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**DAVID W. TAYLOR NAVAL SHIP  
RESEARCH AND DEVELOPMENT CENTER**

Bethesda, Md. 20084



**LEVEL II**

ASR-14 SHIP AND TOW POINT MOTION PREDICTIONS

ADA076193

by

T. R. Applebee  
and  
A. E. Baitis



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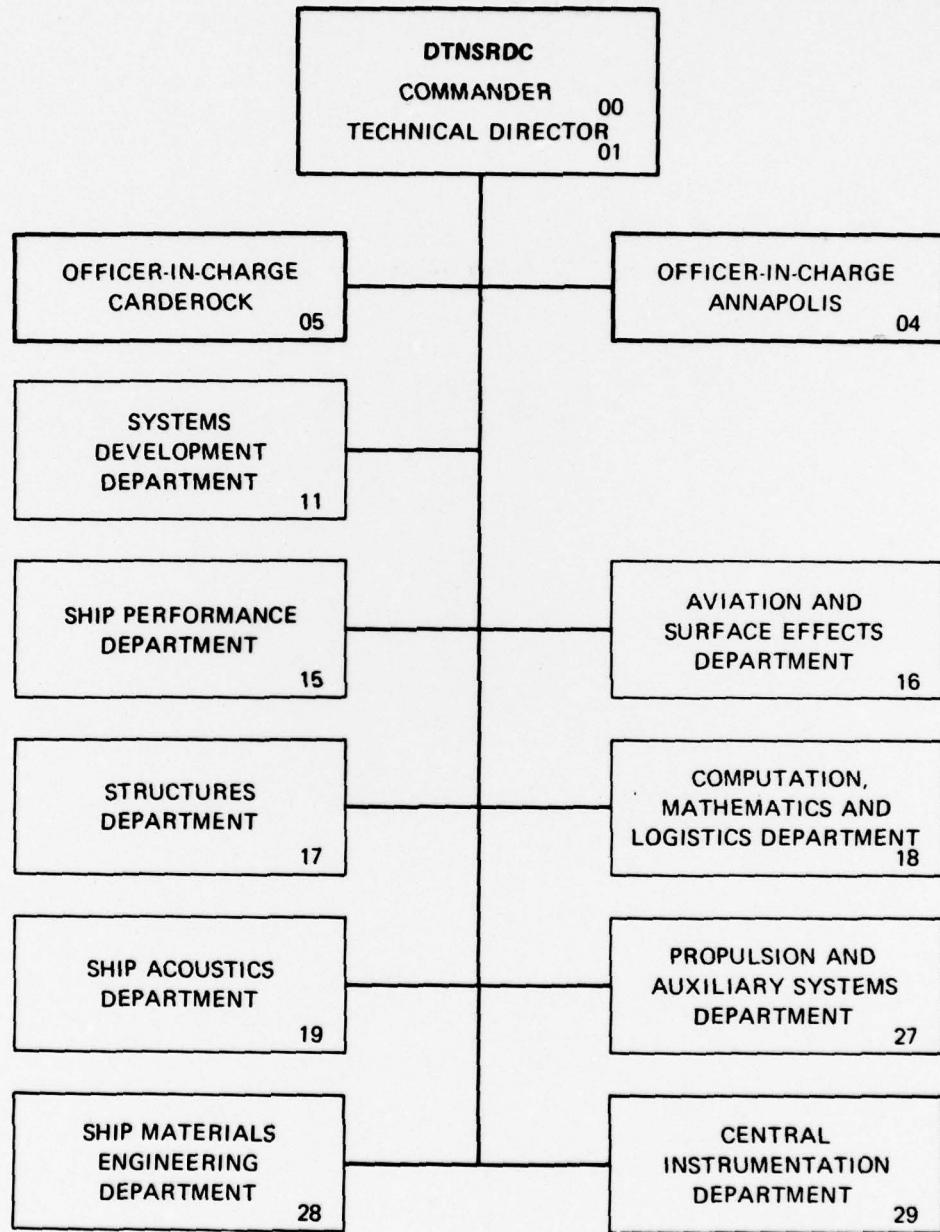
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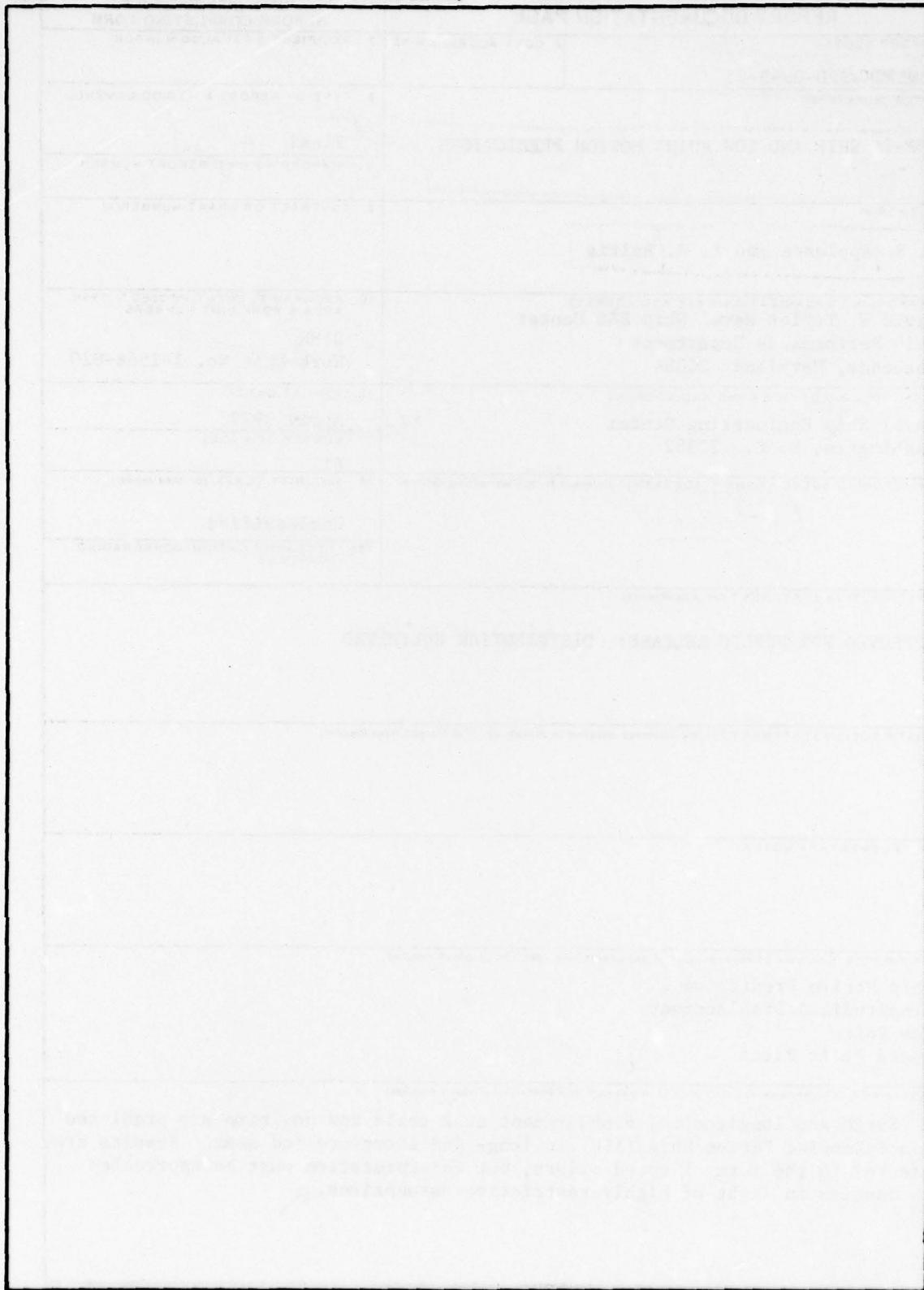


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## ABSTRACT

Surge and longitudinal displacement at a cable tow position are predicted for a Submarine Rescue Ship (ASR) in long- and short-crested seas. Results are presented in the form of speed polars, but interpretation must be approached with caution in light of highly restrictive assumptions.

## ADMINISTRATIVE INFORMATION

This investigation was funded by the Naval Ship Engineering Center (NAVSEC) under Work Request N651977WR91556. The work is identified at the David W. Taylor Naval Ship Research and Development Center (DTNSRDC) as Work Unit Number 1-1568-820.

## INTRODUCTION

In an effort to determine the excursion of a Submarine Rescue Ship (ASR) at an aft tow position, DTNSRDC implemented its Ship-Motion and Sea-Load Program<sup>1\*</sup> (SMSL) and the SHREDS<sup>2</sup> program to obtain a root mean square (RMS) ship motion data base for all headings and speeds. Both long-crested and short-crested seaways were investigated for significant wave heights of 10, 15, and 20 feet and a modal period of 9 seconds.

The predicted results are presented in the form of speed polar plots of longitudinal tow point motion and RMS tables of the ship motion data base. It is noted that the assumptions relating limiting longitudinal tow point motions to the calculated RMS longitudinal motions are of questionable validity. These assumptions are particularly questionable in seas aft of the beam at the higher sea states. Inadequacies in the present ship motion theory do not permit more accurate longitudinal ship motion predictions to be made. Similarly, the measurement accuracies of transducers for longitudinal ship motions have made typical full-scale data unavailable.

The use of the longitudinal displacement speed polar plots for determining operating limits in speed or heading for cable tension loads is subject to the above-mentioned assumptions. Furthermore, it should be pointed out that for the case of "impact" cable loading, the longitudinal

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\*A complete listing of references is given on page 5.

velocity and acceleration needs to be considered because the ship tow point does not move instantaneously.

Caution in the interpretation of tow point motions in the horizontal plane is therefore recommended.

#### CALCULATION CONDITIONS

Because of the inability to obtain the most recent modifications to the hull of the ASR-14, an earlier version of the hull lines was used. Table 1 presents the computed ship particulars and Figure 1 the computed ship lines for this version of the ASR.

Three long-crested and short-crested Bretschneider<sup>3</sup> seaways based on worldwide heavy weather operations (Reference 4) were selected. These seaways, identified as Sea States 5, 6, and high 6, correspond to significant wave heights of 10, 15, and 20 feet, respectively, and a modal period of 9 seconds. Short-cresting was represented by a cosine square spreading function as recommended in Reference 5.

The RMS data base calculated by SHREDS includes surge and the longitudinal displacement at a tow location 8 feet aft of the aft perpendicular, on centerline, and 26.07 feet above the keel.

#### ASSUMPTIONS

It is understood that tow point motions affect the tension in the cable, although the individual x,y,z components of these motions do not equally influence cable tension. In fact, based on a discussion with NAVSEC personnel, it is understood that the x-component or longitudinal tow point motion is the only significant component of ship motion that affects cable tension. As a result, only this component is presented in polar plot form.

Motions were calculated for a ship traveling on a fixed course without rudder activity. Thus a critical assumption affecting the interpretation of the results is that the ship's horizontal excursions are isolated from and independent of helm control. Thus, the ship is assumed to travel without yaw or course correction on the selected heading relative to the

sea. Clearly, this assumption becomes unrealistic\* once seas of sufficient height are encountered at headings other than head or following seas.

Operator control of the rudder in trying to maintain a base ship course, particularly for the seaways investigated, produces significant yaw motion. Figure 2 illustrates such operator control on a 3000-ton USCG cutter of typical destroyer hull form in mild 5 to 7-foot, 7-second modal period beam seas. Such operator-induced yaw motion in turn modifies the ship's forward speed and longitudinal motion response as well as the other ship responses. Rudder or helm control thus results in yaw-surge motion coupling, the importance of which increases as sea state increases, particularly when ship heading is aft of the beam.

It has been assumed that the operator steering activity represents one-half of the total longitudinal tow point motions for the very large response amplitudes of interest. These large motion amplitudes, in turn, represent limiting motion levels. Furthermore, it has been assumed that the limiting motion level of concern is statistically related to the calculated RMS motion. The highest expected value in 1000 successive motion amplitudes is this assumed limiting design motion level.

The limiting longitudinal motions presented in the speed polar plots represent a value twice the highest expected value in 1000 successive longitudinal motion amplitudes, i.e.,  $2 \times 3.72 \times \text{RMS}$ .

#### RESULTS

Figures 3 through 8 present the speed polar plots for the aft tow position, while Figures 9 through 14 present the surge speed polars. Long-crested results for each point are presented first, followed by the short-crested polar plots. Note that all speed polar contours are dimensioned in feet.

The appendix contains the ship motion data base in the form of RMS/TOE tables for unit significant wave height and modal periods of 7, 9, 11, . . . , 21 seconds. The tables present the displacements, velocities, and accelerations for the six-degrees-of-freedom at the origin and for longitudinal, lateral, and vertical motions at the aft tow position.

---

\*See Figure 2 time between 650 and 725 seconds.

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2. Gentile, Dana M. and Joseph E. Whalen, "User's Manual for Program SHREDS: A Computer Program to Provide A Ship's Response in a Directional Seaway," ORI Technical Report 1280 (Dec 1977).
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5. Baitis, A.E. et al., "Design Acceleration and Ship Motions for LNG Cargo Tanks," Presented at 10th Naval Hydrodynamics Symposium, Massachusetts Institute of Technology (Jun 1974).

