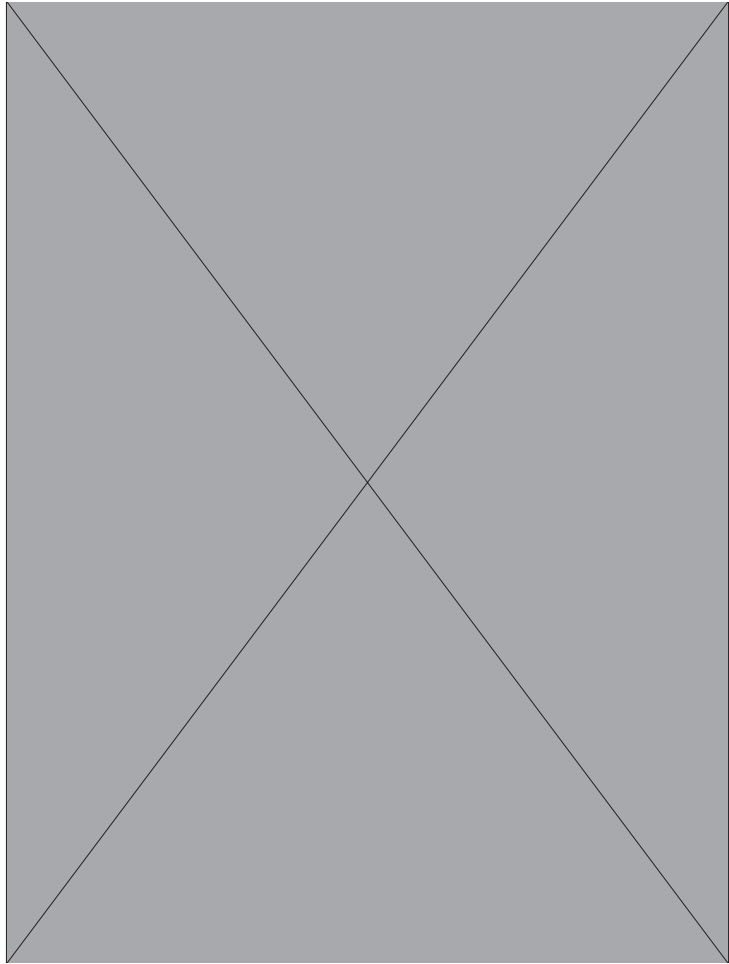
Chicken wire mesh tied in  
five ply reinforcing mats  
made ahead of time at  
Malibu Canyon State Park.



This 1969 book is an exhaustive history and guide to concrete boat building. It is the original source of the beach boat concept. The use of concrete in boat building is traced to Joseph Lambot who first patented *fericement* in 1855. Feri-cement or ferrocement is cement combined with significant amounts of flexible steel.



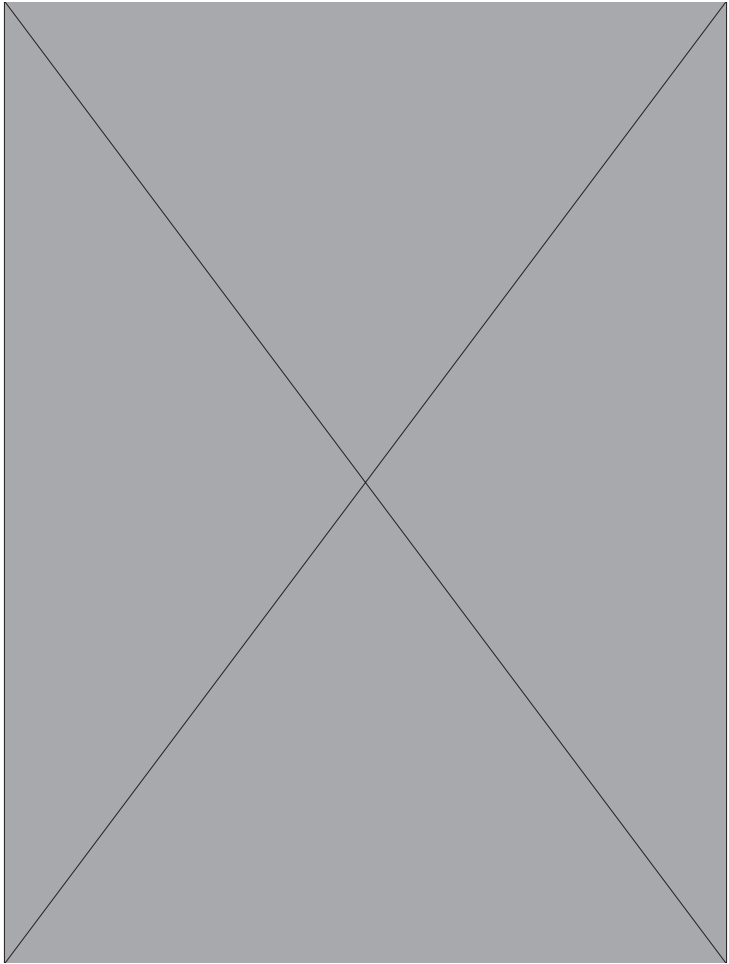
Once at the beach we began  
by measuring out a grid on  
which to trace the shape  
of the hull.



