Sea crossing navigation

Stan Lester explains how he did the navigation for Holyhead to the Isle of Man.

Holyhead harbour

The crossing from Holyhead to Port St Mary was leg 13 of my 2005 round-Britain cruise. Though it's only 45 miles it's an open-sea crossing in tidal waters, so even with GPS it's worth paying attention to the tidal streams and calculating a proper course to steer. While I'm assuming that readers are familiar with the normal technique for doing this, I'll explain how I modify it so that I can keep an eye on my cross-track error without being tempted to steer a straight line over the ground.

Before going into the detail I should explain that for anything more than a cruise down the river I make up an annotated diagram for my passage and a pilotage plan for my intended port – plus alternatives where relevant. I draw these up in colour on laminated A4 cards, using waterproof pens like the ones used for overhead projectors. Finally I clip them to a plastic chopping board (see the pictures on pp3-4) along with my deck log. With the addition of another pen (or chinagraph pencil for wet weather) they slot behind a halyard bag close to the GPS so that they're ready to hand when needed. Most of the time I'm spared the need to go below and consult the chart – which is useful when single-handed and a blessing in rough conditions.

Going back to the passage plan, for a crossing like the Irish Sea, the English Channel or across to the Scilly Isles I start off in the usual way by working out the tidal vectors to come up with a course to steer. Port St Mary is (magnetically speaking) due north of Holyhead. Assuming that I reach the starting waypoint for my crossing (just off the Skerries rocks to the NW of Anglesey) at 0840 and maintain a speed through the water of 5 knots, my course to steer is 347^{o}M to follow a ground track of 000^{o}M. Traditionally that would be it, but I think the GPS is too good a tool to ignore for this kind of crossing. To arrive spot-on at the entrance to Port St Mary without it would need the tidal information to be sufficient and accurate, I (or my autopilot or windvane) to steer perfectly, and accurate compensation made for any changes of course to avoid ships and the like.