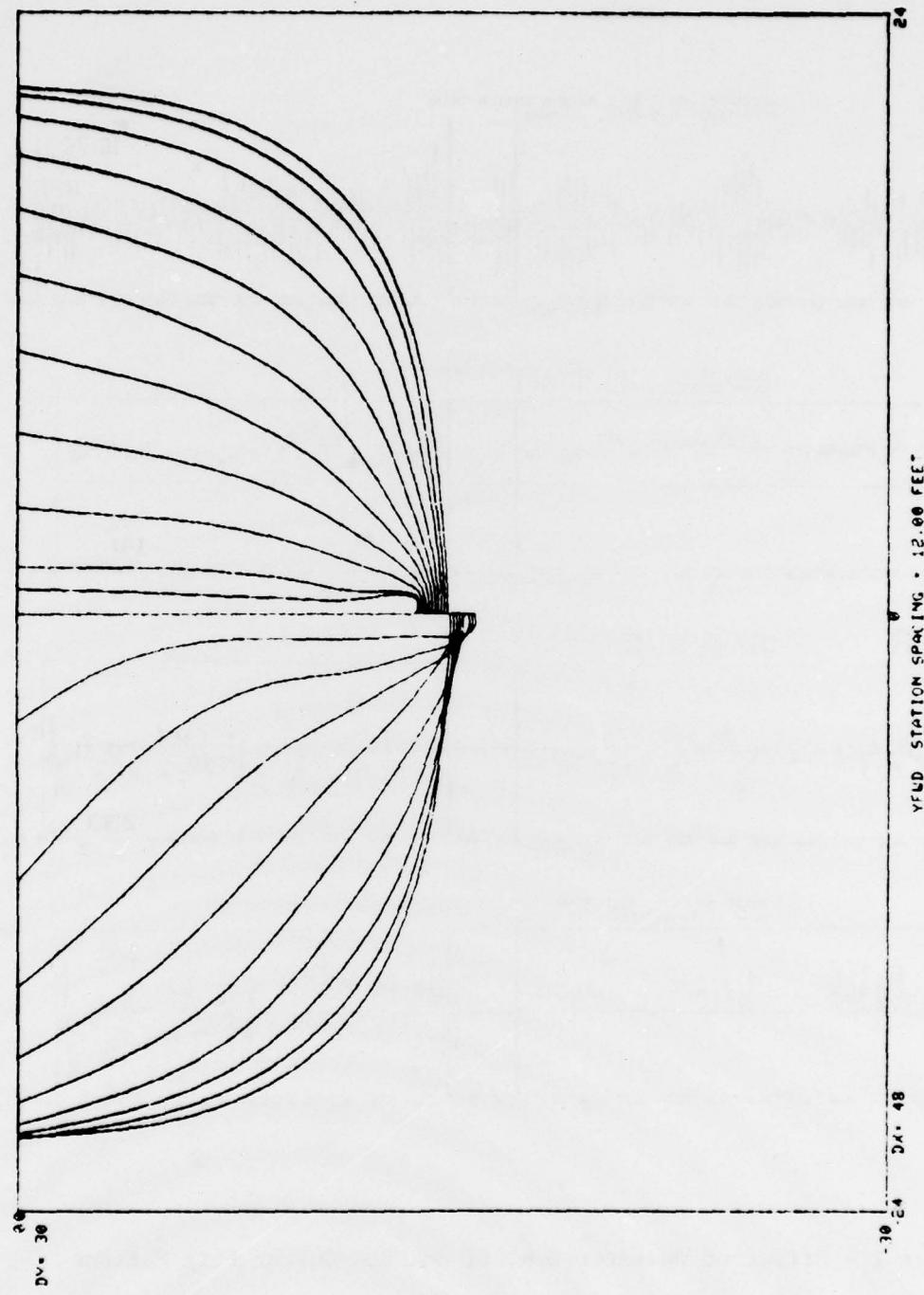


Figure 1 - Computed Ship Lines for the ASR

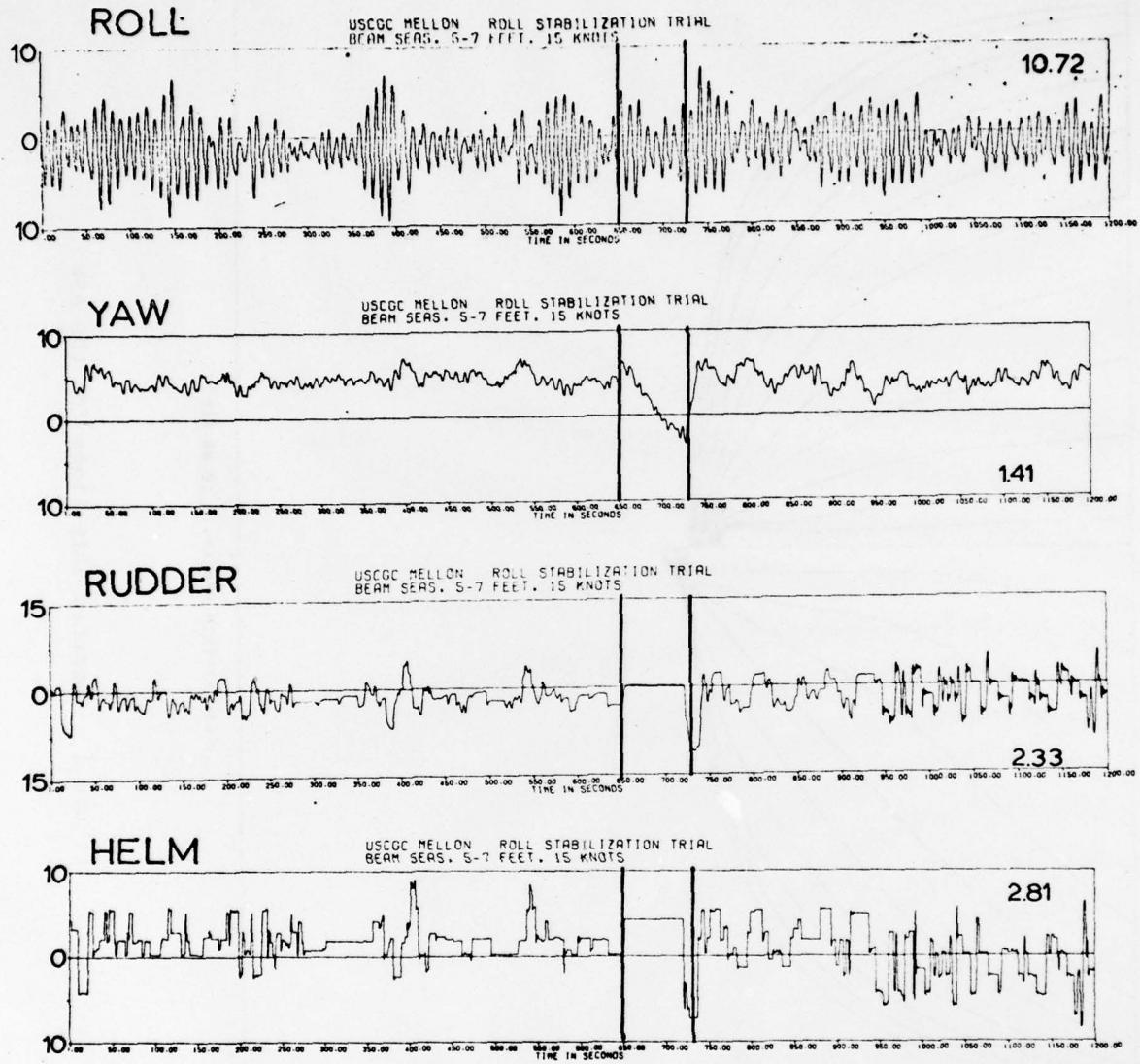
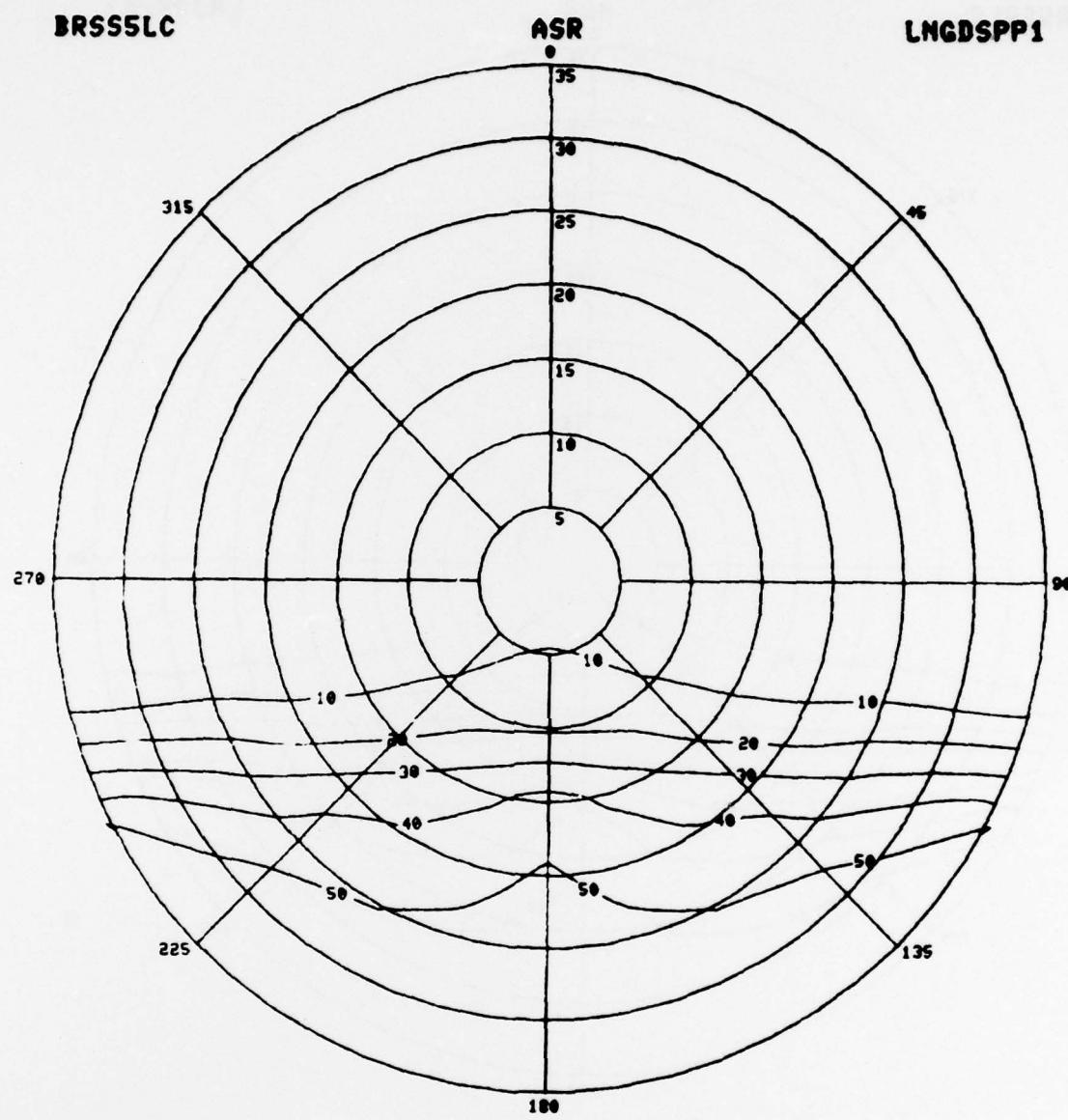
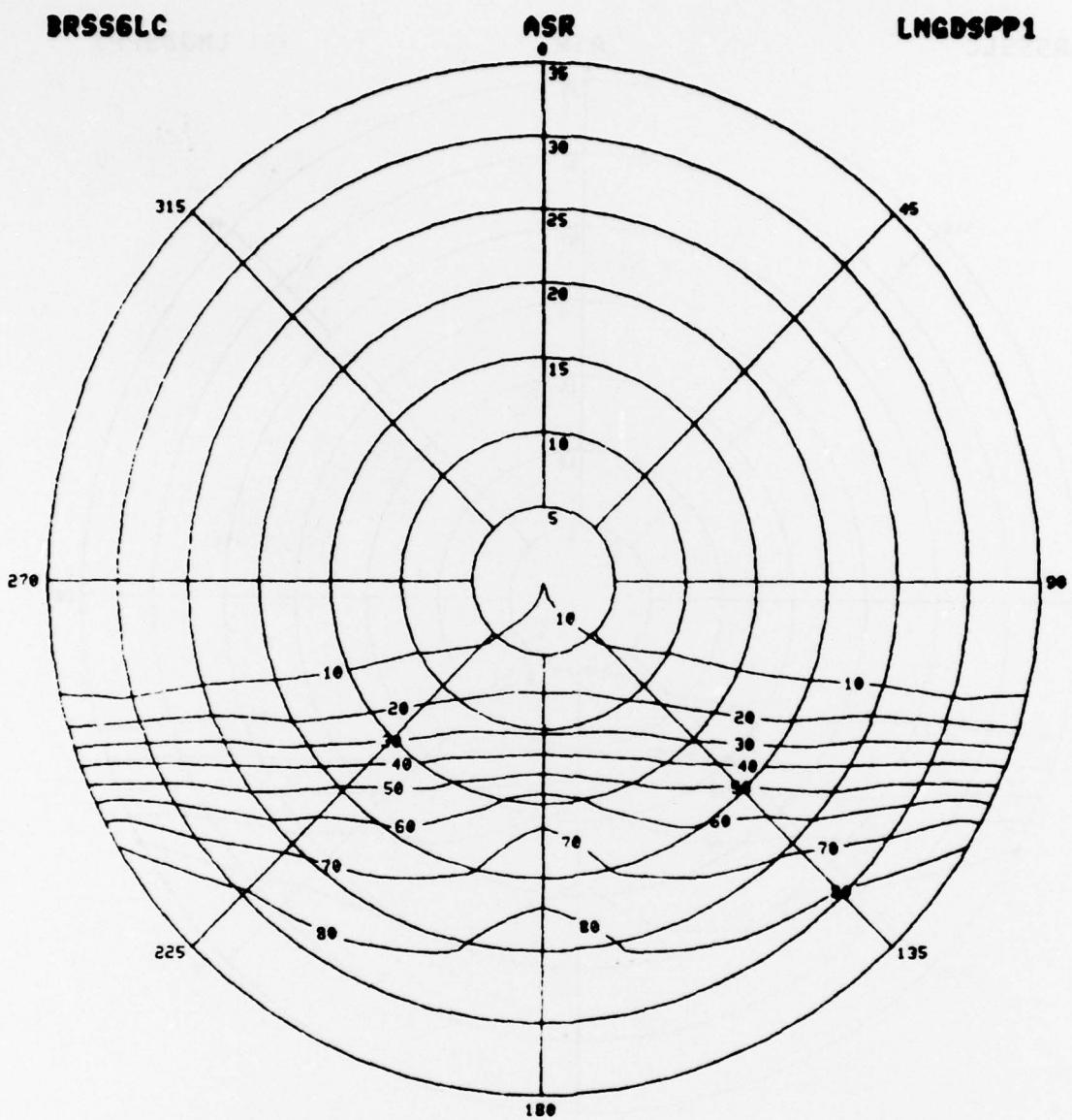


Figure 2 - Effect of Operator Control on USCG Cutter Ship Motions



**Figure 3 - Speed Polar Plot of Longitudinal Displacement at the Aft Tow Position in a Sea State 5, Long-Crested**



**Figure 4 - Speed Polar Plot of Longitudinal Displacement at the  
Aft Tow Position in a Sea State 6, Long-Crested**

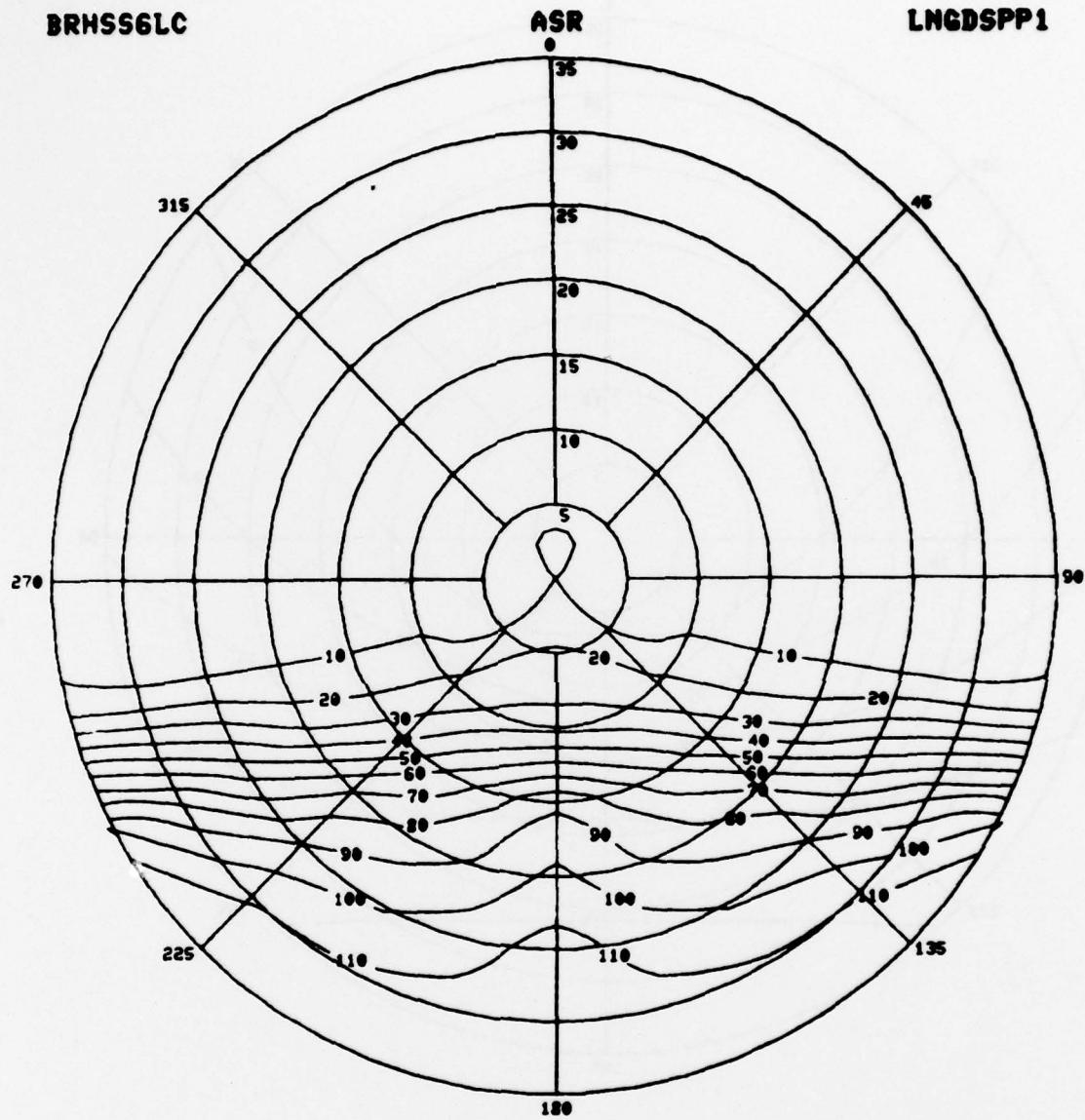
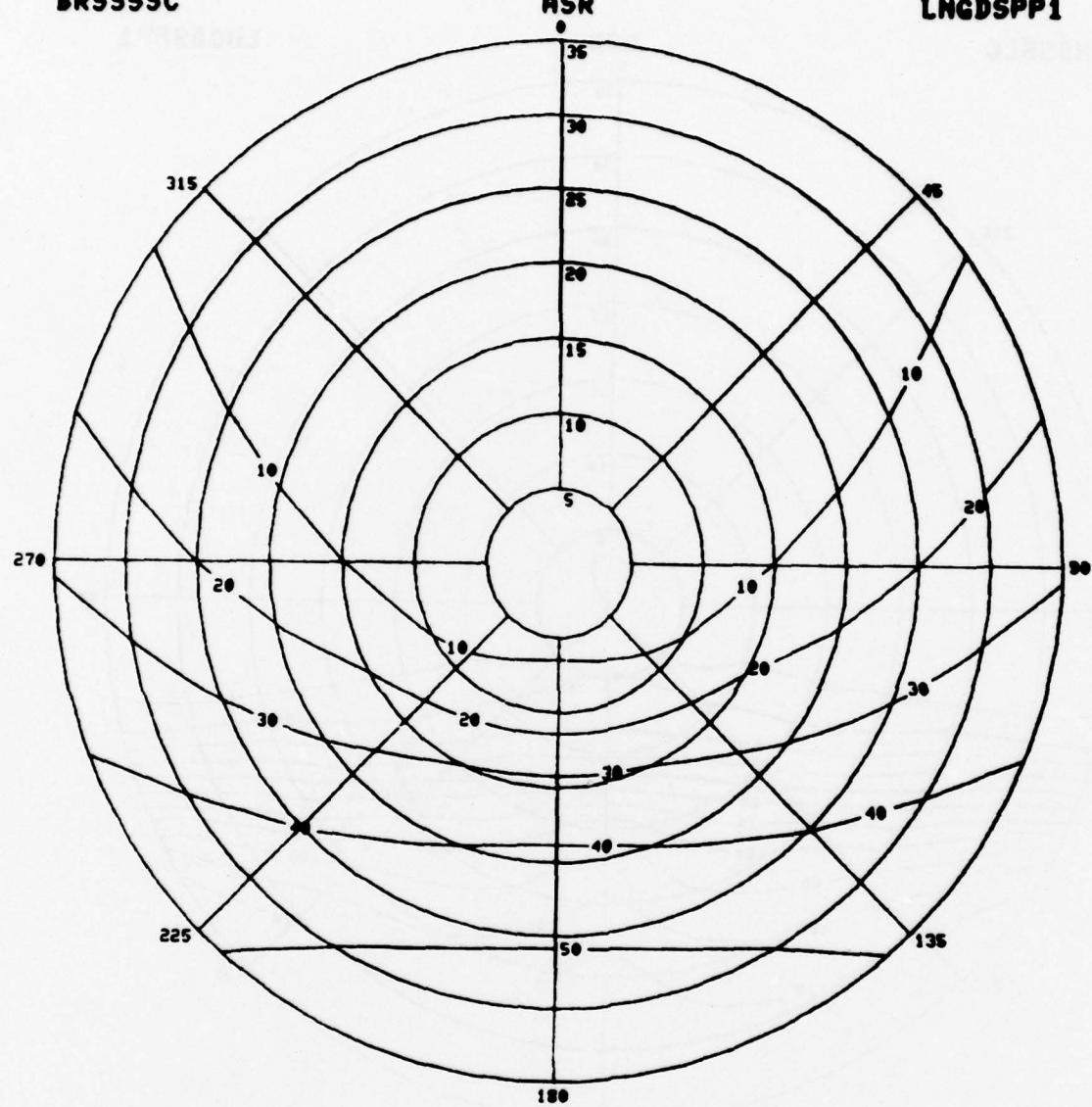