The grid measures 6 by 13  
feet and is divided into  
one-foot squares.



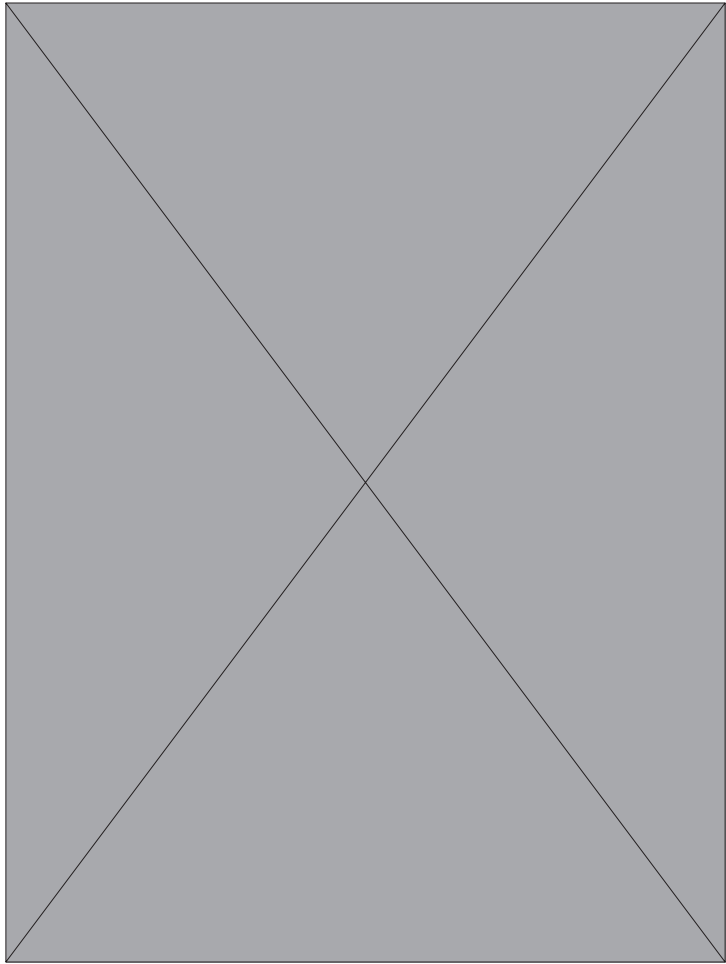
Stakes are put on the  
grid to measure the  
height of the hull at  
given points.



Sand is then piled until  
we reach the top of the  
stakes.



The boat's form begins to  
take shape.



As the sand is piled  
higher we start to form  
it into an approximation  
of the final form.







Keeping the sand wet be-  
comes a crucial concern.



We use a garden hose and  
sprinkler to keep the  
parts not being worked on  
from drying out.



Only wet sand remains  
wet. Any dry sand within  
the pile will remain dry  
as the water follows the  
path of the already wet  
sand.



Having reached the top of the stakes the sand pile is ready to be formed into the intended shape. The shape is derived from the Guppy 13 produced in Chatsworth, California in the early 1970's by Melen Marine Ltd. Chatsworth is about 25 miles from this beach.



Having finished the basic form it is important that it not dry out. We protect it under plastic sheeting until we are ready to apply a mixture of sand and cement which will hold the form together.



Now we are ready to begin coating the form with a final mixture of cement and sand.



