

The Paddlewheel

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Definition: That which makes the boat go

Of all the systems, which make up a sternwheel boat, the paddlewheel is the one most frequently asked about. I guess I can understand this because it is the one component that no other type of vessel has. Also, the paddlewheel is probably second only to the hull in importance on sternwheel boats. Therefore, much study and research should go into the selection, design and construction of the wheel. Well, let's look at some paddlewheel questions.

- What diameter wheel should I use on my boat?

Without going into a long dissertation about all the whys, my advice is to 'install the largest diameter that is proportional to your vessel'. Larger diameter wheels are more efficient and produce better speed. However, there are problems associated with driving large wheels so don't get too carried away.

- How many buckets (paddles) should my wheel have?

There is more agreement on this point than most other aspects of wheel design. Most experienced builders, including me, say 'install one bucket for each foot of diameter *plus two*'. This rule works well for the size paddlewheels that most people will be installing on 'live-aboard' vessels.

- How wide should my paddlewheel be?

This is a bit tougher question to answer. Wheel width is one factor, which determines how much force a paddlewheel will produce. The amount of force required of a wheel is dependent on both the weight of the vessel and the efficiency of the hull. These values should be determined, as close as possible, before attempting to select wheel width. The proper width is usually based on a percentage of the boats 'waterline beam'. Therefore, for me to select this percentage, I would need some information about the vessel in question. I will say that, under no circumstance, on live-aboard boats, should the paddlewheel have a width dimension greater than the diameter.

- How wide (high) should my buckets be?

Again, this is a difficult question to answer. Bucket height is the second factor in determining the force that a wheel will produce. Therefore, it, too, is linked to the vessel weight and hull efficiency. Numbers here can range from 7 to 8 inches on small wheels to 20 to 24 inches on larger ones. A lot of boats in the 45 to 65 foot hull length range will use bucket heights of 14 to 18 inches. However, I must point out that this is just a 'guide line' and that an inch or two difference in height can greatly affect a vessels performance and power requirements.

- How many spoke assemblies should my wheel have?

Most paddlewheels used on 'live-aboard' size boats should be built using three sets of spoke assemblies. Wheels 8 feet or less in width can be built with two.

- How many 'rings' should I have on each spoke assembly?

Paddlewheels less than 8 or 9 feet in diameter can be built with only one ring providing that it is of adequate strength. Of course, larger wheels should have two or more.

- Should my buckets be 'straight' or in a 'vee'?

Keep them straight. 'Wishbone' or 'Herringbone' paddlewheels are not worth the effort plus they do reduce backing and stopping ability. If you insist on using a 'vee', keep it small (like 15 to 20 percent of spoke angle).

- What is the best material for bucket planks?

There are two schools of thought on this subject. One is 'cheap and expendable' and the other is 'tough and durable'. The first theory consists of using pine or poplar boards, either treated or untreated and carrying lots of spares. The second (my favorite) consists of making the planks of 'white oak'. These would be kiln dried and soaked in some type of wood preservative before painting (red, of course). They should then be installed with stainless steel bolts to facilitate changing when it is required. After all, changing bucket planks is not an easy job, so why not make it as easy as possible and do it as infrequently as possible. That's my philosophy.

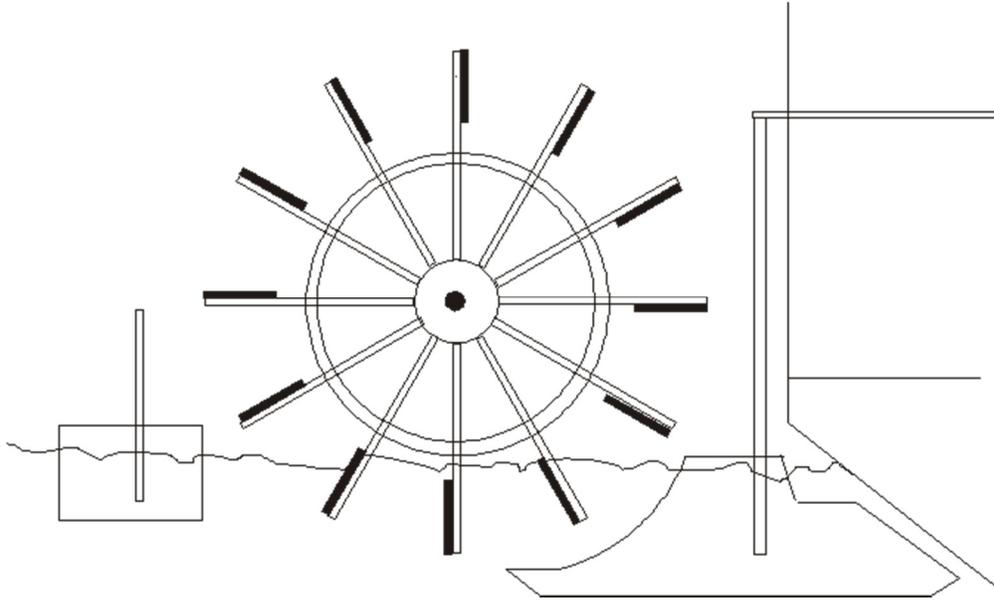
- How's the best way to build a paddlewheel?

I can't answer that question here. To formulate an answer would require certain knowledge about the wheel parameters and something about the vessel that it's to propel.

Even with this knowledge, it would take pages for an explanation after the numbers were established. I can help, but you'll have to contact me direct. I will state that paddlewheel construction should meet two criteria. One, they should be strong. And two, their weight should be kept to a minimum.

- How deep should the paddlewheel 'dip'?

How deep a bucket goes into the water is critical. If it is too shallow, full bucket force is not generated. Also, if it dips too deep, more power is required to drive the wheel with no resultant increase in performance. I find that 2 to 3 inches of water over the inner edge of the bucket, when the vessel is at rest, is about the right depth. However, to know exactly where to place the wheel, requires knowing the draft of the vessel, then positioning the wheel-arms at the proper elevation. Since exact draft is rarely known before launching, I suggest that you allow room for a spacer between the wheel-arm and the wheel shaft bearing in order to permit a closer adjustment of wheel depth after the vessel is launched.



While on the subject of paddlewheel placement, remember to mount the wheel back from the 'splash bulkhead' far enough to permit room for the rudders and rudderposts.