Figure 5 - Speed Polar Plot of Longitudinal Displacement at the  
Aft Tow Position in a High Sea State 6, Long-Crested

**BRSS5SC**

**ASR**

**LNGDSPP1**



**Figure 6 - Speed Polar Plot of Longitudinal Displacement at the  
Aft Tow Position in a Sea State 5, Short-Crested**

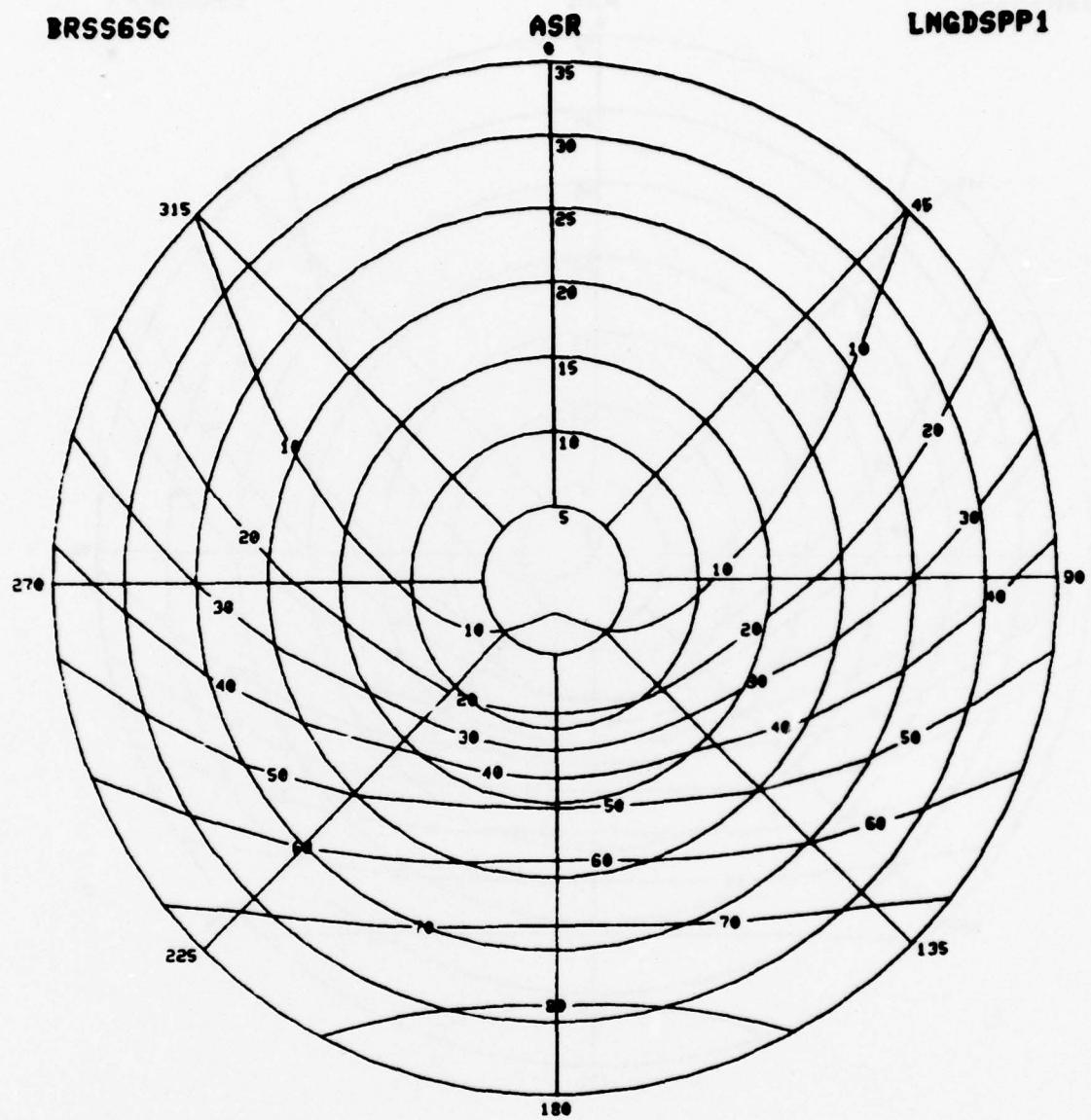
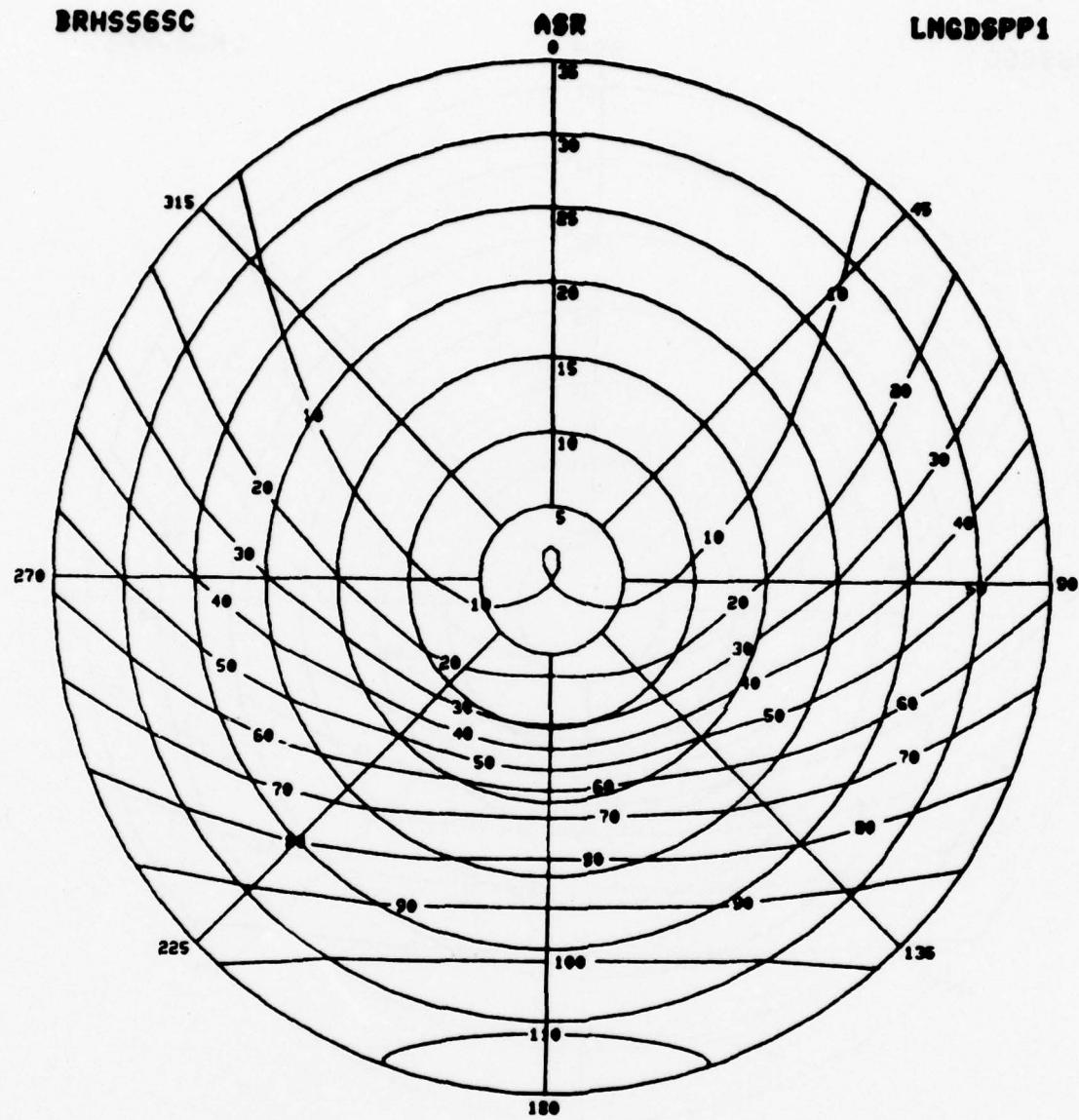


Figure 7 - Speed Polar Plot of Longitudinal Displacement at the Aft Tow Position in a Sea State 6, Short-Crested



**Figure 8 - Speed Polar Plot of Longitudinal Displacement at the Aft Tow Position in a High Sea State 6, Short-Crested**

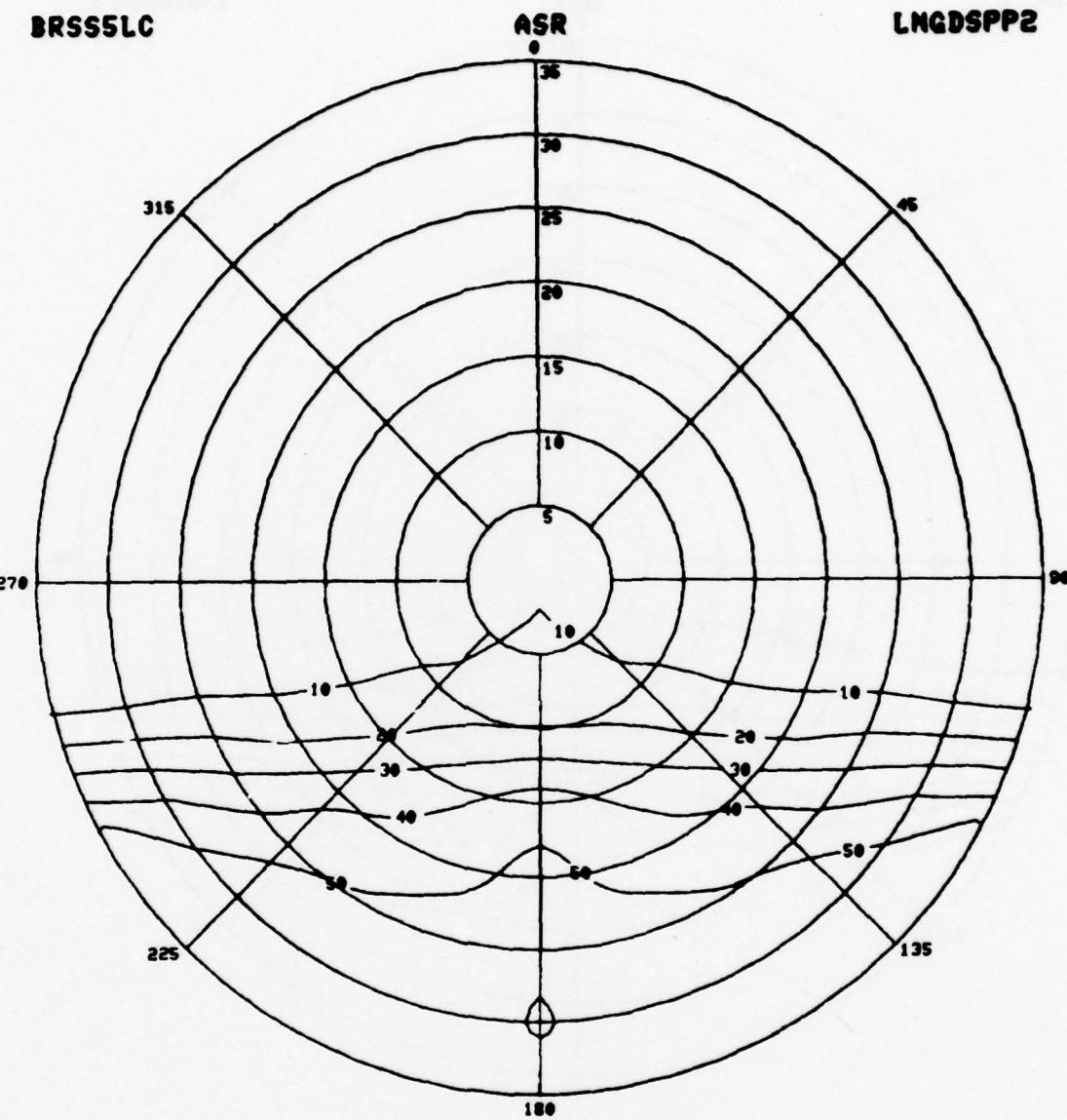


Figure 9 - Speed Polar Plot of Surge in a Sea State 5, Long-Crested

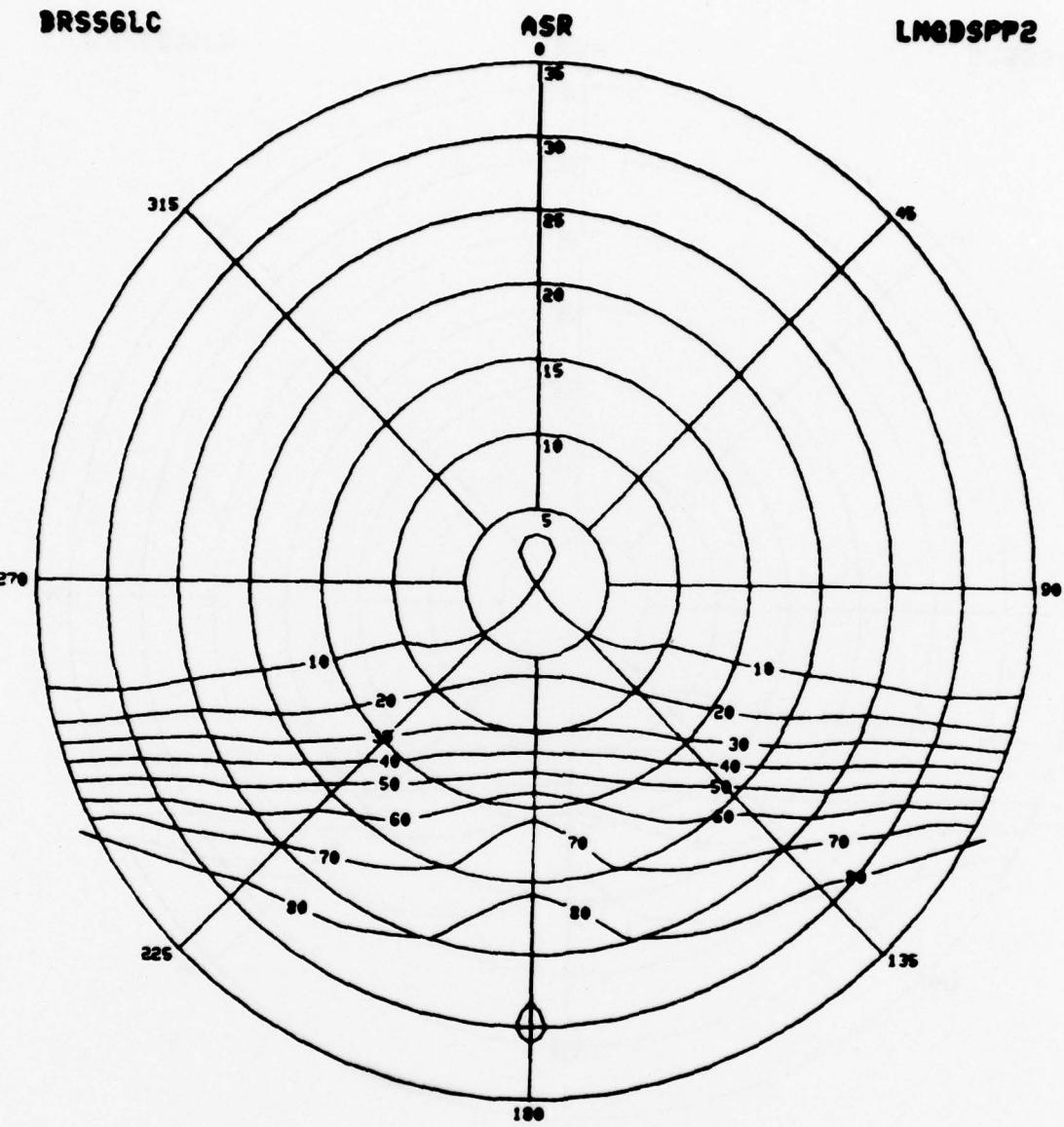
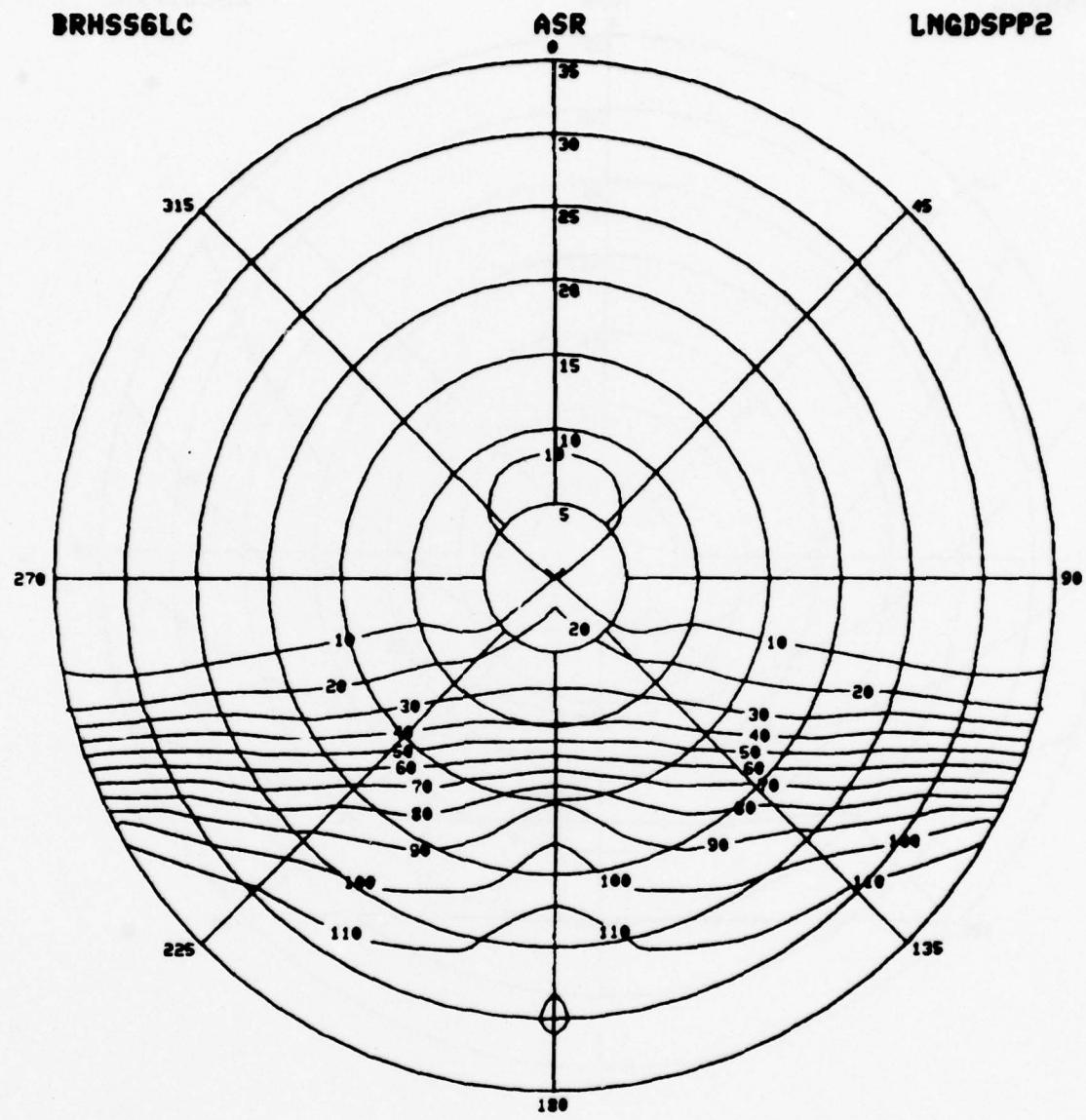