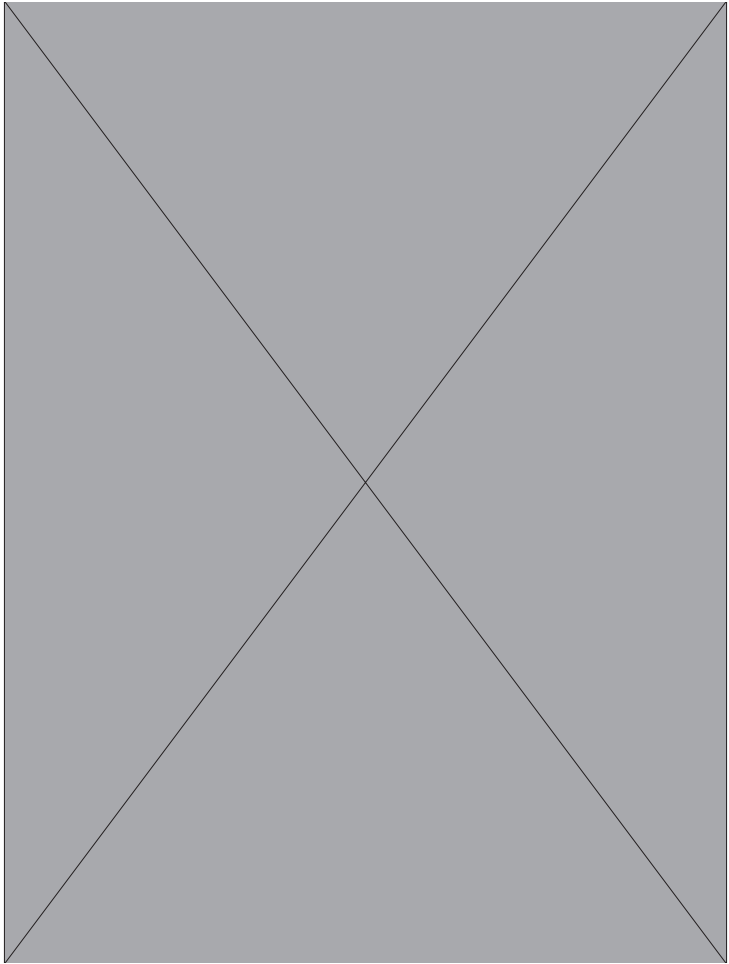
Once the cement and sand mixture is applied the form is essentially complete.







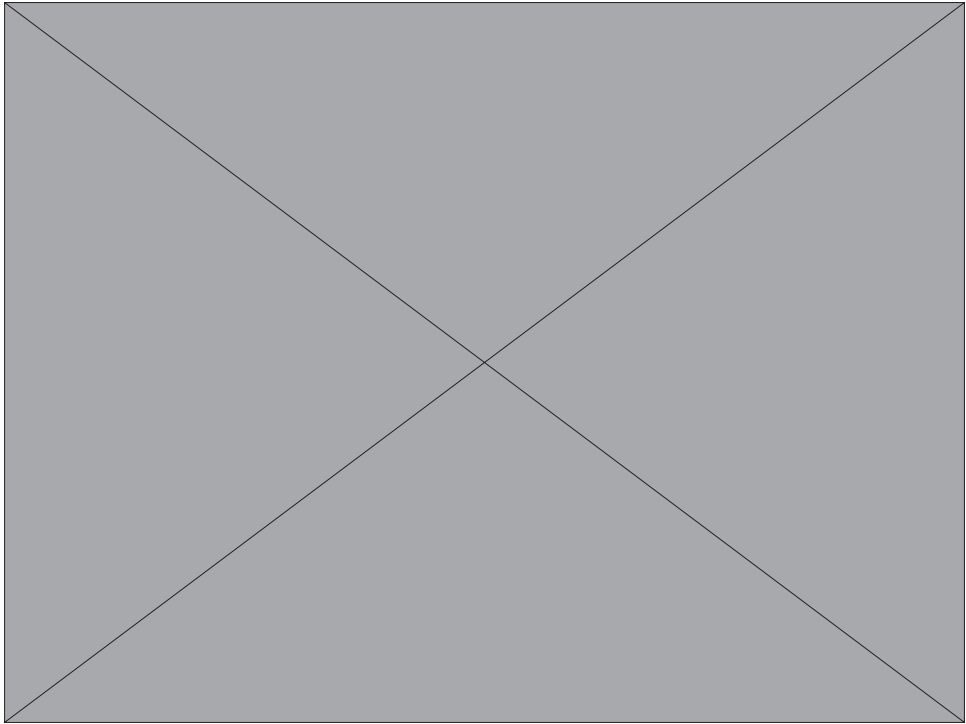
A protective layer of plastic is applied to the completed form.



The first layers of chicken wire which will reinforce the concrete hull can now be applied.



