# Head-Aches No More

On a recent interesting trip (in the Chinese proverb sense) I was again reminded that the marine head, perhaps even more so than the engine, is one of the most critical pieces of equipment onboard. If it becomes unreliable or even fails, a trip can turn into a nightmare with mutiny not far behind. Here are some simple steps to keep your head healthy and a few suggestions from the doctor in the Intensive Care Unit should these attempts fail:

1) Most traditional heads depend on **water to lubricate all components** and to assure an uneventful emptying of the bowl. Make sure the intake seacock and the head-mounted valve (see location #1 in Figure 1) are both open and the head is primed with 2-3 pump strokes of water. It will be too late 'afterwards'. No water coming in? Stop right there and speak to someone with more experience (for brevity referred to as 'SRTASTSWME')
2) The old advice of **only flushing what has been eaten before** still applies and can't be over-emphasized! Skippers need to remind everyone that nothing else (except thin toilet paper in frugal quantities) should be flushed down the 'wet' head. The advertising for many products is utterly misleading as you'll find out when the product encounters the delicate innards of our heads!
3) Remember comment 1)? **Plenty of water** as administered by even, gentle, full pump strokes will remove almost anything under 2) from the bowl. Something doesn't look right? By all means SRTASTSWME! After clearing the bowl, 5-10 pump strokes will also clear the lines and deliver the wares to the temporary seclusion of the holding tank.

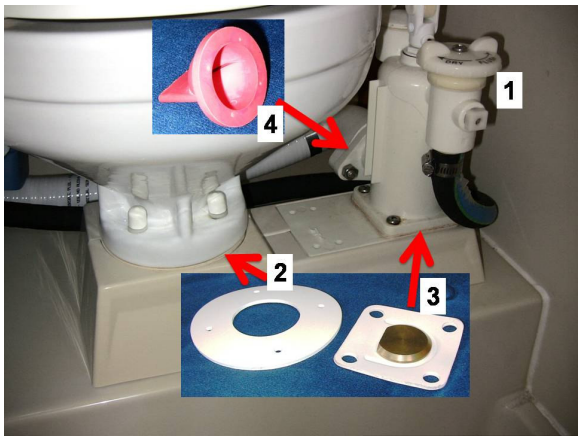


Figure 1: The working parts of a marine sanitation device (Raritan PH-II).
**1:** Seawater intake valve controls the inflow of seawater for purposes of flushing.
**2:** Main seal at base of bowl. Similar in function to wax ring in domestic toilets.
**3:** Flapper valve controls evacuation of bowl and stops backflow.
**4:** Joker valve allows one-way flow of waste into plumbing hoses.
Marine heads of this type will have similar components and operation as discussed here for the Raritan head.

Life isn't always perfect as we found out during a recent charter trip. Understanding the boat's plumbing system, a subject usually covered *ad nauseam* (no pun intended) during the Bareboat Course, is important but, short of this, here are a few pointers that might help in a bind:

1) Symptom: **No water coming into the bowl** when the pump handle is pulled upward after a few strokes. After SRTASTSWME, the conclusions might be a) one of the intake valves isn't open (99% case); or b) the intake is clogged or obstructed on the outside (<1% case). Both issues are easily resolved. Other intake-valve-related problems (#1 in Figure 1) are extremely rare.
2) Symptom: Water pumps into the bowl with every upstroke but **nothing is evacuated at the bottom**, thus leading to gradual filling of the bowl (SRTASTSWME!). This describes our recent character-building experience. Since the top part of the pump is obviously working fine, the problem is in the lower part. Component #2 is the main seal upon which the bowl rests. The critical component that failed in this scenario is the flapper valve (#3) at the bottom of the pump assembly. We had a case of 'dry flush' (remember that from the Bareboat Test?) which clogged the entire drain line between main seal #2 and the flapper valve #3 at the bottom of the pump. The only remedy is removal of pump from its base and clearing of the obstruction bowl-side of the flapper. Despite the initial shudder, the feeling of accomplishment should be rewarding enough!
3) Symptom: Water pumps into the bowl with every upstroke and **waste is pumped out of bowl but returns on next downward stroke**. The culprit? Could it be the joker? On first thought, it can't be 1) or 2) with some level of certainty. The joker valve (#4), a rubber half-sphere with a narrow slit, separates the output of the pump from the downstream plumbing lines. If the slit remains open (perhaps due to a hair ball, Band-Aids or even-more exotic things) the pump re-cycles waste from the plumbing lines, squeezing it through the flapper valve (#3) and back into the bowl. Another case of SRTASTSWME! Removal and cleaning of the joker valve usually exceeds the endurance of most charterers. The valve itself is usually quite 'clean' but the same can't be said about the backflow from the plumbing lines. Nonetheless, armed with a few paper towels, a tray and proper personal protection this, too, is solvable and leads to a deeper appreciation of the system as a whole.
4) Symptom: **Pump handle moves up and down without much resistance** (together with 1) and 2)). Truly a case for a Dr. Welby SRTASTSWME. The likely problem is that the handle and rod detached from the piston (which remains idly at the bottom of the pump cylinder). A rusted threaded rod and too much elbow grease during the pump action is usually the precursor to this failure. The clean top part of the pump will have to be disassembled and the right replacement parts need to be installed. This is usually beyond the resources available onboard a charter vessel.
5) Symptom: Water pumps in, waste pumps out but the **downward push is quite difficult** and accompanied on deck by the characteristic smell of 'human activity'. In many cases, including a particularly memorable one in St. Martin a few years back, this scenario is the signature of a full holding tank. The downward stroke

pushes the contents of the tank through the vent line and out of the vent fitting, which is usually mounted somewhere topsides. Depending on the wind direction this situation may not be easily spotted since nobody follows SRTASTSWME. The solution is to pump out the holding tank properly but it may also require cleaning of the vent lines/fitting.

6) Symptom on gravity-fed holding tanks: Most catamarans but also a good number of monohulls feature **gravity-fed holding tanks** that rely on self-drainage once a seacock is opened. The principle is simple and looks compelling in a brochure! Once a tank is used for a day or two though, enough sediment accumulates at the bottom and drains are clogged as the tank continues to fill even with an open seacock. This can lead to 5) within a short period of time. Identifying a brave soul that is capable of operating a coat hanger or other contraption into the throughhull from outside and can then swim away *fast* resolves the problem. Attempting to remove the plug from the inside (e.g., through an inspection port on the tank) can be difficult or impossible depending on the tank geometry.

The marine head is one of our most trusted pieces of equipment onboard. Life onboard can become unpleasantly basic without it. Used properly it will work without problem for a long time until perhaps requiring a rebuild. Only the very brave will want to tempt this intricate system. If the head is not healthy it requires a determined expert to save the patient from the Intensive Care Unit and the trip from becoming painfully memorable. Like everything else onboard, use it wisely and have an enjoyable time on the water!

Capt. Christoph A. Winter has been an ASA Sailing Instructor for over 12 years, teaching more than 1000 students mostly in advanced courses and navigation. He is a USCG-licensed Captain's and received the ASA Outstanding Instructor award twice. He also holds a doctorate in nuclear physics from the University of Goettingen, Germany. His students will attest to his potentially obsessive tendencies when it comes to the plumbing system on his Ericson34.