Figure 10 – Speed Polar Plot of Surge in a Sea State 6, Long-Crested



**Figure 11 - Speed Polar Plot of Surge in a High  
Sea State 6, Long-Crested**

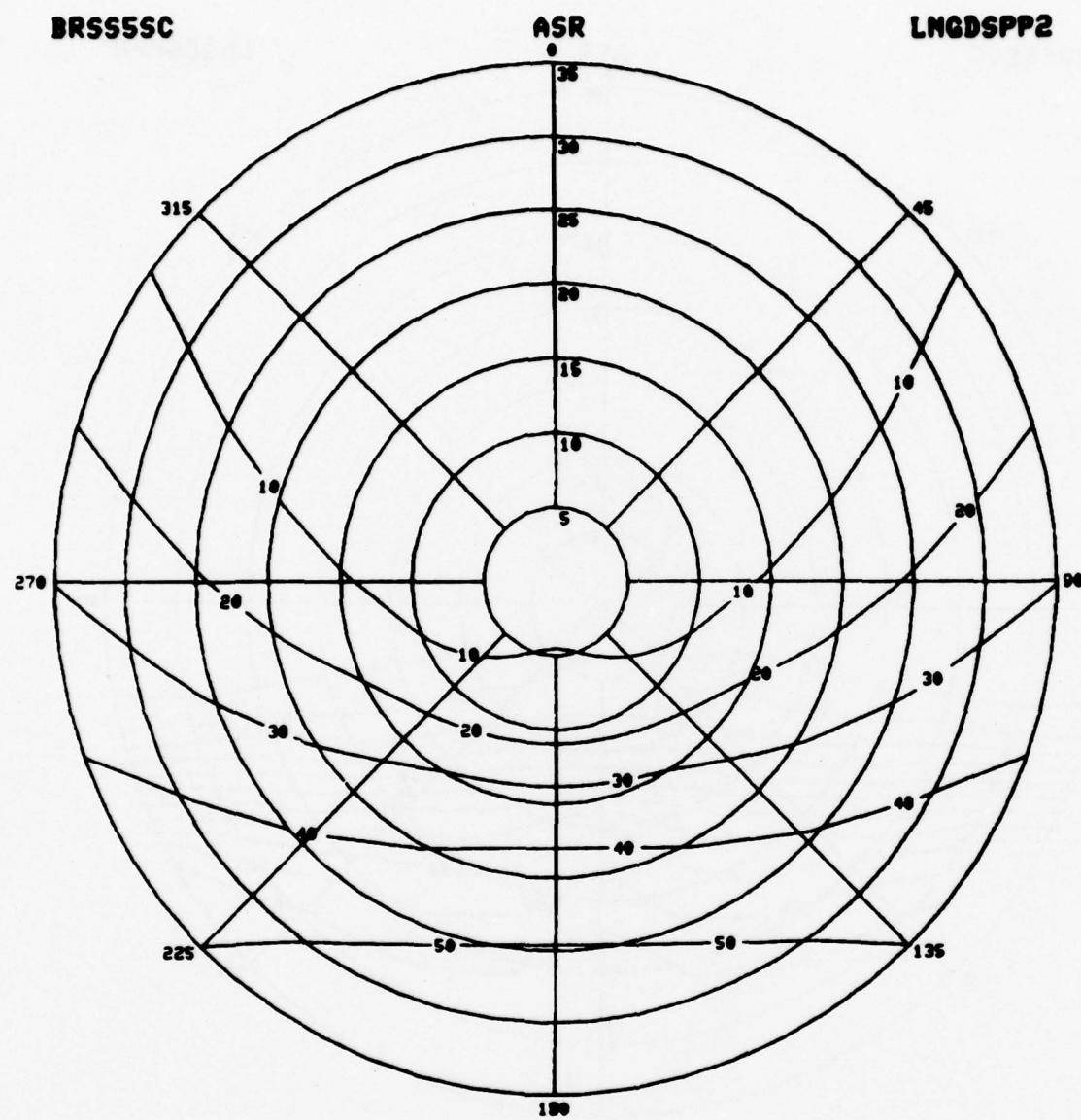


Figure 12 - Speed Polar Plot of Surge in a Sea State 5, Short-Crested

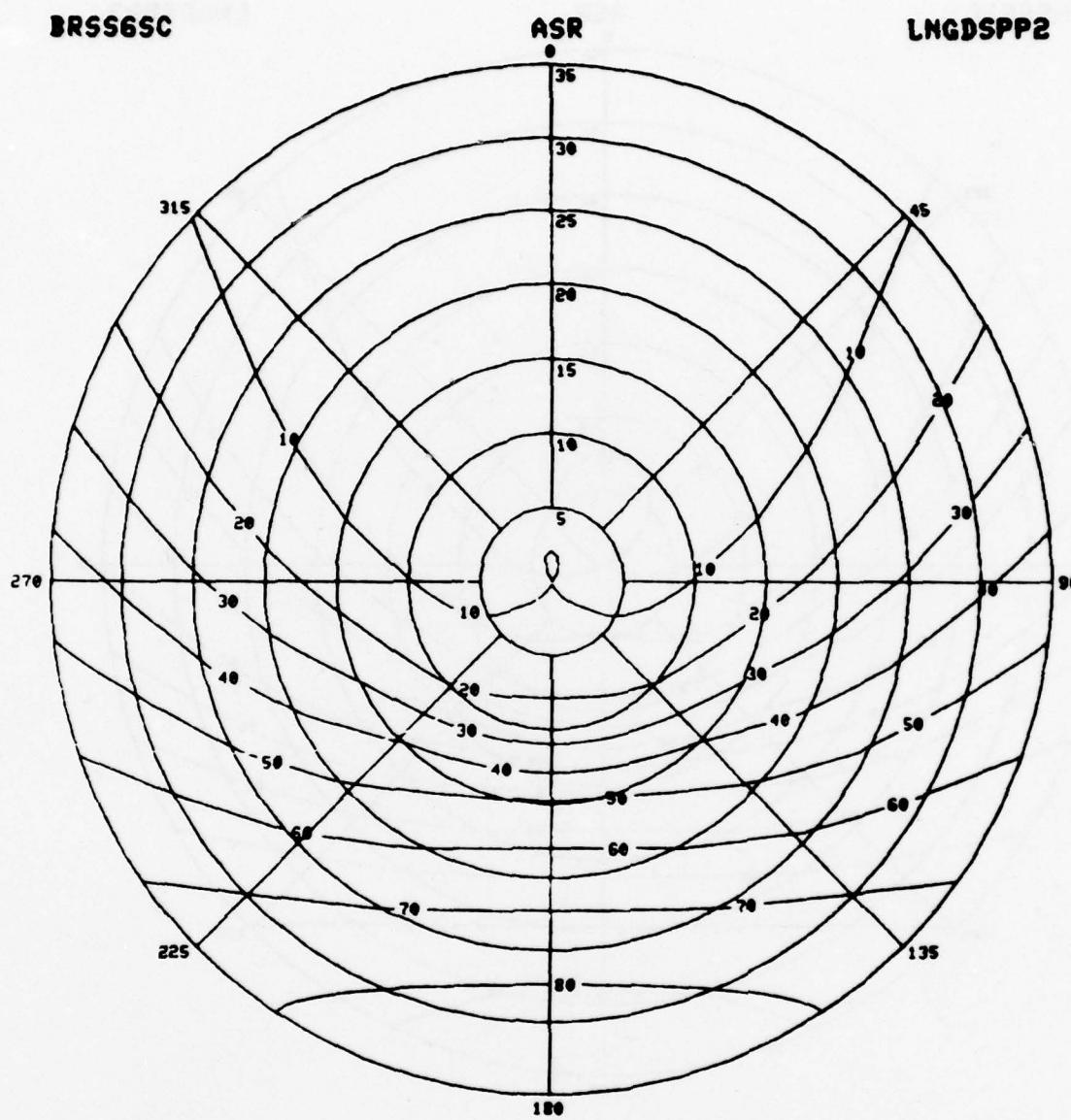


Figure 13 - Speed Polar Plot of Surge in a Sea State 6, Short-Crested

**BRHSS6SC**

ASR

LNGDSPP2

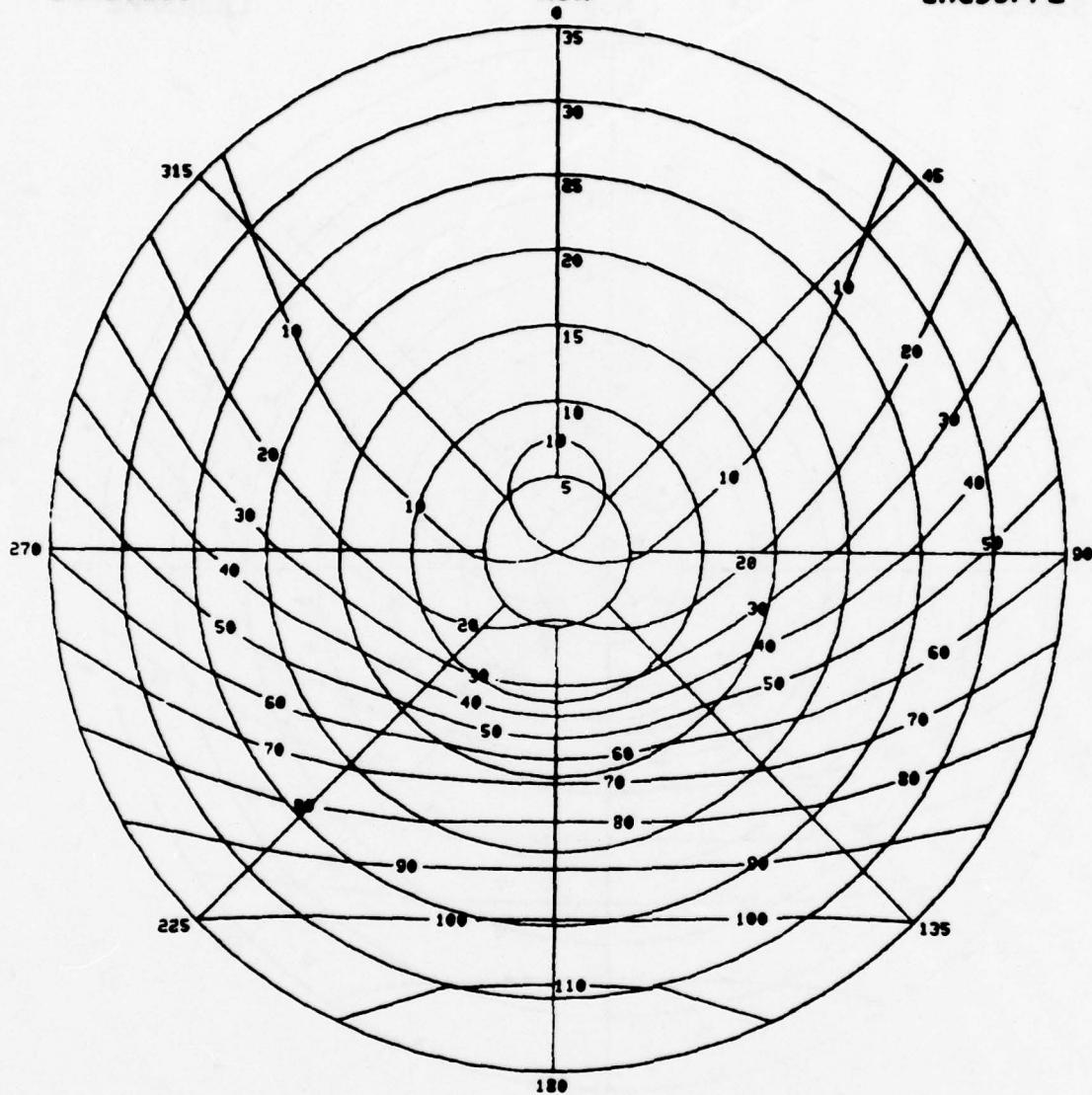


Figure 14 - Speed Polar Plot of Surge in a High Sea State 6, Short-Crested

TABLE 1 - COMPUTED SHIP PARTICULARS

Displacement, $\Delta$	2118 Long Tons (2085 Metric Tons)
Length Between Perpendiculars, $L_{PP}$	240.00 feet (73.15 meters)
Beam, $B$	42.00 feet (12.80 meters)
Draft at Midships, $T_{MD}$	14.71 feet (4.48 meters)
Metacentric Height, $GM$	3.19 feet (0.97 meters)
Vertical Center of Gravity, $KG$	15.60 feet (4.75 meters)
Longitudinal Center of Gravity, $LCG^*$	5.81 feet (1.77 meters)
Trim (by the stern)	2.10 feet (0.64 meters)
Block Coefficient	.50