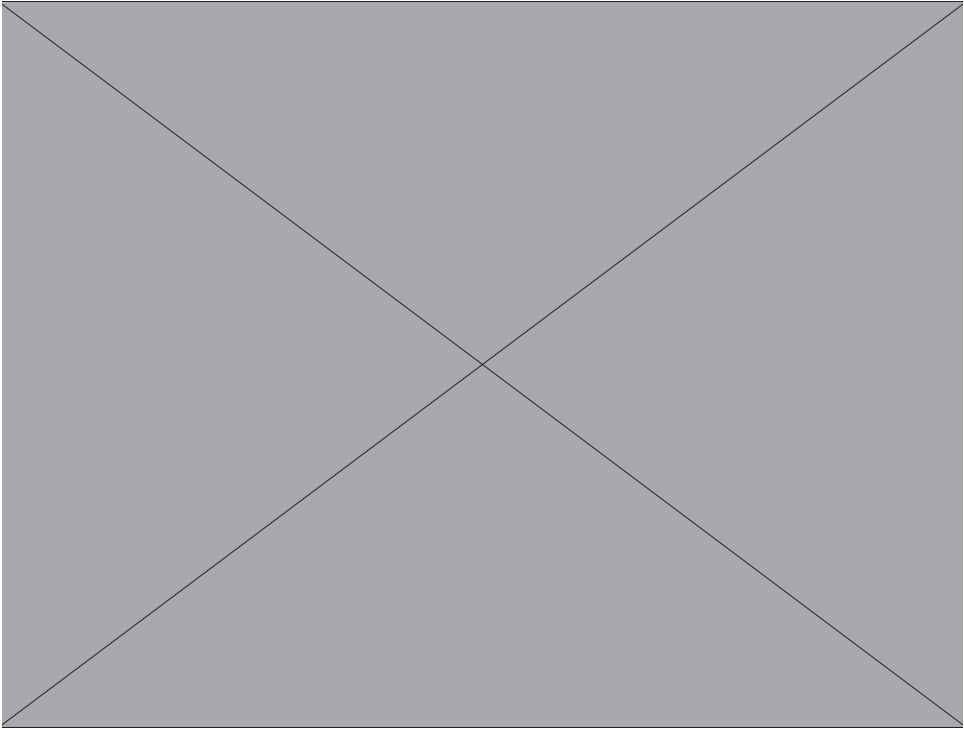
As the chicken wire layers  
build the ultimate shape  
of the hull begins to take  
form.







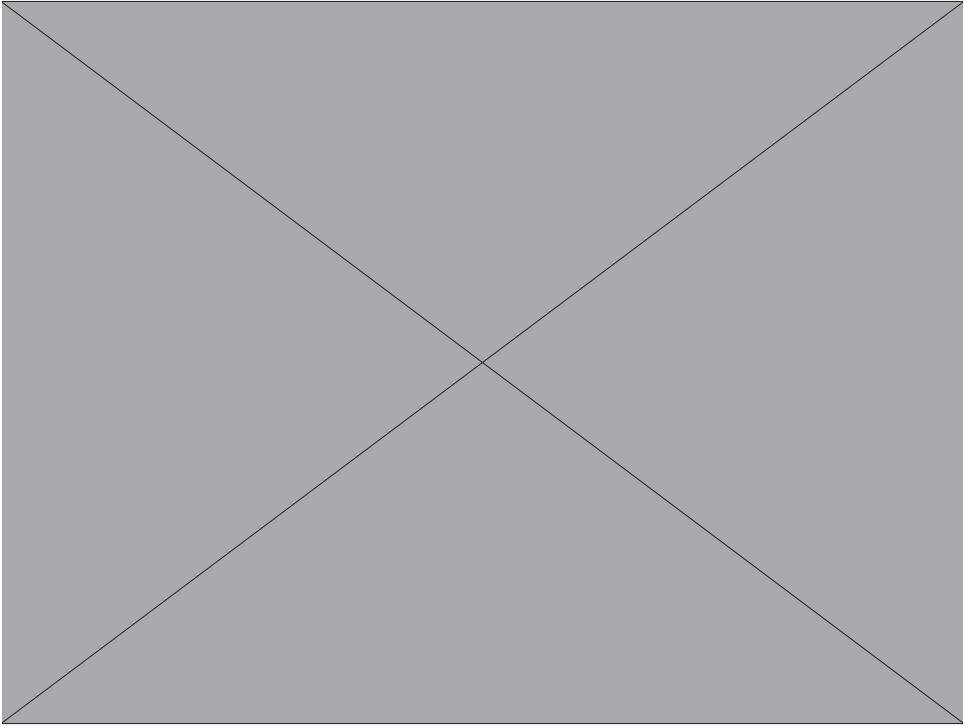




The layers of chicken wire are held together with wire to make a single tight layer of mesh about 3/4-inch thick.