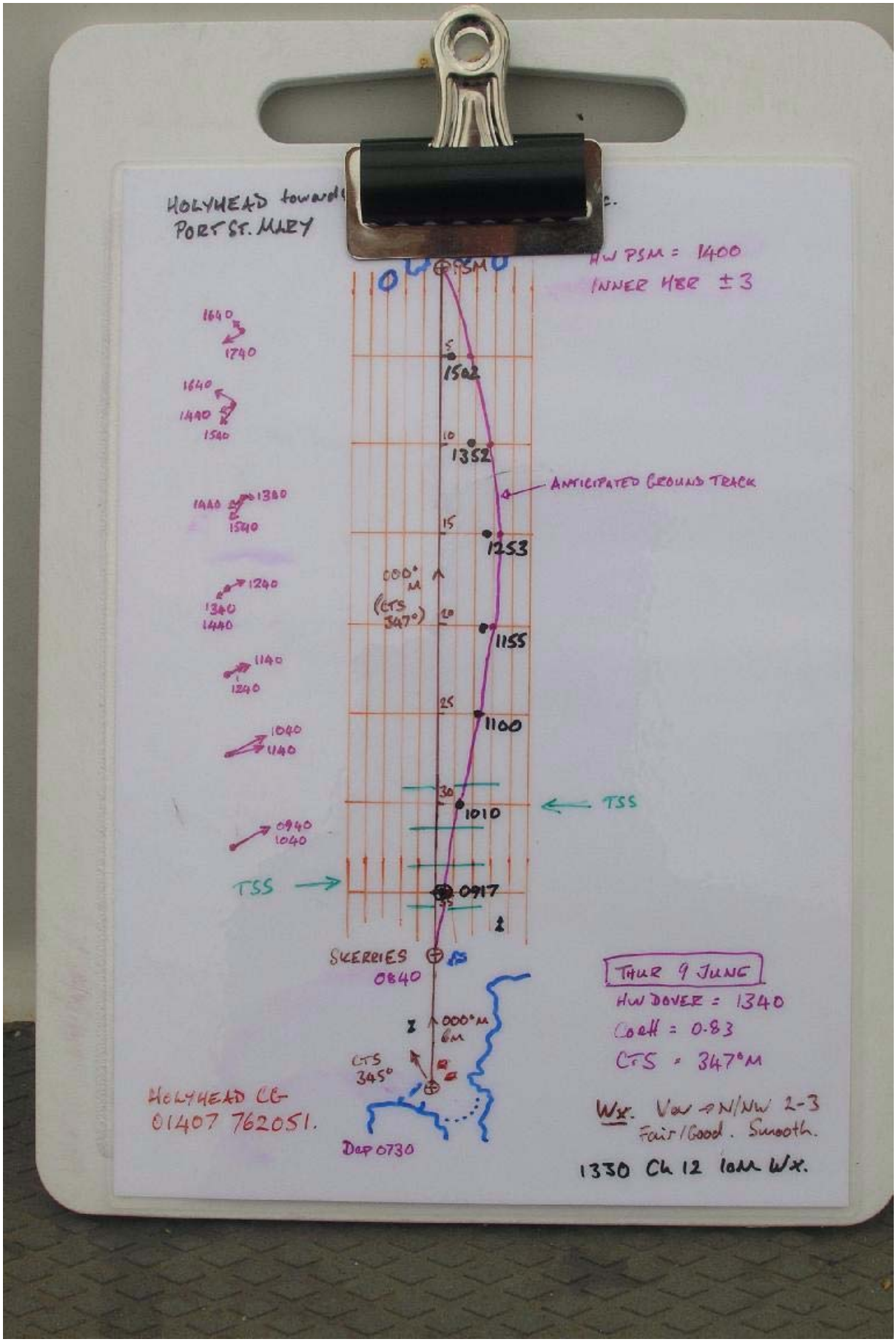
The Skerries

My GPS ‘dodge’ is shown in the picture on page 3. The magenta line shows my ground track if all goes according to the calculations, while the orange grid shows distance from the straight-line course, i.e. the cross-track error or off-course measurement on the GPS. The ground track is simple if slightly tedious to calculate, as it involves working out a series of estimated positions from the same tidal information used to calculate the course to steer. On passage I can check my position quickly and easily against the line, normally at the five-mile intervals shown on the grid, and compensate if I’m drifting off. For quick reference I’ve also put a few tidal arrows on the diagram for the times that I expect to be at the relevant positions.