\*Aft of Midships

**APPENDIX**  
**RMS/TOE TABLES**

## ASR

RMS LON DISP IN FEET/ENCOUNTERED MODAL PERIOD, T' IN SECONDS  
LONGCRESTED  
DE

V	T0	SHIP HEADING ANGLE IN DEGREES										150	165	180	
		0	15	30	45	60	75	90	105	120	135				
0	0	.07/. 8	.07/. 8	.07/. 8	.06/. 7	.03/. 7	.00/. 7	.04/. 7	.06/. 7	.07/. 8	.04/. 7	.07/. 8	.07/. 8	.07/. 8	
0	7	.07/. 9	.07/. 9	.09/. 10	.07/. 9	.04/. 9	.01/. 10	.05/. 9	.08/. 10	.09/. 10	.04/. 9	.04/. 9	.04/. 9	.04/. 9	.04/. 9
1	11	.11/. 10	.10/. 10	.13/. 11	.11/. 11	.08/. 11	.04/. 11	.05/. 11	.09/. 11	.11/. 11	.05/. 11	.11/. 11	.11/. 11	.11/. 11	.11/. 10
1	14	.14/. 11	.14/. 12	.13/. 12	.12/. 13	.08/. 13	.04/. 13	.01/. 14	.05/. 13	.09/. 13	.12/. 14	.05/. 13	.12/. 13	.12/. 13	.12/. 12
1	16	.16/. 14	.14/. 14	.14/. 14	.12/. 13	.08/. 13	.04/. 13	.01/. 14	.05/. 13	.09/. 13	.12/. 14	.05/. 13	.12/. 13	.12/. 13	.12/. 14
1	17	.17/. 16	.16/. 16	.15/. 16	.12/. 16	.09/. 16	.04/. 16	.01/. 16	.05/. 16	.10/. 16	.13/. 16	.05/. 16	.12/. 16	.12/. 16	.12/. 16
1	18	.18/. 18	.17/. 18	.15/. 18	.13/. 18	.09/. 18	.04/. 18	.01/. 18	.05/. 18	.10/. 18	.14/. 18	.05/. 18	.12/. 18	.12/. 18	.12/. 18
1	19	.18/. 21	.18/. 21	.18/. 21	.16/. 21	.09/. 21	.05/. 21	.01/. 21	.06/. 21	.10/. 21	.14/. 21	.05/. 21	.13/. 21	.13/. 21	.13/. 21
2	21	.05/. 8	.05/. 8	.05/. 8	.05/. 8	.04/. 8	.03/. 7	.00/. 7	.04/. 8	.03/. 8	.08/. 8	.10/. 10	.10/. 10	.10/. 10	.10/. 10
3	7	.08/. 9	.08/. 10	.08/. 10	.08/. 10	.06/. 10	.06/. 10	.01/. 10	.05/. 10	.04/. 10	.04/. 10	.10/. 10	.16/. 11	.16/. 11	.16/. 11
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4	10	.03/. 8	.03/. 8	.03/. 8	.04/. 8	.04/. 8	.04/. 8	.03/. 7	.00/. 7	.03/. 8	.10/. 9	.14/. 10	.17/. 12	.19/. 13	.20/. 13
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4	11	.08/. 12	.08/. 12	.08/. 12	.07/. 12	.06/. 12	.03/. 11	.01/. 11	.06/. 12	.12/. 13	.19/. 13	.25/. 14	.29/. 15	.30/. 15	.30/. 15
4	13	.10/. 14	.10/. 14	.09/. 14	.09/. 14	.06/. 14	.04/. 14	.01/. 14	.06/. 14	.13/. 15	.25/. 16	.30/. 16	.31/. 16	.31/. 16	.31/. 16
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6	19	.09/. 21	.09/. 21	.09/. 21	.09/. 21	.08/. 21	.07/. 21	.04/. 21	.01/. 21	.07/. 22	.16/. 24	.29/. 19	.41/. 23	.50/. 26	.54/. 27
6	21	.10/. 21	.10/. 21	.10/. 21	.09/. 21	.09/. 21	.07/. 21	.04/. 21	.01/. 21	.07/. 22	.16/. 24	.29/. 19	.41/. 23	.50/. 26	.54/. 27
7	7	.02/. 9	.02/. 9	.02/. 9	.02/. 9	.03/. 10	.03/. 10	.02/. 10	.00/. 10	.08/. 11	.13/. 13	.46/. 17	.58/. 31	.57/. **	.59/. 8
7	9	.03/. 10	.03/. 10	.03/. 10	.03/. 10	.03/. 10	.03/. 10	.02/. 10	.00/. 10	.08/. 11	.13/. 13	.48/. 19	.58/. 31	.59/. 42	.59/. 57
7	11	.05/. 13	.05/. 13	.05/. 13	.05/. 13	.04/. 12	.03/. 12	.01/. 11	.08/. 13	.13/. 13	.32/. 17	.60/. 24	.72/. 30	.79/. 33	.85/. 37
7	13	.06/. 14	.06/. 14	.06/. 14	.05/. 14	.05/. 14	.03/. 14	.01/. 14	.08/. 15	.18/. 13	.28/. 17	.54/. 24	.71/. 30	.80/. 33	.87/. 33
7	15	.07/. 16	.07/. 16	.07/. 16	.06/. 16	.05/. 16	.03/. 16	.01/. 16	.08/. 17	.25/. 17	.49/. 24	.67/. 30	.78/. 33	.85/. 33	.85/. 33
7	17	.08/. 18	.07/. 18	.07/. 18	.06/. 18	.05/. 18	.03/. 18	.01/. 18	.08/. 18	.22/. 17	.44/. 24	.62/. 30	.74/. 33	.81/. 33	.81/. 33
7	19	.08/. 21	.08/. 21	.08/. 21	.07/. 21	.06/. 21	.03/. 21	.01/. 18	.07/. 20	.21/. 17	.40/. 24	.57/. 30	.69/. 33	.75/. 33	.75/. 33
7	21	.09/. 21	.09/. 21	.08/. 21	.07/. 21	.06/. 21	.03/. 21	.01/. 21	.07/. 21	.19/. 17	.37/. 24	.53/. 30	.64/. 33	.70/. 33	.70/. 33

## ASR

RMS LON VEL IN FPS/ENCOUNTERED MODAL PERIOD, T<sub>0</sub>, IN SECONDS  
LONGCRESTED

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										135	150	165	180
		0	15	30	45	60	75	90	105	120	135				
0	0	.06/ 8	.06/ 8	.06/ 7	.06/ 7	.05/ 7	.03/ 7	.00/ 7	.04/ 7	.05/ 7	.06/ 7	.03/ 6	.05/ 8	.05/ 8	.05/ 8
0	7	.08/ 9	.08/ 9	.07/ 9	.07/ 9	.05/ 8	.03/ 8	.00/ 8	.04/ 8	.06/ 8	.07/ 9	.04/ 8	.07/ 8	.08/ 9	.08/ 9
9	9	.08/ 9	.08/ 9	.08/ 10	.08/ 10	.07/ 10	.06/ 10	.03/ 10	.03/ 10	.03/ 10	.06/ 10	.03/ 10	.03/ 10	.07/ 10	.07/ 10
11	11	.08/ 10	.08/ 10	.08/ 13	.08/ 13	.07/ 13	.06/ 13	.05/ 12	.05/ 12	.00/ 13	.03/ 12	.05/ 12	.07/ 13	.07/ 11	.09/ 13
13	13	.09/ 13	.09/ 13	.07/ 13	.07/ 13	.06/ 13	.05/ 12	.02/ 12	.00/ 13	.00/ 14	.03/ 14	.03/ 14	.07/ 14	.06/ 13	.09/ 14
15	15	.08/ 14	.08/ 14	.07/ 14	.07/ 14	.06/ 14	.05/ 14	.02/ 14	.00/ 14	.00/ 14	.03/ 14	.03/ 14	.05/ 14	.05/ 14	.06/ 16
17	17	.08/ 16	.08/ 16	.07/ 16	.07/ 16	.06/ 16	.05/ 16	.02/ 16	.00/ 16	.03/ 16	.06/ 16	.06/ 16	.06/ 16	.06/ 16	.08/ 16
19	19	.07/ 18	.07/ 18	.06/ 18	.05/ 18	.04/ 18	.03/ 18	.02/ 18	.00/ 18	.04/ 18	.06/ 18	.06/ 18	.06/ 18	.06/ 18	.08/ 18
21	21	.07/ 18	.07/ 18	.06/ 18	.05/ 18	.04/ 18	.03/ 18	.02/ 18	.00/ 18	.04/ 18	.06/ 18	.06/ 18	.06/ 18	.06/ 18	.07/ 18
5	7	.05/ 8	.05/ 8	.05/ 8	.05/ 7	.05/ 7	.05/ 7	.03/ 7	.00/ 7	.04/ 7	.03/ 7	.06/ 8	.07/ 9	.07/ 10	.07/ 10
9	9	.07/ 9	.07/ 9	.06/ 9	.06/ 9	.05/ 8	.03/ 8	.00/ 8	.04/ 9	.03/ 9	.07/ 9	.09/ 10	.09/ 10	.09/ 11	.09/ 11
11	11	.07/ 10	.07/ 10	.06/ 10	.06/ 10	.05/ 10	.03/ 10	.00/ 10	.04/ 10	.02/ 10	.06/ 11	.09/ 12	.10/ 12	.10/ 12	.10/ 12
13	13	.07/ 13	.07/ 13	.07/ 13	.06/ 13	.05/ 13	.03/ 13	.00/ 13	.03/ 12	.02/ 12	.06/ 13	.09/ 13	.10/ 13	.10/ 13	.10/ 13
15	15	.07/ 14	.07/ 14	.07/ 14	.06/ 14	.05/ 14	.03/ 14	.00/ 14	.00/ 14	.03/ 14	.02/ 14	.05/ 14	.08/ 14	.09/ 16	.10/ 16
17	17	.07/ 16	.07/ 16	.06/ 16	.05/ 16	.04/ 16	.02/ 16	.00/ 16	.03/ 16	.02/ 17	.05/ 17	.08/ 17	.09/ 17	.09/ 17	.09/ 17
19	19	.07/ 18	.07/ 18	.06/ 18	.05/ 18	.04/ 18	.02/ 18	.00/ 18	.02/ 18	.02/ 18	.05/ 17	.07/ 17	.08/ 17	.08/ 17	.09/ 18
21	21	.06/ 18	.06/ 18	.06/ 18	.05/ 18	.04/ 18	.03/ 18	.02/ 18	.00/ 18	.01/ 19	.04/ 19	.07/ 20	.08/ 20	.08/ 20	.08/ 20
10	7	.04/ 8	.04/ 8	.04/ 8	.04/ 7	.04/ 7	.04/ 7	.03/ 7	.00/ 7	.04/ 8	.07/ 9	.08/ 10	.09/ 12	.09/ 13	.09/ 13
9	9	.06/ 10	.06/ 10	.06/ 9	.06/ 9	.05/ 9	.04/ 9	.03/ 8	.00/ 9	.04/ 9	.07/ 10	.09/ 11	.11/ 13	.12/ 13	.12/ 13
11	11	.07/ 10	.06/ 10	.06/ 10	.05/ 10	.04/ 10	.03/ 10	.02/ 10	.01/ 10	.04/ 11	.07/ 11	.09/ 13	.11/ 13	.12/ 13	.12/ 13
13	13	.07/ 13	.07/ 13	.06/ 13	.05/ 13	.04/ 13	.02/ 12	.00/ 12	.03/ 13	.06/ 13	.09/ 14	.11/ 15	.12/ 15	.12/ 15	.12/ 15
15	15	.07/ 14	.07/ 14	.06/ 14	.05/ 14	.04/ 14	.02/ 14	.00/ 14	.03/ 14	.06/ 15	.08/ 15	.10/ 16	.11/ 17	.12/ 17	.12/ 17
17	17	.06/ 16	.06/ 16	.06/ 16	.05/ 16	.04/ 16	.02/ 16	.00/ 16	.03/ 17	.05/ 16	.07/ 17	.09/ 17	.10/ 18	.11/ 18	.11/ 18
19	19	.06/ 18	.06/ 18	.05/ 18	.05/ 18	.04/ 18	.03/ 18	.02/ 18	.00/ 18	.03/ 17	.05/ 17	.07/ 18	.09/ 19	.10/ 20	.10/ 20
21	21	.06/ 21	.05/ 21	.05/ 18	.04/ 18	.03/ 18	.02/ 18	.00/ 18	.02/ 19	.04/ 20	.06/ 20	.08/ 21	.09/ 22	.09/ 22	.09/ 22
15	7	.03/ 8	.03/ 8	.03/ 8	.04/ 8	.04/ 7	.03/ 7	.02/ 7	.00/ 7	.05/ 8	.08/ 10	.11/ 14	.13/ 17	.12/ 20	.13/ 20
9	9	.05/ 10	.05/ 10	.05/ 9	.05/ 9	.05/ 9	.04/ 9	.03/ 8	.00/ 9	.04/ 10	.08/ 11	.12/ 14	.15/ 17	.15/ 20	.16/ 20
11	11	.06/ 11	.06/ 11	.06/ 10	.05/ 10	.04/ 10	.02/ 10	.00/ 10	.04/ 11	.08/ 13	.11/ 14	.14/ 17	.16/ 20	.17/ 20	.17/ 20
13	13	.06/ 13	.06/ 13	.06/ 13	.05/ 13	.04/ 13	.02/ 12	.00/ 13	.04/ 13	.07/ 14	.10/ 14	.13/ 17	.15/ 20	.16/ 20	.16/ 20
15	15	.06/ 14	.06/ 14	.05/ 14	.05/ 14	.04/ 14	.02/ 14	.00/ 14	.03/ 14	.06/ 16	.09/ 14	.12/ 17	.14/ 20	.14/ 20	.14/ 20
17	17	.06/ 16	.06/ 16	.05/ 16	.05/ 16	.04/ 16	.02/ 16	.00/ 16	.03/ 16	.06/ 17	.09/ 14	.11/ 17	.12/ 20	.13/ 20	.13/ 20
19	19	.06/ 18	.05/ 18	.05/ 18	.04/ 18	.03/ 18	.02/ 18	.00/ 18	.03/ 17	.05/ 18	.08/ 14	.10/ 17	.11/ 20	.12/ 20	.12/ 20
21	21	.05/ 21	.05/ 21	.04/ 21	.04/ 21	.03/ 18	.02/ 18	.00/ 18	.02/ 19	.05/ 21	.07/ 20	.09/ 17	.10/ 20	.11/ 20	.11/ 20
20	7	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.03/ 7	.02/ 7	.00/ 7	.05/ 8	.10/ 13	.12/ 19	.08/ 26	.07/ 35	.07/ 35
9	9	.04/ 10	.04/ 10	.04/ 9	.04/ 9	.04/ 9	.04/ 9	.02/ 8	.00/ 9	.05/ 10	.10/ 13	.14/ 19	.16/ 23	.17/ 27	.17/ 27
11	11	.05/ 11	.05/ 11	.05/ 11	.05/ 11	.05/ 11	.05/ 10	.04/ 10	.02/ 10	.00/ 10	.04/ 12	.09/ 13	.13/ 19	.14/ 23	.14/ 23
13	13	.05/ 13	.05/ 13	.05/ 13	.05/ 13	.04/ 13	.02/ 13	.00/ 13	.04/ 13	.04/ 13	.08/ 13	.12/ 19	.14/ 23	.15/ 27	.15/ 27
15	15	.05/ 14	.05/ 14	.05/ 14	.04/ 14	.04/ 14	.02/ 14	.00/ 14	.00/ 14	.03/ 15	.07/ 13	.11/ 19	.13/ 23	.14/ 26	.14/ 26
17	17	.05/ 16	.05/ 16	.05/ 16	.04/ 16	.04/ 16	.03/ 16	.02/ 16	.00/ 16	.03/ 16	.06/ 13	.10/ 19	.12/ 23	.13/ 26	.14/ 27
19	19	.05/ 18	.05/ 18	.05/ 18	.04/ 18	.04/ 18	.03/ 18	.02/ 18	.00/ 16	.03/ 18	.06/ 13	.09/ 19	.11/ 23	.12/ 26	.13/ 27
21	21	.05/ 21	.05/ 21	.04/ 21	.04/ 21	.03/ 18	.02/ 18	.00/ 18	.02/ 20	.05/ 13	.08/ 19	.10/ 23	.11/ 26	.12/ 27	.12/ 27
25	7	.02/ 9	.02/ 9	.03/ 8	.03/ 8	.03/ 8	.03/ 7	.02/ 7	.00/ 7	.05/ 9	.13/ 17	.12/ 27	.09/ 45	.08/ 7	.08/ 7
9	9	.04/ 10	.04/ 10	.04/ 9	.04/ 9	.04/ 9	.04/ 9	.02/ 8	.00/ 9	.05/ 9	.12/ 17	.13/ 24	.10/ 31	.09/ 39	.09/ 42
11	11	.05/ 11	.05/ 11	.05/ 11	.05/ 11	.04/ 10	.04/ 10	.02/ 10	.00/ 10	.04/ 12	.11/ 17	.14/ 24	.12/ 30	.11/ 33	.11/ 35
13	13	.05/ 13	.05/ 13	.05/ 13	.04/ 13	.04/ 13	.02/ 13	.00/ 13	.04/ 13	.03/ 15	.08/ 17	.13/ 24	.13/ 30	.13/ 33	.13/ 33
15	15	.05/ 14	.05/ 14	.05/ 14	.04/ 14	.04/ 14	.02/ 14	.00/ 14	.00/ 14	.03/ 15	.07/ 17	.12/ 24	.13/ 30	.13/ 33	.14/ 33
17	17	.05/ 16	.05/ 16	.05/ 16	.04/ 16	.04/ 16	.03/ 16	.02/ 16	.00/ 16	.03/ 17	.07/ 17	.11/ 24	.12/ 30	.13/ 33	.14/ 33
19	19	.05/ 18	.05/ 18	.04/ 18	.04/ 18	.03/ 18	.02/ 18	.00/ 18	.03/ 18	.06/ 17	.10/ 24	.12/ 30	.12/ 33	.13/ 33	.13/ 33
21	21	.05/ 21	.04/ 21	.04/ 21	.03/ 21	.03/ 21	.02/ 18	.00/ 18	.03/ 20	.06/ 19	.09/ 24	.11/ 20	.12/ 33	.12/ 33	.12/ 33

ASR

LONGCRESTED  
WAVES ENCOUNTERED MODAL PERIOD, T<sub>m</sub>, IN SECONDS  
(ACC. X 100)