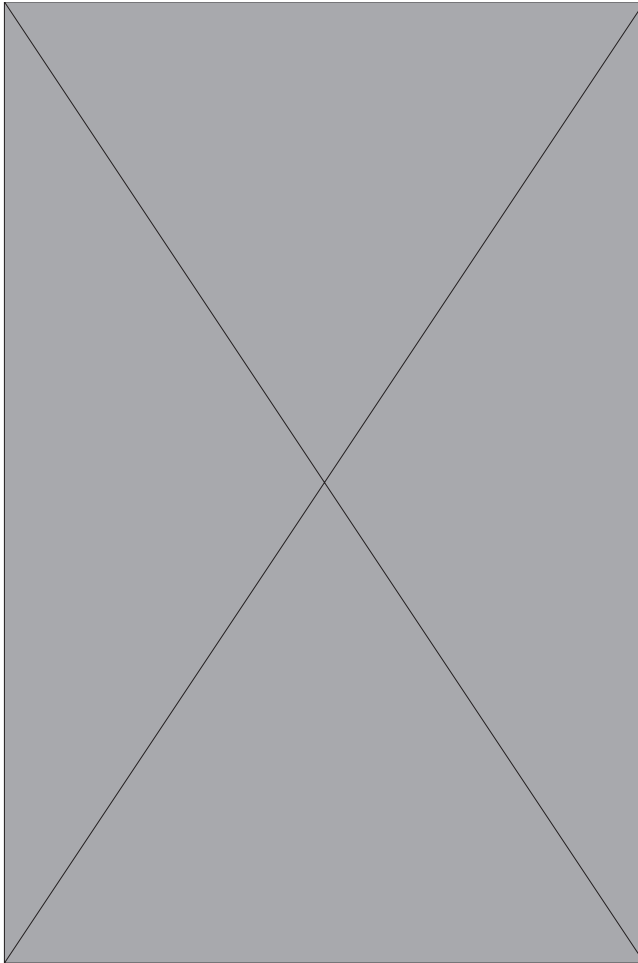
The final form including  
the keel is now ready for  
the external layer of  
concrete.



The boat sailed by Bas Jan  
Ader when he disappeared  
somewhere between the  
United States and Europe  
in 1975 was a Guppy 13.



For the concrete hull to achieve the required flexibility the metal content is important as well as the strength of the concrete. The concrete must be very 'rich' and the sand must be clean and fine. We sifted the sand before mixing it in a 2:1 ratio with white portland cement.



We start applying the  
cement mortar beginning  
at the bow.



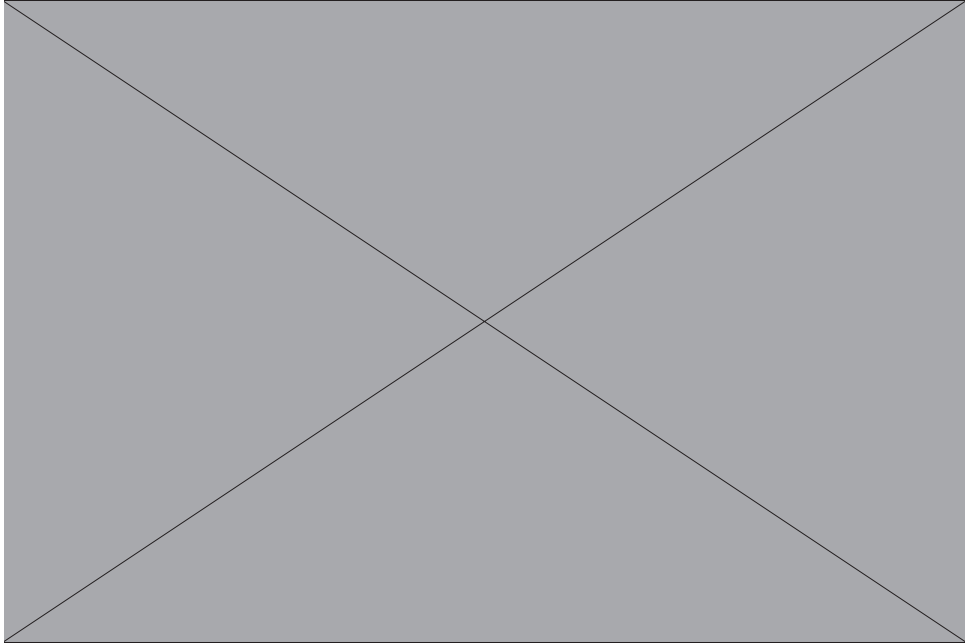




We mix a total of 9  
batches of concrete and  
sand mortar over the  
course of the day.



