

“Crown Princess” Steering Incident 18. July 2006

06.09.2006

1. Analysis of the Chartplot Short Term Voyage Recording

The data diskette received from the ship on July 20, 2006 was restored on a Chartplot 1100 for replay of the time window between 18:00 and 20:00 UTC on July 18, 2006.

The replay was stopped at the important events in order to print out the contents of the Chart and Conning screen of the Chartplot monitor. The interpretation of these pictures is documented in detail and commented in the table attached on the next page.

The incident happened at about 19:24 UTC after a course change from 090° to 040° had been executed with Trackpilot in Heading mode. The recorded data have shown that the ship was moving during the course change to port with a ROT of <18,7°/min and rudder actions of up to +/- 5° within this period of time. The Trackpilot was switched off then and manual steering was applied.

By manual steering a sharp turn to port was induced, instead of stopping the rate of turn by counter rudder. About 1 minute after deactivation of the Trackpilot the rudders were set amidships for the first time.

Thereafter the turning to port was stopped by setting the rudders 35° to starboard.

At about 19:27 the rudders were amidships again and after that the ship was slowly turning on to a course back to the harbour.

2. Interpretation and Conclusions:

- No malfunction of the Trackpilot could be found in the recording.
- Before the incident happened, the ship was steered by hand on different courses without any visible problems.
- One hour after departure at a sailing speed of 18 kt the Trackpilot was activated in Heading mode.
- The depth below keel (initially about 7 meters) reduced to 5 meters. The Rudder Economy was set to 5 (tolerant) and a rudder limit was set to 10°. These settings of the Trackpilot (which are in the responsibility of the crew) can lead to a nonproper function of steering in Heading mode for this ships speed of 18 to 20 knots together with the measured waterdepth.
No general recommendations can be given by the manufacturer in the manual in this respect, because the settings have to be adjusted by the crew according to the sea state and other conditions surrounding the vessel.
- It must be assumed that the squat effect influenced the steering ability of the ship. The rudder gain setting by the crew for the Trackpilot (Rudder Economy = 5 is a tolerant value) has been too low for this conditions.
- In the chapter “Parameterisation of TP” within the Multipilot 1100 Operator Manual it is stated that the Trackpilot has to be adapted for the existing situation by means of parametrisation.

The procedure is described the above named Operator Manual and is also part of the operator training course.

- The complete Operator Manual for the Trackpilot ED 3051 G 022 will follow soon by E-mail.

Table of events extracted from the Chartplot Voyage Recording Backup

Time [UTC]	Rudder P / S [deg]	HDG [deg]	ROT [deg/min]	COG [deg]	SOG [deg]	Comment (TP=Trackpilot; CP=Chartpilot) Radius=4.0 NM; Economy=5
18:00						Leaving Port Canaveral
...						Manual steering until about 19:00
19:00:04	...	100.4	<0.5	100.1	17.6	
19:01:24	-1.5 / -1.4	100.1	>1.2	100.6	18.0	TP=ON; Set HDG=100; Rudder Lim.=5
19:08:24	+/- 5 for 5 minutes	094.1	Max. +/- 10	094.1	18.6	Set HDG=093; Rudder Lim.=10 Depth=6.9 m, decreasing
19:20:06	stable	046.1	>0.7	046.8	18.5	Set HDG=040; Depth=5 m
19:24:05	+/- 5 for 5 minutes	038.8	< 18.7	039.0	20.0	Speed increased to 20.0 kt; Depth increasing from 5 to 7.7 m;
19:24:15	-5.1 / -4.6	035.2	< 20.9	035.3	20.1	TP switched OFF; Manual steering
19:24:25	+2.0 / +2.1	029.9	< 29.8	029.6	20.1	Manual steering; small counter rudder; ROT increasing
19:24:45	-29.2/-28.4	014.8	< 50.8	014.1	19.6	ROT still increasing
19:25:05	-24.3/-22.2	349.9	< 77.1	345.1	18.2	ROT still increasing
19:25:15	amidships	337.4	< 76.3	327.2	17.6	ROT increase stopped
19:26:05	+33.6/+33.2	296.0	< 31.3	294.8	13.4	ROT decreasing; engine rpm reducing
19:27:06	amidships	303.4	> 23.5	305.7	12.2	ROT stopped; now turning to starboard
19:33:45	+/- 10	...	> 5.x	...	13.9	Ship turning slowly on a large radius
...	
20:00:04	...	163.6	...	162.7	19.5	End of recording