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										165	160
		15	30	45	60	75	90	105	120	135	150		
0	7	.14/.7	.15/.7	.16/.7	.15/.7	.14/.8	.09/.7	.01/.7	.12/.6	.15/.7	.16/.7	.10/.6	.14/.7
9	.18/.8	.18/.8	.17/.8	.17/.8	.15/.9	.12/.9	.07/.8	.01/.9	.10/.7	.15/.8	.17/.8	.09/.6	.16/.8
11	.17/.10	.15/.10	.16/.10	.15/.10	.13/.10	.10/.10	.06/.10	.01/.10	.07/.10	.11/.10	.15/.9	.08/.7	.18/.10
13	.16/.10	.16/.10	.15/.10	.15/.10	.13/.10	.10/.10	.06/.10	.01/.10	.07/.10	.11/.10	.14/.10	.06/.9	.16/.10
15	.14/.12	.14/.12	.13/.12	.11/.11	.09/.11	.05/.10	.01/.12	.06/.11	.09/.11	.12/.11	.05/.10	.12/.10	.14/.12
17	.12/.13	.12/.13	.10/.13	.07/.13	.04/.13	.01/.13	.05/.13	.08/.13	.10/.13	.10/.13	.04/.13	.10/.11	.13/.13
19	.11/.14	.11/.14	.10/.14	.08/.14	.06/.14	.03/.14	.00/.14	.04/.14	.07/.14	.09/.14	.04/.14	.09/.13	.11/.14
21	.10/.16	.09/.16	.09/.16	.07/.16	.05/.14	.03/.14	.00/.14	.04/.16	.06/.16	.08/.16	.03/.14	.07/.14	.10/.16
8	7	.15/.7	.15/.7	.16/.7	.15/.7	.17/.8	.09/.7	.01/.7	.10/.8	.07/.7	.14/.8	.14/.9	.14/.10
9	.18/.8	.18/.8	.18/.8	.17/.8	.15/.9	.12/.9	.07/.8	.01/.9	.08/.9	.06/.9	.13/.9	.16/.1	.17/.10
11	.16/.10	.16/.10	.15/.10	.13/.10	.10/.10	.06/.10	.01/.10	.07/.10	.05/.10	.11/.10	.14/.12	.16/.12	.17/.12
13	.14/.12	.14/.12	.13/.12	.11/.11	.09/.11	.05/.10	.01/.12	.06/.11	.09/.11	.13/.12	.15/.12	.16/.13	.16/.13
15	.12/.13	.12/.13	.10/.13	.08/.13	.06/.13	.04/.13	.01/.13	.05/.13	.08/.13	.13/.13	.14/.13	.14/.13	.14/.13
17	.11/.14	.11/.14	.10/.14	.08/.14	.06/.14	.03/.14	.00/.14	.04/.14	.07/.14	.10/.14	.12/.14	.13/.15	.13/.15
19	.10/.16	.09/.16	.09/.16	.07/.16	.05/.16	.03/.14	.00/.14	.03/.15	.06/.15	.09/.16	.10/.16	.11/.16	.11/.16
21	.10/.16	.09/.16	.09/.16	.07/.16	.05/.16	.03/.14	.00/.14	.03/.15	.06/.15	.09/.16	.10/.16	.10/.16	.10/.16
10	7	.14/.8	.14/.8	.15/.7	.15/.7	.15/.7	.14/.8	.09/.7	.01/.7	.10/.8	.15/.8	.15/.10	.14/.12
9	.18/.8	.18/.8	.17/.8	.17/.8	.15/.9	.12/.9	.07/.8	.01/.9	.08/.9	.12/.10	.16/.11	.17/.12	.17/.13
11	.18/.10	.17/.10	.17/.10	.15/.10	.13/.10	.10/.10	.06/.10	.01/.10	.07/.10	.11/.12	.15/.12	.16/.13	.17/.13
13	.16/.10	.16/.10	.15/.10	.13/.10	.10/.10	.06/.10	.01/.10	.07/.10	.11/.12	.13/.13	.15/.14	.16/.13	.16/.13
15	.14/.12	.14/.12	.13/.12	.11/.11	.09/.11	.05/.10	.01/.12	.06/.12	.09/.11	.13/.13	.15/.14	.14/.15	.14/.15
17	.13/.13	.12/.13	.10/.13	.08/.13	.06/.13	.04/.13	.01/.13	.05/.13	.08/.13	.11/.13	.13/.14	.14/.15	.14/.15
19	.11/.14	.11/.14	.10/.14	.08/.14	.06/.14	.03/.14	.00/.14	.04/.14	.07/.15	.09/.15	.10/.16	.11/.17	.11/.17
21	.10/.16	.09/.16	.09/.16	.07/.16	.05/.16	.03/.16	.00/.14	.03/.15	.06/.16	.08/.17	.09/.17	.09/.18	.10/.17
15	7	.13/.8	.14/.8	.14/.8	.14/.8	.16/.8	.12/.9	.09/.7	.01/.7	.10/.8	.14/.10	.14/.12	.13/.13
9	.17/.10	.17/.10	.17/.10	.15/.10	.12/.9	.07/.8	.01/.9	.08/.10	.12/.11	.14/.14	.16/.17	.17/.17	.17/.17
11	.16/.10	.16/.10	.15/.10	.13/.10	.10/.10	.06/.10	.01/.10	.07/.10	.10/.12	.13/.14	.14/.20	.15/.20	.15/.20
13	.14/.13	.14/.13	.13/.12	.11/.12	.09/.11	.05/.11	.01/.12	.06/.12	.09/.13	.11/.14	.13/.17	.13/.20	.13/.20
15	.13/.14	.12/.14	.10/.13	.08/.13	.06/.13	.04/.13	.01/.13	.05/.13	.08/.14	.10/.14	.11/.17	.12/.20	.12/.20
17	.13/.14	.12/.14	.10/.13	.08/.14	.06/.14	.03/.14	.00/.14	.04/.14	.07/.15	.09/.14	.10/.17	.10/.20	.10/.20
19	.11/.14	.11/.14	.10/.14	.08/.14	.06/.14	.03/.16	.00/.14	.03/.15	.06/.17	.07/.14	.09/.20	.09/.20	.09/.20
21	.10/.16	.09/.16	.09/.16	.07/.16	.05/.16	.03/.16	.00/.14	.03/.15	.06/.17	.07/.14	.09/.17	.09/.20	.09/.20
20	7	.13/.8	.13/.8	.14/.8	.14/.8	.14/.8	.14/.8	.10/.6	.01/.4	.12/.8	.14/.13	.14/.19	.04/.31
9	.17/.9	.17/.9	.17/.9	.16/.8	.14/.8	.10/.7	.08/.7	.01/.7	.10/.9	.14/.13	.14/.19	.09/.23	.07/.27
11	.17/.10	.17/.10	.16/.10	.15/.9	.12/.9	.07/.8	.01/.9	.08/.10	.12/.13	.13/.19	.14/.23	.09/.26	.09/.27
13	.16/.10	.15/.10	.13/.10	.10/.10	.09/.10	.05/.10	.01/.10	.07/.11	.10/.13	.11/.19	.12/.23	.10/.26	.10/.27
15	.14/.13	.14/.13	.13/.12	.11/.12	.09/.11	.05/.11	.01/.12	.06/.13	.09/.13	.11/.19	.11/.23	.10/.26	.10/.27
17	.13/.14	.12/.14	.10/.13	.08/.13	.07/.13	.04/.13	.01/.13	.05/.13	.08/.13	.09/.19	.10/.23	.10/.26	.10/.27
19	.11/.14	.11/.14	.10/.14	.08/.14	.06/.14	.03/.14	.00/.14	.04/.15	.06/.13	.07/.14	.09/.23	.09/.26	.09/.27
21	.10/.16	.09/.16	.09/.16	.07/.16	.05/.16	.03/.16	.00/.14	.03/.16	.06/.13	.07/.19	.08/.23	.08/.26	.08/.27
25	7	.12/.8	.12/.7	.13/.7	.14/.8	.13/.8	.10/.7	.01/.4	.11/.9	.13/.17	.05/.6	.06/.6	.07/.7
9	.16/.9	.16/.9	.16/.9	.15/.8	.13/.8	.10/.8	.08/.7	.01/.7	.10/.9	.13/.17	.05/.31	.05/.37	.06/.35
11	.17/.10	.17/.10	.16/.10	.15/.9	.12/.9	.09/.8	.07/.8	.01/.9	.08/.9	.12/.17	.07/.30	.06/.33	.06/.35
13	.16/.10	.15/.10	.13/.10	.10/.10	.08/.10	.05/.10	.01/.10	.06/.11	.07/.9	.10/.17	.09/.30	.07/.33	.07/.33
15	.14/.13	.14/.13	.13/.12	.11/.12	.09/.11	.05/.11	.01/.12	.06/.12	.07/.9	.10/.17	.09/.30	.08/.33	.08/.33
17	.13/.14	.12/.14	.10/.13	.08/.13	.07/.13	.04/.13	.01/.13	.05/.13	.06/.13	.07/.17	.08/.24	.08/.30	.08/.33
19	.11/.14	.11/.14	.10/.14	.08/.14	.06/.14	.03/.14	.00/.14	.04/.15	.06/.17	.08/.24	.08/.30	.07/.33	.07/.33
21	.10/.16	.09/.16	.09/.16	.07/.16	.05/.16	.03/.16	.00/.14	.03/.17	.06/.17	.07/.24	.07/.30	.07/.33	.07/.33

## ASR

 RMS LAT DISP IN FEET/ENCOUNTERED MODAL PERIOD, T<sub>e</sub> IN SECONDS  
 LONGCRESTED  
 ASR

V	10	0	15	30	45	60	75	90	105	120	135	150	165	180	SHIP HEADING ANGLE IN DEGREES	
															0°	45°
0	7	0.00/**	.01/ 8	.03/ 8	.05/ 8	.09/ 8	.13/ 8	.15/ 7	.13/ 8	.09/ 8	.05/ 8	.03/ 8	.01/ 8	.00/ 8	.01/ 8	.01/ 8
0	9	0.00/**	.03/11	.06/10	.10/10	.17/10	.19/10	.17/10	.17/10	.14/10	.06/10	.03/10	.03/10	.00/10	.03/10	.00/10
11	0.00/**	.04/12	.08/12	.13/12	.17/12	.20/12	.22/12	.20/12	.17/12	.13/12	.09/12	.04/12	.04/12	.00/10	.04/12	.00/10
13	0.00/**	.05/14	.10/13	.15/13	.19/13	.22/13	.24/13	.22/13	.19/13	.15/13	.10/13	.05/13	.05/13	.00/10	.05/13	.00/10
15	0.00/**	.06/14	.11/14	.16/14	.20/14	.23/14	.23/14	.23/14	.23/14	.20/14	.16/14	.11/14	.06/14	.00/14	.06/14	.00/14
17	0.00/**	.06/16	.11/16	.16/16	.21/16	.24/16	.24/16	.23/16	.21/16	.16/16	.11/16	.06/16	.00/16	.00/16	.00/16	.00/16
19	0.00/**	.06/18	.12/18	.17/18	.21/18	.23/18	.24/18	.24/18	.21/18	.17/18	.12/18	.06/18	.00/18	.00/18	.00/18	.00/18
21	0.00/**	.06/21	.12/21	.17/21	.21/21	.24/21	.25/21	.24/21	.21/21	.17/21	.12/21	.06/21	.00/21	.00/21	.00/21	.00/21
6	7	0.00/**	.01/ 8	.03/ 8	.05/ 8	.08/ 8	.12/ 8	.15/ 7	.14/ 8	.10/ 9	.07/ 9	.04/11	.02/11	.00/10	.02/11	.00/10
9	0.00/**	.02/10	.05/10	.08/10	.12/10	.16/10	.19/10	.16/10	.18/11	.16/10	.12/11	.08/11	.04/11	.00/10	.04/11	.00/10
11	0.00/**	.03/13	.07/13	.11/13	.16/12	.20/12	.22/12	.21/11	.19/12	.15/13	.10/13	.06/13	.00/13	.00/13	.00/13	.00/13
13	0.00/**	.04/14	.09/14	.13/14	.18/13	.22/13	.24/13	.23/13	.21/13	.17/14	.12/14	.06/14	.00/14	.00/14	.00/14	.00/14
15	0.00/**	.05/16	.10/16	.15/16	.19/16	.22/16	.24/16	.24/16	.22/15	.17/15	.12/16	.06/16	.00/16	.00/16	.00/16	.00/16
17	0.00/**	.05/16	.10/16	.15/16	.19/16	.23/16	.24/16	.24/16	.22/17	.18/19	.12/19	.06/20	.00/20	.00/20	.00/20	.00/20
19	0.00/**	.05/18	.11/18	.16/18	.20/18	.23/18	.24/18	.24/18	.22/19	.18/19	.13/20	.07/20	.00/20	.00/20	.00/20	.00/20
21	0.00/**	.06/21	.11/21	.16/21	.20/21	.23/21	.25/21	.24/21	.22/22	.18/22	.13/22	.07/22	.00/22	.00/22	.00/22	.00/22
10	7	0.00/**	.01/ 8	.02/ 8	.04/ 8	.07/ 8	.12/ 8	.15/ 7	.15/ 8	.12/10	.10/11	.07/12	.03/13	.00/13	.00/13	.00/13
11	0.00/**	.02/12	.06/12	.10/12	.14/12	.19/12	.22/12	.21/12	.20/13	.18/11	.15/12	.10/13	.06/14	.00/14	.00/14	.00/14
13	0.00/**	.04/14	.08/14	.12/14	.16/14	.21/13	.23/13	.23/13	.23/14	.19/15	.13/16	.07/17	.00/17	.00/17	.00/17	.00/17
15	0.00/**	.05/16	.09/16	.14/16	.18/16	.22/16	.24/14	.24/14	.23/15	.23/16	.19/17	.14/17	.07/18	.00/18	.00/18	.00/18
17	0.00/**	.05/18	.10/18	.14/16	.18/16	.22/16	.24/16	.24/16	.23/20	.19/18	.14/20	.07/20	.00/20	.00/20	.00/20	.00/20
19	0.00/**	.05/18	.10/18	.14/18	.19/18	.22/18	.24/18	.24/18	.23/20	.20/21	.14/22	.07/22	.00/22	.00/22	.00/22	.00/22
21	0.00/**	.05/21	.10/21	.15/21	.19/21	.22/21	.25/21	.25/22	.23/22	.20/23	.14/24	.07/24	.00/24	.00/24	.00/24	.00/24
15	7	0.00/**	.01/ 8	.02/ 8	.04/ 8	.07/ 8	.11/ 8	.15/ 7	.15/ 8	.16/ 9	.16/11	.15/17	.10/20	.00/20	.00/20	.00/20
9	0.00/**	.02/10	.04/10	.07/10	.10/10	.15/10	.19/10	.15/10	.20/10	.18/11	.15/12	.10/13	.06/14	.00/14	.00/14	.00/14
11	0.00/**	.03/13	.06/13	.09/13	.13/13	.18/12	.22/11	.24/12	.24/14	.21/14	.17/17	.10/20	.00/20	.00/20	.00/20	.00/20
13	0.00/**	.03/14	.07/14	.11/14	.15/14	.20/14	.23/13	.25/14	.25/16	.22/17	.18/17	.10/20	.00/20	.00/20	.00/20	.00/20
15	0.00/**	.04/16	.08/16	.12/16	.17/16	.21/16	.24/14	.24/14	.25/17	.23/18	.18/17	.10/20	.00/20	.00/20	.00/20	.00/20
17	0.00/**	.04/18	.09/18	.13/18	.17/18	.21/18	.24/16	.24/16	.26/19	.23/20	.18/22	.10/20	.00/20	.00/20	.00/20	.00/20
19	0.00/**	.05/19	.09/19	.14/19	.18/19	.21/19	.24/18	.24/18	.26/21	.22/21	.17/23	.10/23	.00/23	.00/23	.00/23	.00/23
21	0.00/**	.05/21	.09/21	.14/21	.18/21	.22/21	.24/21	.26/22	.25/23	.22/25	.17/26	.09/25	.00/25	.00/25	.00/25	.00/25
20	7	0.00/**	.01/ 9	.02/ 9	.03/ 9	.06/ 9	.10/ 8	.15/ 7	.19/10	.25/13	.33/19	.23/29	.13/42	.00/**	.00/**	.00/**
9	0.00/**	.02/10	.03/10	.06/10	.09/10	.14/10	.19/10	.14/10	.24/11	.28/13	.34/19	.25/23	.16/26	.00/**	.00/**	.00/**
11	0.00/**	.02/13	.05/13	.08/13	.12/13	.17/12	.22/11	.26/13	.29/13	.34/19	.32/19	.26/23	.16/26	.00/**	.00/**	.00/**
13	0.00/**	.03/16	.06/14	.10/14	.14/14	.19/14	.23/13	.27/15	.30/16	.32/16	.32/19	.26/23	.16/26	.00/**	.00/**	.00/**
15	0.00/**	.04/16	.07/16	.11/16	.16/16	.20/16	.24/14	.27/16	.27/18	.29/18	.31/19	.25/23	.15/26	.00/**	.00/**	.00/**
17	0.00/**	.04/18	.08/18	.12/18	.16/18	.20/16	.24/16	.27/18	.27/20	.29/22	.30/19	.26/20	.15/26	.00/**	.00/**	.00/**
19	0.00/**	.04/18	.08/18	.13/18	.17/18	.21/18	.24/18	.27/20	.27/22	.29/22	.29/19	.23/23	.14/26	.00/**	.00/**	.00/**
21	0.00/**	.04/21	.09/21	.13/21	.17/21	.21/21	.24/21	.27/22	.28/24	.28/24	.28/19	.22/23	.13/26	.00/**	.00/**	.00/**
25	7	0.00/**	.01/ 9	.02/ 9	.03/ 9	.06/ 8	.10/ 8	.15/ 7	.22/10	.44/17	.31/31	.20/**	.11/ 8	.00/**	.00/**	.00/**
9	0.00/**	.01/10	.03/10	.05/10	.09/10	.13/10	.19/10	.17/10	.27/12	.43/17	.34/24	.24/33	.15/52	.00/**	.00/**	.00/**
11	0.00/**	.02/13	.04/13	.07/13	.11/13	.16/12	.22/11	.29/13	.35/24	.41/17	.35/24	.25/30	.16/33	.00/**	.00/**	.00/**
13	0.00/**	.03/14	.06/14	.09/14	.13/14	.18/14	.23/13	.29/15	.39/17	.36/24	.36/24	.26/30	.16/33	.00/**	.00/**	.00/**
15	0.00/**	.03/16	.07/16	.10/16	.14/16	.19/16	.24/14	.29/17	.37/17	.35/24	.35/24	.26/30	.17/33	.00/**	.00/**	.00/**
17	0.00/**	.04/18	.07/18	.11/18	.15/18	.20/16	.24/16	.29/18	.35/17	.35/24	.35/24	.26/30	.17/33	.00/**	.00/**	.00/**
19	0.00/**	.04/18	.08/18	.12/18	.16/18	.20/18	.24/18	.29/20	.34/17	.34/24	.34/24	.26/30	.16/33	.00/**	.00/**	.00/**
21	0.00/**	.04/21	.08/21	.12/21	.16/21	.20/21	.24/21	.29/23	.33/17	.33/24	.33/24	.25/30	.16/33	.00/**	.00/**	.00/**