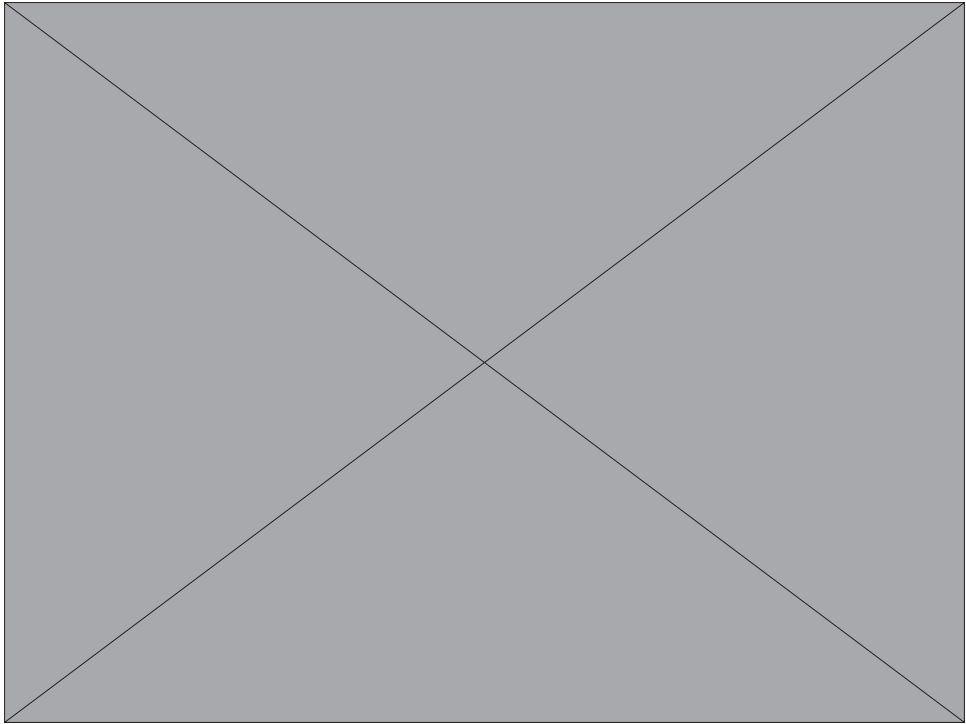
The mortar must be applied in one day to ensure that the hull cures as a continuous surface.



The hull was completed in  
the late evening.



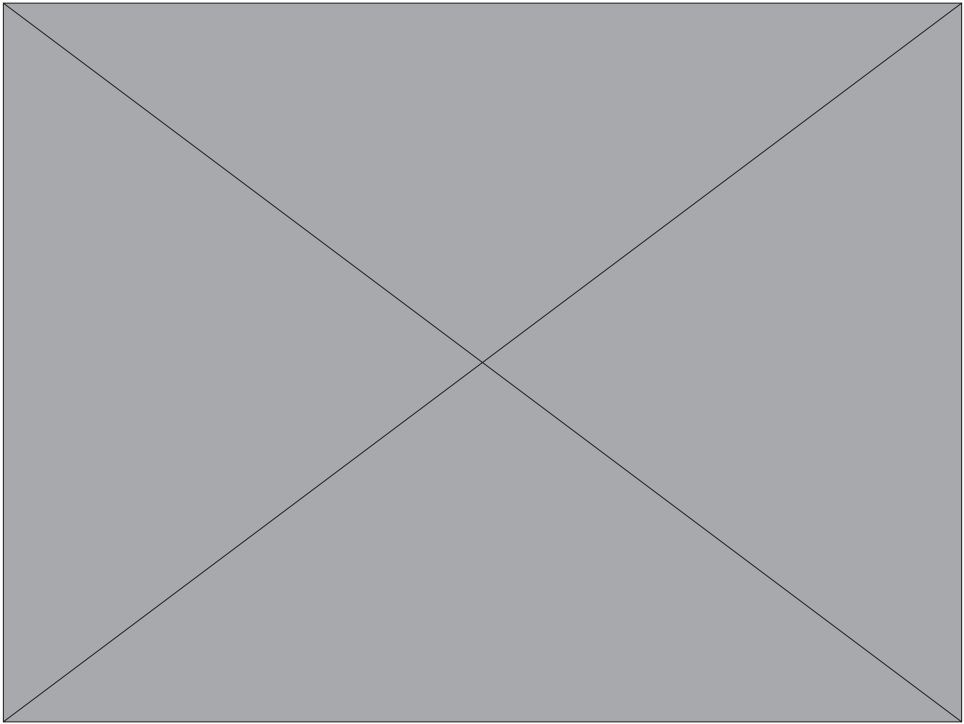
The concrete must remain wet to continue curing. Ideally it will not be allowed to dry out for at least 28 days.



The external skin and  
form are now complete.