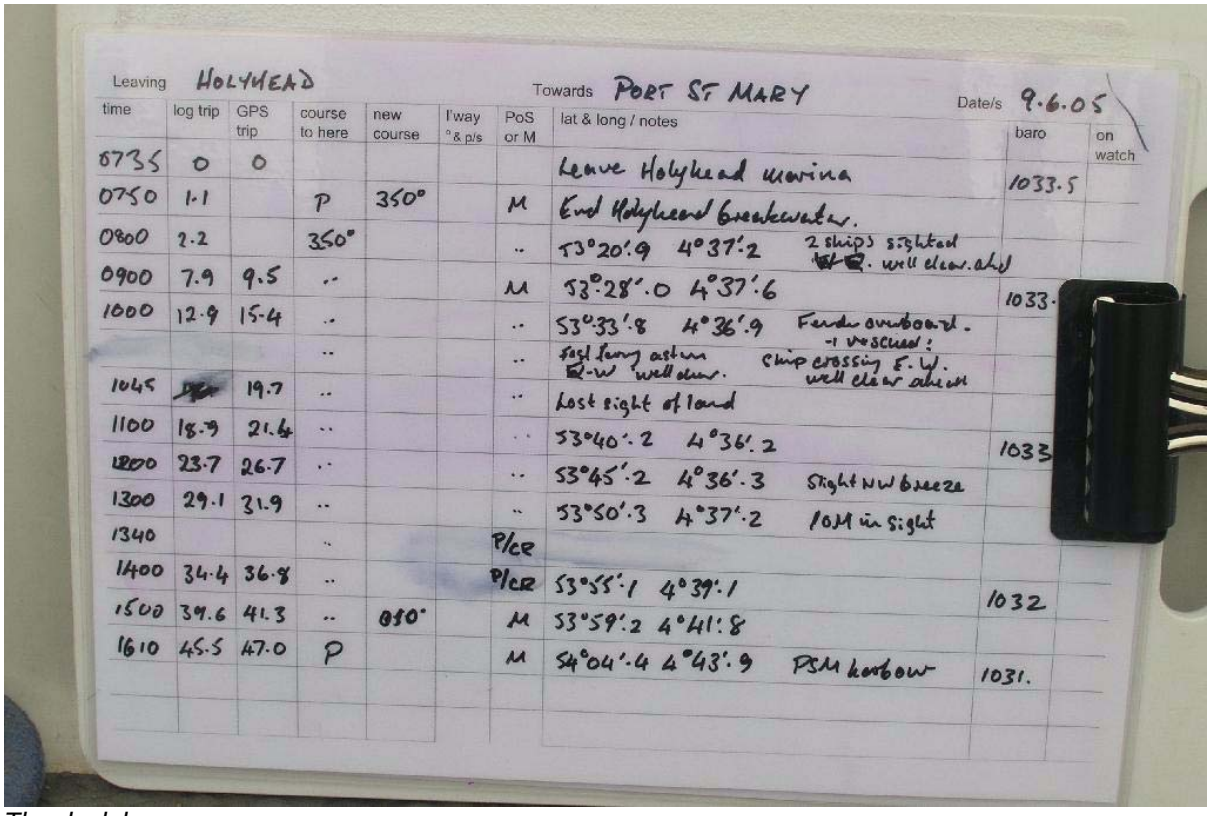
So that’s the theory: how did it work out in practice? We left Holyhead just after half-seven on 9th June in a dreary dankness that was to continue for most of the passage, though visibility was never less than three miles. We reached the Skerries waypoint at 0840 as planned and steered on a heading just under 350^{o}, setting the engine to give us five knots. The first three five-mile points were exactly on the line (the black marks on the passage diagram). There were only four ships crossing our path, none of them calling for a change of course, and the only diversion we had was when a fender came undone from the stern rail and we had to practice man-overboard drill to retrieve it. I did allow the speed to increase a little over the five knots, and about two-thirds of the way to the Isle of Man the wind picked up enough to give us two hours of sailing. Without any changes of course we ended up a mile or so off the expected track with five miles to go, at which point I turned on to 010^{o} and ran neatly down the straight-line course into Port St Mary harbour. Had we been straying much more earlier on in the passage I would have steered an extra five degrees, then checked again at the next five-mile interval. Maybe I simply proved the point about working out an accurate course to steer, but a couple of times on longer passages – particularly Dartmouth to Guernsey – having the ground track drawn in has let me make minor adjustments to my heading in time to drop neatly into the northern end of the Little Russel.

I’ve included the passage diagram and actual positions on the next page, followed by my deck log and the pilotage plan.