## ASR

RMS LAT VEL IN FPS/ENCOUNTERED MODAL PERIOD, T' IN SECONDS  
LONGCRESTED

V	10	0	15	30	45	60	75	90	SHIP HEADING ANGLE IN DEGREES	105	120	135	150	165	180	QE
0	7	0.00/**	.01/ 8	.02/ 8	.04/ 8	.08/ 7	.12/ 7	.15/ 7	.12/ 7	.07/ 7	.04/ 8	.02/ 8	.01/ 8	.00/ 8	.00/ 8	.00/ 8
9	0.00/**	.02/ 9	.04/ 9	.07/ 9	.10/ 9	.13/ 9	.15/ 8	.13/ 9	.13/ 9	.10/ 9	.07/ 9	.04/ 10	.02/ 10	.00/ 10	.00/ 10	.00/ 10
11	0.00/**	.02/12	.05/12	.08/11	.10/11	.13/11	.14/11	.13/11	.11/11	.08/11	.02/11	.02/11	.02/11	.00/10	.00/10	.00/10
13	0.00/**	.03/13	.05/13	.08/13	.10/12	.13/12	.14/12	.13/12	.11/12	.08/12	.05/12	.03/12	.03/12	.00/10	.00/10	.00/10
15	0.00/**	.03/14	.05/14	.08/14	.10/14	.12/13	.13/13	.12/13	.10/13	.08/14	.05/14	.03/14	.03/14	.00/10	.00/10	.00/10
17	0.00/**	.03/14	.05/14	.07/14	.09/14	.11/14	.12/14	.11/14	.09/14	.07/14	.05/14	.03/14	.03/14	.00/14	.00/14	.00/14
19	0.00/**	.02/16	.05/16	.07/16	.09/16	.11/16	.12/16	.11/16	.10/16	.09/16	.07/15	.05/16	.03/16	.00/16	.00/16	.00/16
21	0.00/**	.02/18	.04/18	.06/18	.08/18	.10/18	.09/18	.10/18	.09/18	.08/18	.06/18	.04/18	.02/18	.00/18	.00/18	.00/18
8	7	0.00/**	.01/ 8	.02/ 8	.04/ 8	.08/ 7	.12/ 7	.15/ 7	.12/ 7	.08/ 8	.04/ 9	.02/10	.01/11	.00/10	.00/10	.00/10
9	0.00/**	.02/13	.05/13	.07/13	.10/11	.13/11	.14/11	.13/11	.11/11	.08/11	.05/12	.03/12	.03/12	.00/10	.00/10	.00/10
11	0.00/**	.03/13	.05/13	.08/13	.10/13	.13/13	.14/12	.13/12	.11/12	.08/13	.05/13	.03/13	.03/13	.00/13	.00/13	.00/13
13	0.00/**	.03/14	.05/14	.08/14	.10/14	.12/13	.13/13	.12/13	.10/13	.08/14	.05/14	.03/14	.03/14	.00/15	.00/15	.00/15
15	0.00/**	.03/14	.05/14	.08/14	.10/14	.12/14	.13/13	.12/13	.10/13	.08/14	.05/14	.03/15	.03/15	.00/15	.00/15	.00/15
17	0.00/**	.02/16	.05/16	.07/16	.09/16	.11/14	.12/14	.11/14	.10/14	.09/15	.07/15	.05/16	.03/16	.00/16	.00/16	.00/16
19	0.00/**	.02/16	.05/16	.07/16	.09/16	.10/16	.11/16	.10/16	.09/17	.07/19	.05/19	.03/20	.02/20	.00/20	.00/20	.00/20
21	0.00/**	.02/18	.04/18	.06/18	.08/18	.10/18	.09/18	.10/18	.09/18	.08/19	.06/19	.04/20	.02/20	.00/20	.00/20	.00/20
10	7	0.00/**	.01/ 8	.02/ 8	.04/ 8	.08/ 7	.12/ 7	.15/ 7	.12/ 7	.08/ 8	.04/ 9	.02/10	.01/11	.00/10	.00/10	.00/10
9	0.00/**	.02/10	.04/10	.06/10	.10/ 9	.13/ 9	.15/ 9	.13/ 9	.10/ 9	.08/11	.05/11	.02/11	.01/11	.00/10	.00/10	.00/10
11	0.00/**	.02/11	.05/11	.07/11	.10/10	.13/11	.14/10	.13/11	.11/12	.08/13	.05/12	.03/12	.03/12	.00/10	.00/10	.00/10
13	0.00/**	.02/14	.05/14	.08/14	.10/14	.13/13	.14/12	.13/13	.11/13	.08/14	.05/15	.03/15	.03/15	.00/15	.00/15	.00/15
15	0.00/**	.03/14	.05/14	.08/14	.10/14	.12/14	.13/13	.12/14	.10/15	.08/15	.05/16	.03/16	.03/16	.00/16	.00/16	.00/16
17	0.00/**	.02/16	.05/16	.07/16	.09/16	.11/14	.12/14	.11/14	.10/15	.09/16	.07/17	.05/19	.02/20	.00/18	.00/18	.00/18
19	0.00/**	.02/18	.05/18	.07/18	.09/18	.10/16	.11/16	.10/16	.09/18	.07/20	.05/20	.03/22	.02/22	.00/22	.00/22	.00/22
21	0.00/**	.02/18	.04/18	.06/18	.08/18	.10/18	.09/19	.10/18	.09/19	.08/20	.06/21	.04/22	.02/22	.00/22	.00/22	.00/22
15	7	0.00/**	.01/ 8	.02/ 8	.04/ 8	.08/ 7	.12/ 7	.15/ 7	.12/ 7	.08/ 8	.04/ 9	.02/10	.01/12	.00/13	.00/13	.00/13
9	0.00/**	.02/10	.04/10	.06/10	.10/ 9	.13/ 9	.15/ 9	.13/ 9	.10/ 9	.08/11	.05/13	.02/14	.01/14	.00/14	.00/14	.00/14
11	0.00/**	.02/11	.05/11	.07/11	.10/10	.13/11	.14/10	.13/11	.11/12	.08/13	.05/14	.03/15	.03/15	.00/15	.00/15	.00/15
13	0.00/**	.02/13	.05/13	.08/13	.10/13	.13/13	.14/12	.13/13	.11/13	.08/14	.05/15	.03/16	.03/16	.00/16	.00/16	.00/16
15	0.00/**	.02/15	.05/15	.08/15	.10/15	.13/15	.14/14	.13/15	.11/15	.08/16	.05/17	.03/17	.03/17	.00/17	.00/17	.00/17
17	0.00/**	.02/16	.05/16	.07/16	.09/16	.11/14	.12/14	.11/14	.10/15	.09/16	.07/17	.05/19	.02/20	.00/18	.00/18	.00/18
19	0.00/**	.02/18	.05/18	.07/18	.09/18	.10/16	.11/16	.10/16	.09/18	.07/20	.05/21	.03/22	.02/22	.00/22	.00/22	.00/22
21	0.00/**	.02/18	.04/18	.06/18	.08/18	.10/18	.09/19	.10/18	.09/20	.08/21	.07/22	.05/23	.03/24	.02/24	.00/24	.00/24
15	7	0.00/**	.01/ 8	.02/ 8	.04/ 8	.08/ 7	.12/ 7	.15/ 7	.12/ 7	.08/ 8	.04/ 9	.02/10	.01/12	.00/13	.00/13	.00/13
9	0.00/**	.02/11	.05/11	.07/11	.10/10	.13/10	.14/10	.13/10	.11/10	.08/11	.05/12	.03/13	.03/13	.00/14	.00/14	.00/14
11	0.00/**	.02/13	.05/13	.07/13	.10/13	.12/12	.13/12	.12/12	.10/12	.08/13	.05/14	.03/15	.03/15	.00/15	.00/15	.00/15
13	0.00/**	.02/16	.05/16	.07/16	.09/16	.11/14	.12/14	.11/14	.10/15	.08/16	.05/17	.03/18	.03/18	.00/18	.00/18	.00/18
15	0.00/**	.02/18	.05/18	.07/18	.09/18	.11/16	.12/16	.11/16	.10/17	.08/18	.05/19	.03/20	.03/20	.00/20	.00/20	.00/20
17	0.00/**	.02/18	.05/18	.07/18	.09/18	.10/16	.11/16	.10/16	.09/18	.07/20	.05/21	.03/22	.03/22	.00/22	.00/22	.00/22
19	0.00/**	.02/18	.04/18	.06/18	.08/18	.10/18	.09/19	.10/18	.09/20	.08/21	.07/22	.05/23	.03/24	.02/24	.00/24	.00/24
20	7	0.00/**	.01/ 8	.02/ 8	.04/ 8	.08/ 7	.12/ 7	.15/ 7	.12/ 7	.08/ 8	.04/ 9	.02/10	.01/13	.00/19	.00/25	.00/25
9	0.00/**	.02/10	.04/10	.06/10	.09/ 9	.13/ 9	.15/ 9	.13/ 9	.10/ 9	.08/11	.05/13	.02/13	.01/13	.00/19	.00/26	.00/26
11	0.00/**	.02/11	.04/11	.06/11	.09/11	.13/10	.14/10	.13/10	.11/10	.08/11	.05/12	.02/13	.01/12	.00/19	.00/26	.00/26
13	0.00/**	.02/13	.05/13	.07/13	.10/13	.12/12	.13/12	.12/12	.10/12	.08/13	.05/14	.02/13	.01/12	.00/19	.00/26	.00/26
15	0.00/**	.02/16	.05/16	.07/16	.09/16	.11/14	.12/14	.11/14	.10/15	.08/16	.05/17	.02/13	.01/12	.00/19	.00/26	.00/26
17	0.00/**	.02/18	.05/18	.07/18	.09/18	.11/16	.12/16	.11/16	.10/17	.08/18	.05/19	.02/13	.01/12	.00/19	.00/26	.00/26
19	0.00/**	.02/18	.04/18	.06/18	.08/18	.10/18	.09/19	.10/18	.09/20	.08/21	.07/22	.05/23	.03/24	.02/24	.00/24	.00/24
21	0.00/**	.02/18	.04/18	.06/18	.08/18	.10/18	.09/19	.10/18	.09/20	.08/22	.07/19	.05/23	.03/26	.02/26	.00/26	.00/26
25	7	0.00/**	.01/ 8	.02/ 8	.04/ 8	.08/ 7	.12/ 7	.15/ 7	.12/ 7	.08/ 8	.04/ 9	.02/10	.01/17	.00/27	.00/45	.00/45
9	0.00/**	.02/10	.04/10	.06/ 9	.09/ 9	.13/ 9	.15/ 9	.13/ 9	.10/ 9	.08/11	.05/11	.02/11	.01/17	.00/27	.00/26	.00/26
11	0.00/**	.02/11	.04/11	.06/11	.09/11	.13/10	.14/10	.13/10	.11/10	.08/11	.05/12	.02/12	.01/17	.00/27	.00/26	.00/26
13	0.00/**	.02/13	.05/13	.07/13	.10/13	.12/12	.13/12	.12/12	.10/12	.08/13	.05/14	.02/12	.01/17	.00/27	.00/26	.00/26
15	0.00/**	.02/16	.05/16	.07/16	.09/16	.11/14	.12/14	.11/14	.10/15	.08/15	.05/16	.02/13	.01/17	.00/27	.00/26	.00/26
17	0.00/**	.02/18	.05/18	.07/18	.09/18	.11/16	.12/16	.11/16	.10/17	.08/17	.05/18	.02/13	.01/17	.00/27	.00/26	.00/26
19	0.00/**	.02/18	.04/18	.06/18	.08/18	.10/18	.09/19	.10/18	.09/20	.08/21	.07/22	.05/23	.03/24	.02/24	.00/24	.00/24
21	0.00/**	.02/18	.04/18	.06/18	.08/18	.10/18	.09/19	.10/18	.09/20	.08/22	.07/19	.05/23	.03/26	.02/26	.00/26	.00/26

LONGCRESTED  
RMS LAT ACC IN G/S/ENCOUNTERED MODAL PERIOD, T<sub>m</sub>, IN SECONDS  
(ACC. X 100)

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										150	165	180
		0	15	30	45	60	75	90	105	120	135			
0	7	.00/.**	.03/ 8	.06/ 8	.12/ 7	.22/ 7	.38/ 6	.49/ 6	.36/ 7	.21/ 7	.12/ 8	.06/ 8	.03/ 8	.00/ 8
0	9	.00/.**	.04/ 9	.09/ 9	.15/ 8	.23/ 8	.35/ 8	.42/ 7	.33/ 8	.23/ 8	.15/ 9	.09/ 9	.04/ 10	.00/ 10
11	11	.00/.**	.04/11	.09/11	.15/11	.22/ 9	.30/ 9	.35/ 9	.29/ 9	.22/10	.15/10	.10/10	.05/10	.00/10
13	13	.00/.**	.04/12	.09/12	.14/12	.20/11	.26/11	.29/11	.25/11	.20/11	.14/11	.09/11	.05/11	.00/11
15	15	.00/.**	.04/12	.08/12	.13/12	.17/12	.22/12	.24/12	.22/12	.18/12	.13/12	.09/12	.04/12	.00/12
17	17	.00/.**	.04/13	.08/13	.11/13	.15/13	.19/13	.21/12	.19/12	.12/13	.12/13	.08/13	.04/13	.00/13
19	19	.00/.**	.03/14	.07/14	.10/14	.13/14	.16/13	.18/13	.16/13	.13/13	.10/13	.07/13	.03/14	.00/14
21	21	.00/.**	.03/14	.08/14	.12/14	.14/14	.15/14	.14/14	.12/14	.09/14	.06/14	.03/14	.00/14	.00/14
8	8	.00/.**	.03/ 8	.07/ 8	.14/ 7	.25/ 7	.41/ 6	.49/ 6	.33/ 7	.18/ 8	.10/ 9	.05/10	.02/11	.00/10
9	9	.00/.**	.05/ 9	.10/ 9	.17/ 9	.26/ 8	.37/ 8	.41/ 8	.31/ 8	.21/ 9	.13/11	.08/11	.04/11	.00/11
11	11	.00/.**	.05/10	.10/10	.17/10	.24/10	.32/ 9	.35/ 9	.28/11	.20/11	.14/11	.09/11	.04/11	.00/10
13	13	.00/.**	.05/13	.10/13	.16/13	.22/12	.27/12	.29/11	.24/11	.19/11	.13/11	.08/12	.04/13	.00/13
15	15	.00/.**	.05/13	.09/13	.14/13	.19/13	.23/12	.24/12	.21/11	.16/12	.12/13	.08/13	.04/13	.00/13
17	17	.00/.**	.04/13	.08/13	.12/13	.16/13	.20/12	.21/12	.18/12	.15/13	.12/13	.07/14	.03/14	.00/14
19	19	.00/.**	.04/13	.07/14	.11/14	.14/13	.17/13	.18/13	.17/13	.12/13	.09/14	.06/14	.03/15	.00/16
21	21	.00/.**	.03/14	.07/14	.10/14	.12/14	.15/14	.15/14	.13/14	.11/15	.08/15	.05/15	.03/16	.00/16
10	10	.00/.**	.04/ 8	.08/ 8	.16/ 7	.27/ 7	.44/ 6	.49/ 6	.30/ 8	.16/ 9	.10/11	.05/12	.02/13	.00/13
9	9	.00/.**	.05/ 9	.11/ 9	.19/ 8	.28/ 8	.39/ 8	.41/ 8	.30/ 9	.19/11	.13/11	.07/13	.03/14	.00/14
11	11	.00/.**	.06/10	.12/10	.18/10	.26/10	.32/ 9	.35/ 9	.27/10	.19/11	.13/12	.07/14	.03/14	.00/15
13	13	.00/.**	.06/11	.11/11	.17/11	.23/13	.28/11	.29/11	.23/11	.17/12	.12/13	.07/14	.03/15	.00/15
15	15	.00/.**	.05/14	.10/14	.15/14	.20/13	.24/13	.24/12	.20/12	.15/13	.11/14	.06/15	.03/16	.00/16
17	17	.00/.**	.05/14	.09/14	.13/14	.17/13	.20/13	.21/12	.17/12	.13/13	.09/15	.06/16	.03/17	.00/17
19	19	.00/.**	.04/14	.08/14	.12/14	.15/14	.18/13	.18/13	.15/13	.12/15	.08/15	.05/17	.03/18	.00/18
21	21	.00/.**	.04/14	.07/14	.10/14	.13/14	.15/14	.15/14	.13/15	.10/15	.07/16	.05/19	.02/20	.00/20
15	15	.00/.**	.04/ 8	.09/ 8	.17/ 7	.30/ 7	.46/ 6	.49/ 6	.29/ 8	.16/ 11	.08/14	.04/17	.02/20	.00/20
7	9	.00/.**	.06/ 9	.12/ 9	.21/ 8	.31/ 8	.41/ 8	.42/ 8	.29/10	.19/11	.10/14	.06/17	.03/20	.00/20
11	11	.00/.**	.06/10	.13/10	.20/10	.28/10	.35/10	.35/ 9	.26/11	.18/12	.11/14	.06/17	.03/20	.00/20
13	13	.00/.**	.06/11	.12/11	.18/11	.24/11	.29/10	.29/10	.22/11	.16/13	.10/14	.06/17	.03/20	.00/20
15	15	.00/.**	.05/13	.11/13	.16/13	.21/13	.25/12	.24/12	.19/12	.14/14	.10/15	.08/17	.03/20	.00/20
17	17	.00/.**	.05/16	.10/14	.14/14	.18/14	.21/13	.21/13	.17/13	.12/15	.10/15	.05/17	.03/20	.00/20
19	19	.00/.**	.04/16	.09/16	.13/14	.16/14	.18/14	.18/14	.14/14	.11/16	.07/18	.05/17	.02/20	.00/20
21	21	.00/.**	.04/16	.08/16	.11/16	.14/14	.16/14	.15/14	.13/14	.10/16	.07/19	.04/17	.02/20	.00/20
20	7	.00/.**	.04/ 8	.10/ 8	.19/ 8	.32/ 7	.48/ 6	.49/ 6	.27/ 9	.15/13	.08/19	.03/25	.01/31	.00/30
9	9	.00/.**	.06/ 9	.14/ 9	.22/ 8	.33/ 8	.43/ 7	.42/ 8	.28/10	.17/13	.10/19	.04/23	.02/26	.00/27
11	11	.00/.**	.07/10	.14/10	.22/10	.32/ 9	.36/10	.35/ 9	.25/11	.17/13	.10/19	.05/23	.03/26	.00/27
13	13	.00/.**	.06/11	.13/11	.20/11	.26/11	.30/10	.29/10	.22/12	.15/13	.10/19	.05/23	.03/26	.00/27
15	15	.00/.**	.06/13	.12/13	.17/13	.22/13	.26/13	.24/11	.19/13	.13/13	.09/19	.05/23	.03/26	.00/27
17	17	.00/.**	.05/16	.10/16	.15/14	.22/13	.22/13	.21/13	.16/13	.12/13	.08/19	.05/23	.02/26	.00/27
19	19	.00/.**	.05/16	.09/16	.13/16	.17/14	.19/14	.18/14	.12/15	.09/13	.07/19	.04/23	.02/26	.00/27
21	21	.00/.**	.04/16	.08/16	.12/16	.14/14	.16/14	.15/14	.12/15	.09/13	.07/19	.04/23	.02/26	.00/27
25	7	.00/.**	.05/ 8	.11/ 8	.20/ 7	.34/ 7	.50/ 7	.49/ 7	.28/10	.15/17	.03/26	.02/37	.01/ 7	.00/ 8
9	9	.00/.**	.07/ 9	.15/ 9	.24/ 8	.34/ 8	.44/ 8	.44/ 7	.28/10	.17/17	.05/24	.02/31	.01/37	.00/ 8
11	11	.00/.**	.07/10	.15/10	.23/10	.31/ 9	.37/ 9	.35/ 9	.25/11	.16/17	.07/24	.03/30	.01/33	.00/ 8
13	13	.00/.**	.07/11	.14/11	.21/10	.27/10	.31/10	.29/10	.22/12	.15/17	.07/24	.03/30	.01/33	.00/ 8
15	15	.00/.**	.06/13	.12/13	.18/13	.23/13	.26/13	.24/11	.19/13	.13/13	.08/19	.05/23	.02/26	.00/ 8
17	17	.00/.**	.06/14	.11/14	.16/14	.20/14	.22/13	.21/13	.16/14	.12/17	.07/24	.03/30	.02/33	.00/ 8
19	19	.00/.**	.05/16	.10/16	.14/16	.17/14	.19/14	.18/14	.14/14	.10/17	.06/24	.03/30	.02/33	.00/ 8
21	21	.00/.**	.04/16	.08/16	.12/16	.15/16	.16/14	.15/14	.12/15	.09/13	.07/19	.04/23	.02/26	.00/ 8