We keep the hull wet as  
we prepare to flip it  
over.



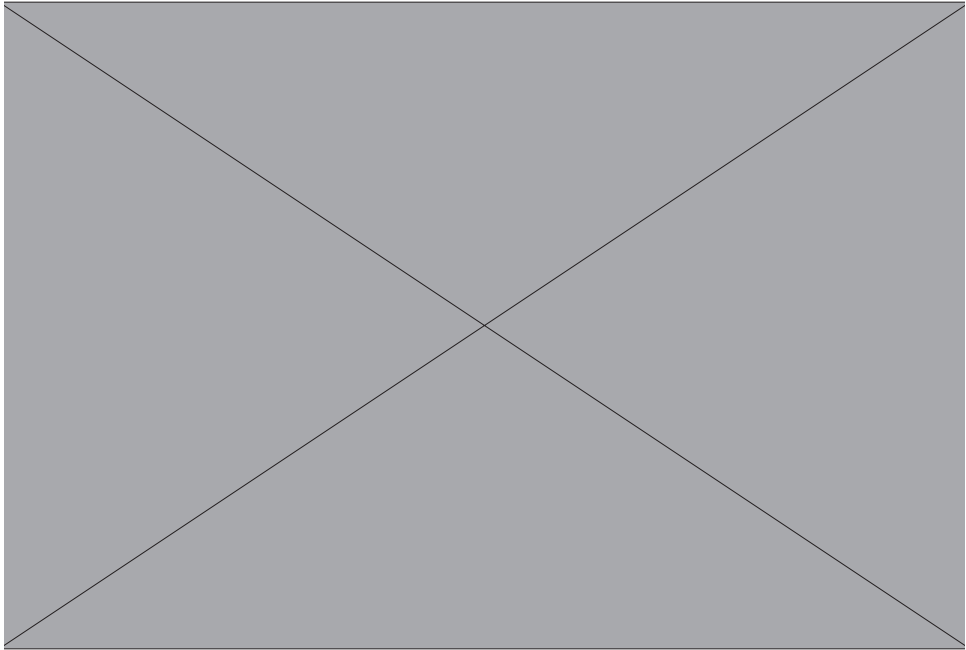
The sand is dug out from  
under the shell of the  
hull.



A first glance of the  
internal surface is now  
possible.



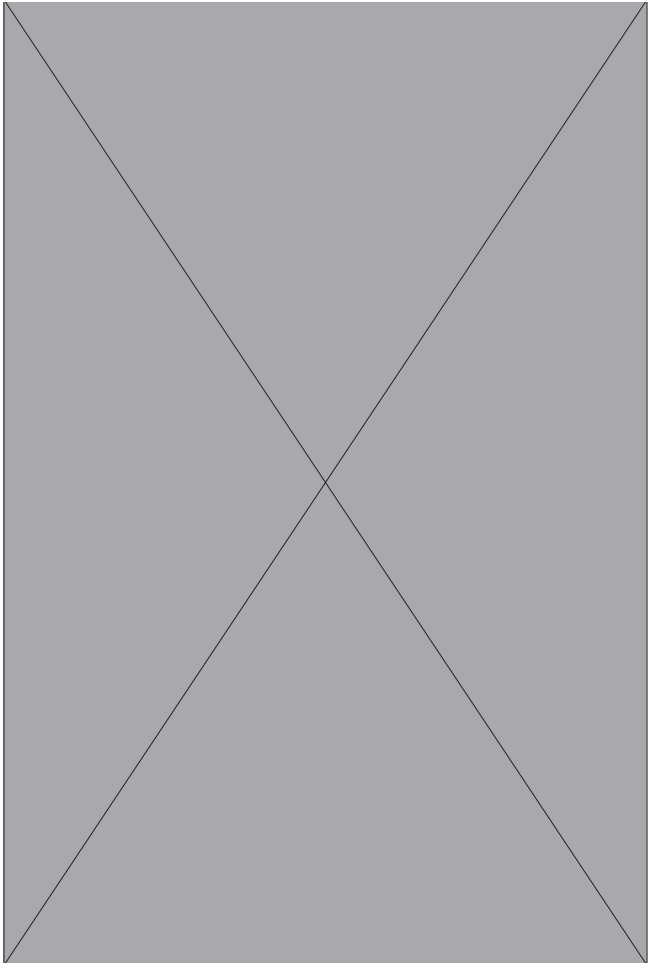
Flipping a boat estimated  
to weigh about 1000 pounds  
poses a significant chal-  
lenge.



A solution is found.