Port St Mary



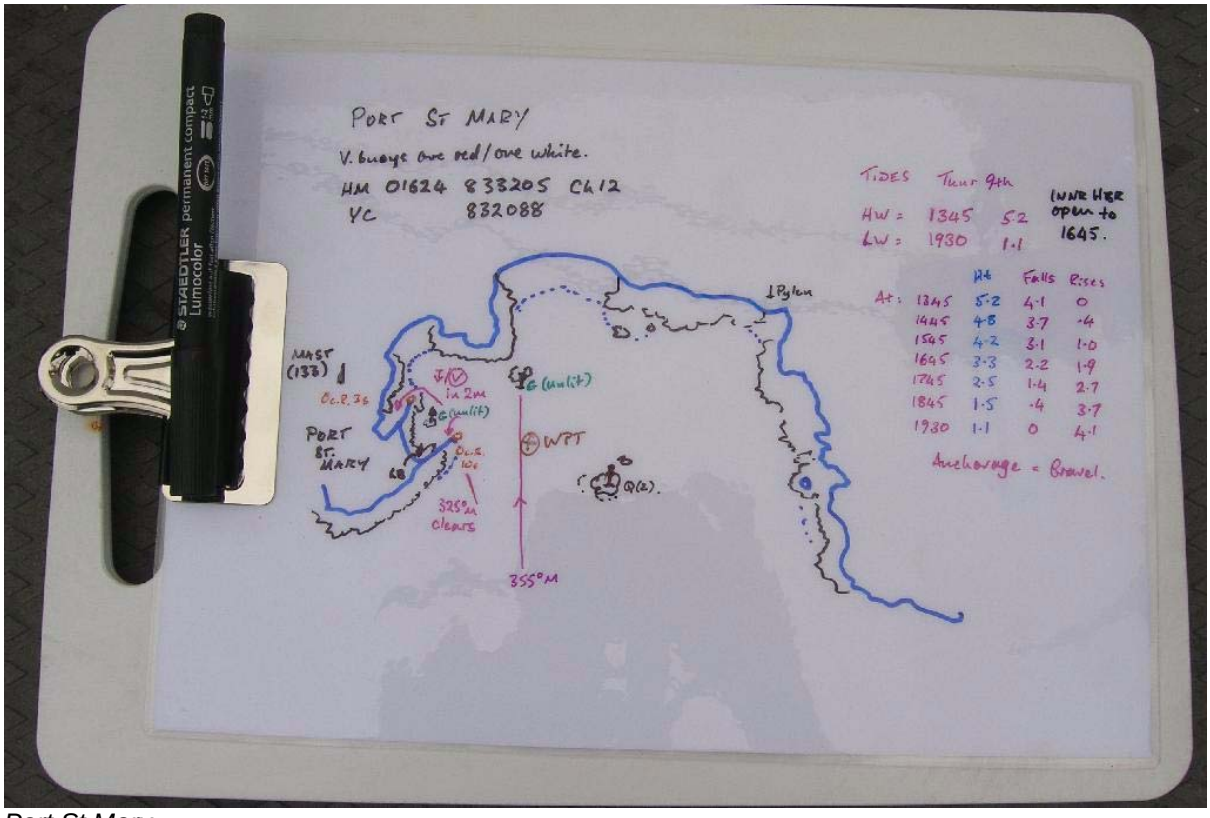
Passage plan



Leaving HOLYHEAD Towards PORT ST MARY Date/s 9.6.05

time	log trip	GPS trip	course to here	new course	I'way °& p/s	PoS or M	lat & long / notes	baro	on watch
0735	0	0					Leave Holyhead marina		
0750	1.1		P	350°		M	End Holyhead breakwater.	1033.5	
0800	2.2		350°			..	53°20'.9 4°37'.2 2 ships sighted R-W. well clear. ahd		
0900	7.9	9.5	..			M	53°28'.0 4°37'.6	1033.	
1000	12.9	15.4	..			..	53°33'.8 4°36'.9 Ferry overboard. -1 rescued!		
			..			..	fast ferry astern R-W well clear. ship crossing S.W. well clear ahead		
1045		19.7	..			..	Lost sight of land		
1100	18.9	21.6	..			..	53°40'.2 4°36'.2	1033	
1200	23.7	26.7	..			..	53°45'.2 4°36'.3 Slight NW breeze		
1300	29.1	31.9	..			..	53°50'.3 4°37'.2 10M in sight		
1340			..			P/CR			
1400	34.4	36.8	..			P/CR	53°55'.1 4°39'.1	1032	
1500	39.6	41.3	..	030°		M	53°59'.2 4°41'.8		
1610	45.5	47.0	P			M	54°04'.4 4°43'.9 PSM harbour	1031.	

The deck log



Port St Mary

There's more information on the voyage and details of Stan's book *Around the Island* (Avista Press 2007) at ~~http://homepages.rya-online.net~~