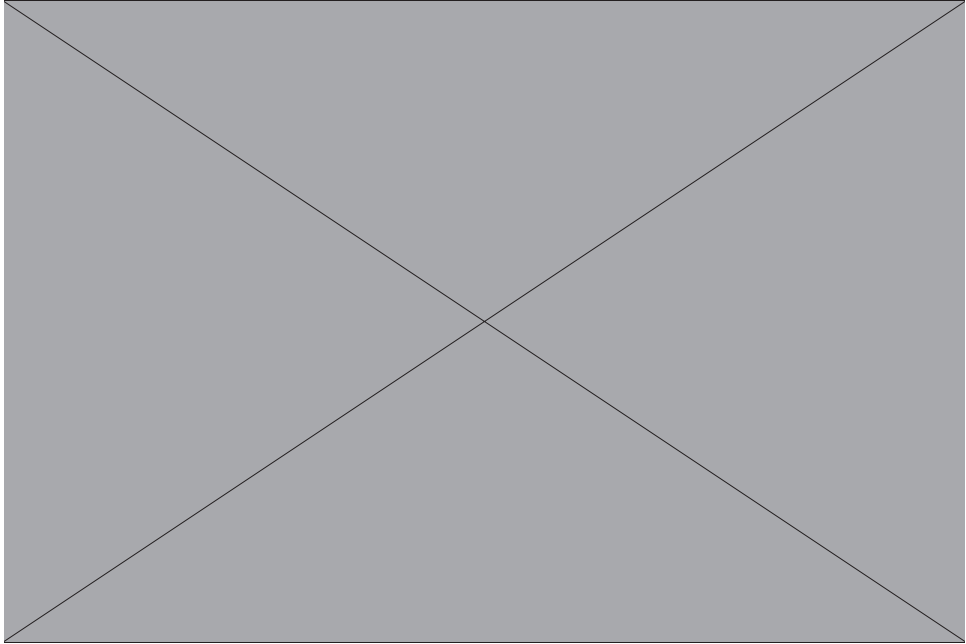
The hull is turned onto a  
mound of sand.



The sand mound is dug  
out from under the hull  
allowing it to slowly  
right itself.



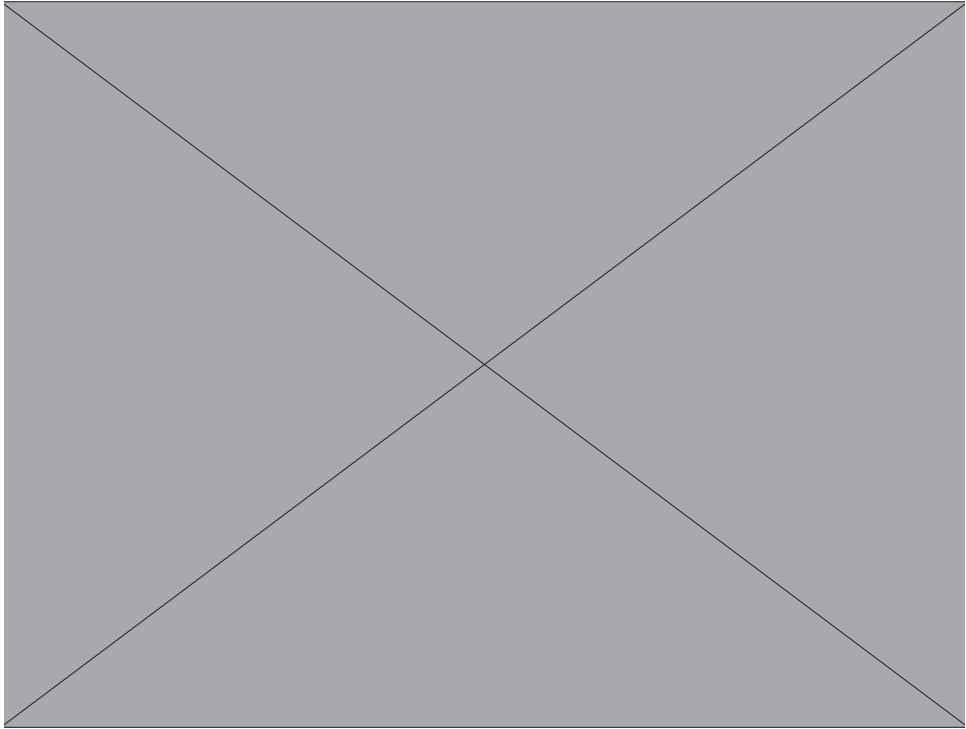
The boat finally rests  
righted on a mound of  
sand.



The top edge of the form  
can now be removed and  
the inside finished with  
more mortar.







The inside and top edge  
are now complete and the  
hull is braced for trans-  
port.