## ASR

RMS VER DISP IN FEET/ENCOUNTERED MODAL PERIOD, T<sub>1</sub> - IN SECONDS  
 ROLLER CHOCK - 8.0 FT AFT OF AP. ON CL. AND 26.07 FT ABOVE KEEL  
 DE

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										150	165	180	
		15	30	45	60	75	90	105	120	135					
0	0	.36/ 7	.37/ 7	.39/ 7	.42/ 7	.42/ 6	.42/ 6	.31/ 6	.23/ 7	.39/ 6	.45/ 6	.43/ 7	.39/ 7	.37/ 7	.36/ 7
1	7	.42/ 8	.42/ 8	.42/ 8	.42/ 8	.39/ 8	.39/ 8	.30/ 9	.25/ 9	.35/ 8	.41/ 8	.42/ 8	.42/ 8	.41/ 8	.41/ 8
11	9	.41/10	.40/10	.40/10	.39/10	.35/10	.35/10	.29/10	.25/10	.31/10	.37/10	.39/10	.40/10	.40/10	.40/10
13	11	.38/11	.37/12	.35/12	.32/13	.28/13	.25/13	.20/13	.25/13	.29/13	.33/13	.35/12	.37/12	.37/11	.38/11
15	14	.35/14	.34/14	.34/14	.30/14	.27/14	.25/16	.25/16	.28/14	.27/14	.31/14	.33/14	.34/14	.35/14	.35/14
17	16	.33/16	.32/16	.32/16	.31/16	.29/16	.26/18	.26/18	.25/18	.27/18	.29/16	.32/16	.32/16	.33/16	.33/16
19	18	.31/18	.30/18	.29/18	.28/18	.28/18	.26/18	.26/18	.26/18	.26/18	.28/18	.30/18	.31/18	.31/18	.31/18
21	21	.29/21	.29/21	.28/21	.28/21	.27/21	.26/21	.25/21	.26/21	.27/21	.28/21	.29/21	.29/21	.30/21	.30/21
8	7	.40/ 7	.41/ 7	.42/ 7	.43/ 7	.41/ 6	.41/ 6	.32/ 6	.24/ 7	.37/ 6	.39/ 7	.35/ 8	.31/ 9	.29/ 9	.28/10
9	8	.46/ 8	.46/ 8	.46/ 8	.46/ 7	.46/ 7	.46/ 7	.39/ 7	.31/ 9	.33/ 9	.37/ 9	.36/ 10	.36/ 10	.35/10	.35/10
11	10	.44/10	.44/10	.43/10	.40/10	.36/10	.36/10	.36/10	.26/10	.31/11	.34/11	.35/11	.35/11	.35/11	.35/11
13	11	.40/11	.40/11	.39/12	.36/12	.33/13	.32/13	.28/13	.26/13	.29/13	.31/13	.33/13	.34/13	.34/13	.34/13
15	14	.37/14	.37/14	.36/14	.33/14	.30/14	.27/14	.25/16	.27/15	.29/15	.31/15	.32/15	.32/15	.32/16	.32/16
17	16	.34/16	.34/16	.33/16	.31/16	.29/16	.26/18	.25/18	.25/18	.27/18	.28/17	.29/17	.30/17	.31/17	.31/17
19	18	.32/18	.32/18	.31/18	.30/18	.28/18	.26/18	.25/18	.26/18	.26/18	.27/19	.28/19	.29/20	.29/20	.29/20
21	21	.30/21	.30/21	.28/21	.27/21	.26/21	.25/21	.25/21	.26/21	.27/22	.27/22	.28/22	.28/22	.29/22	.29/22
10	7	.39/ 7	.40/ 7	.41/ 7	.42/ 7	.41/ 7	.41/ 7	.33/ 6	.26/ 7	.33/ 7	.34/ 8	.30/ 10	.26/ 12	.24/13	.24/13
9	8	.48/ 8	.47/ 8	.47/ 8	.45/ 7	.45/ 7	.40/ 7	.32/ 7	.27/ 9	.32/ 9	.34/ 10	.33/ 11	.32/ 12	.32/13	.32/13
11	9	.46/ 9	.45/ 9	.44/ 9	.41/ 9	.41/ 9	.37/10	.30/11	.26/10	.30/11	.32/12	.32/13	.32/13	.32/13	.32/13
13	12	.42/12	.41/12	.40/12	.37/13	.33/13	.26/13	.26/13	.28/13	.28/13	.30/14	.31/14	.31/15	.31/15	.31/15
15	14	.38/14	.38/14	.36/14	.34/14	.31/14	.28/14	.26/14	.26/14	.27/15	.28/15	.29/17	.30/17	.30/17	.30/17
17	16	.35/16	.35/16	.34/16	.32/16	.29/16	.27/18	.25/18	.25/18	.26/17	.27/18	.28/18	.29/19	.29/20	.29/20
19	18	.33/18	.32/18	.32/18	.30/18	.28/18	.26/18	.25/18	.26/18	.26/19	.27/19	.28/21	.28/22	.28/22	.28/22
21	21	.31/21	.30/21	.30/21	.29/21	.27/21	.26/21	.25/21	.26/21	.26/22	.26/22	.27/23	.27/24	.28/24	.28/24
15	7	.38/ 8	.39/ 8	.41/ 7	.43/ 7	.42/ 7	.42/ 7	.36/ 6	.27/ 6	.33/ 8	.32/10	.26/14	.22/17	.22/17	.22/17
9	8	.49/ 8	.49/ 8	.49/ 8	.49/ 8	.47/ 8	.42/ 7	.35/ 8	.27/ 8	.31/10	.32/10	.29/14	.27/17	.27/20	.27/20
11	8	.48/ 8	.47/ 8	.47/ 8	.46/ 8	.43/ 7	.43/ 7	.39/10	.32/10	.27/10	.29/12	.30/13	.29/14	.29/17	.29/20
13	12	.43/12	.42/12	.42/12	.42/12	.42/12	.39/13	.35/13	.30/13	.27/13	.28/14	.29/14	.29/17	.29/20	.29/20
15	14	.40/14	.39/14	.38/14	.36/14	.32/14	.32/14	.29/14	.26/14	.27/15	.28/15	.28/15	.28/17	.29/20	.29/20
17	16	.36/16	.35/16	.35/16	.33/16	.30/16	.27/16	.26/18	.26/18	.26/17	.27/19	.27/20	.27/20	.28/20	.28/20
19	18	.33/18	.32/18	.32/18	.31/18	.29/18	.27/18	.25/18	.26/20	.25/21	.26/21	.26/22	.27/23	.27/23	.27/23
21	21	.32/21	.31/21	.31/21	.29/21	.28/21	.26/21	.25/21	.26/21	.26/23	.26/23	.26/25	.27/26	.27/26	.27/26
20	7	.37/ 8	.38/ 8	.40/ 8	.44/ 7	.45/ 7	.45/ 7	.39/ 6	.27/ 6	.32/ 8	.30/13	.24/19	.21/27	.19/35	.20/35
9	8	.53/ 8	.52/ 8	.52/ 8	.50/ 7	.46/ 7	.46/ 7	.37/ 6	.28/ 6	.31/10	.31/13	.27/19	.26/23	.26/26	.26/29
11	8	.52/ 8	.51/ 8	.51/ 8	.49/ 8	.47/ 8	.47/ 7	.41/ 7	.34/10	.28/10	.29/13	.28/19	.27/23	.28/26	.28/27
13	7	.47/ 8	.46/ 8	.46/ 8	.42/ 8	.37/ 8	.37/ 8	.32/13	.27/13	.28/14	.28/13	.27/19	.28/23	.28/26	.28/27
15	14	.42/14	.42/14	.40/14	.38/14	.34/14	.30/14	.27/14	.27/14	.27/16	.27/19	.27/19	.27/23	.28/26	.28/27
17	16	.39/16	.38/16	.36/16	.35/16	.32/16	.29/16	.29/16	.26/16	.26/18	.26/19	.27/26	.27/26	.27/27	.27/27
19	18	.36/18	.35/18	.34/18	.32/18	.30/18	.28/18	.26/18	.26/20	.26/22	.26/22	.26/23	.27/26	.27/27	.27/27
21	21	.33/21	.33/21	.32/21	.31/21	.29/21	.27/21	.26/21	.26/22	.26/24	.26/24	.26/24	.27/23	.27/23	.27/23
25	7	.35/ 8	.36/ 8	.40/ 8	.44/ 8	.47/ 7	.47/ 7	.43/ 6	.28/ 7	.33/ 9	.30/17	.28/35	.24/**	.22/**	.19/ 8
9	8	.56/ 9	.56/ 9	.56/ 9	.55/ 8	.55/ 8	.50/ 8	.45/ 8	.41/ 6	.29/ 9	.31/ 9	.29/17	.29/37	.29/**	.26/**
11	8	.56/ 9	.56/ 9	.56/ 9	.55/ 8	.55/ 8	.50/ 8	.45/ 8	.40/ 7	.29/10	.30/13	.28/17	.29/30	.30/33	.29/33
13	9	.51/ 9	.51/ 9	.51/ 9	.49/ 8	.49/ 8	.45/ 8	.45/ 8	.40/ 7	.33/13	.28/13	.27/17	.28/24	.28/24	.29/33
15	9	.46/ 9	.45/ 9	.44/ 8	.44/ 8	.40/ 8	.36/14	.31/14	.27/14	.27/17	.27/17	.27/24	.27/24	.28/33	.28/33
17	16	.41/16	.41/16	.40/16	.37/16	.33/16	.30/16	.30/16	.27/16	.26/17	.26/17	.27/24	.27/24	.28/33	.28/33
19	18	.38/18	.36/18	.34/18	.31/18	.31/18	.28/18	.28/18	.26/18	.26/18	.26/17	.26/24	.26/24	.27/33	.27/33
21	21	.35/21	.34/21	.34/21	.32/21	.30/21	.28/21	.26/21	.26/21	.26/23	.26/23	.26/26	.27/26	.27/26	.27/26

## ASR

RMS VER VEL IN FPS/ENCOUNTERED MODAL PERIOD, T<sub>0</sub>, IN SECONDS  
 ROLLER CHOCK - 8.0 FT AFT OF AP., ON CL., AND 26.07 FT ABOVE KEEL

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										165	180	
		0	15	30	45	60	75	90	105	120	135			
0	7	.33/ 7	.34/ 7	.37/ 7	.42/ 6	.44/ 6	.33/ 6	.24/ 6	.44/ 5	.47/ 6	.42/ 6	.37/ 7	.34/ 7	.33/ 7
1	9	.34/ 8	.34/ 7	.35/ 7	.37/ 7	.36/ 6	.28/ 6	.22/ 8	.34/ 5	.39/ 6	.37/ 7	.35/ 7	.34/ 7	.33/ 6
2	11	.30/ 8	.30/ 8	.30/ 8	.29/ 6	.29/ 6	.23/ 9	.19/ 10	.27/ 5	.31/ 6	.30/ 8	.30/ 8	.29/ 8	.29/ 8
3	13	.25/ 9	.25/ 9	.25/ 9	.25/ 9	.24/ 10	.19/ 10	.16/ 11	.22/ 10	.25/ 9	.25/ 9	.25/ 9	.25/ 9	.25/ 9
4	15	.21/ 10	.21/ 10	.21/ 10	.21/ 10	.20/ 12	.16/ 13	.14/ 13	.18/ 13	.20/ 12	.21/ 10	.21/ 10	.21/ 10	.21/ 10
5	17	.18/ 11	.18/ 11	.18/ 13	.18/ 13	.17/ 14	.14/ 14	.13/ 14	.15/ 14	.17/ 14	.18/ 13	.18/ 13	.18/ 12	.18/ 12
6	19	.16/ 14	.16/ 14	.16/ 16	.15/ 16	.14/ 16	.11/ 16	.11/ 16	.15/ 16	.15/ 16	.16/ 16	.16/ 16	.16/ 14	.16/ 14
7	21	.14/ 16	.14/ 16	.13/ 18	.13/ 18	.11/ 18	.10/ 18	.12/ 18	.13/ 18	.13/ 18	.14/ 18	.14/ 18	.14/ 18	.14/ 18
8	7	.44/ 7	.45/ 7	.47/ 7	.48/ 6	.46/ 6	.35/ 6	.25/ 6	.39/ 6	.35/ 7	.28/ 8	.23/ 9	.20/ 9	.19/ 9
9	9	.45/ 7	.45/ 7	.45/ 7	.44/ 7	.44/ 7	.39/ 6	.30/ 6	.22/ 8	.22/ 8	.26/ 9	.23/ 10	.22/ 10	.21/ 10
10	11	.39/ 8	.39/ 8	.38/ 7	.36/ 7	.32/ 7	.24/ 7	.19/ 10	.24/ 9	.24/ 9	.22/ 10	.20/ 11	.20/ 11	.20/ 11
11	13	.33/ 8	.33/ 8	.32/ 8	.31/ 8	.29/ 7	.26/ 7	.20/ 10	.20/ 11	.20/ 11	.19/ 11	.18/ 12	.18/ 12	.18/ 12
12	15	.27/ 8	.27/ 8	.27/ 8	.26/ 8	.24/ 8	.21/ 8	.17/ 13	.15/ 13	.17/ 13	.16/ 13	.16/ 13	.16/ 13	.16/ 13
13	17	.23/ 10	.23/ 10	.22/ 11	.20/ 13	.18/ 14	.15/ 14	.13/ 14	.14/ 15	.15/ 15	.14/ 15	.14/ 14	.14/ 14	.14/ 14
14	19	.20/ 14	.19/ 14	.19/ 14	.18/ 16	.16/ 16	.13/ 16	.12/ 16	.13/ 16	.13/ 17	.12/ 17	.12/ 17	.12/ 17	.12/ 17
15	21	.17/ 16	.17/ 16	.16/ 18	.15/ 18	.14/ 18	.12/ 18	.10/ 18	.11/ 18	.11/ 19	.11/ 19	.11/ 20	.11/ 20	.11/ 20
16	7	.49/ 7	.49/ 7	.51/ 7	.52/ 7	.49/ 6	.39/ 6	.26/ 6	.34/ 6	.25/ 8	.18/ 10	.14/ 12	.12/ 13	.11/ 13
17	9	.53/ 7	.53/ 7	.52/ 7	.49/ 7	.43/ 6	.33/ 6	.23/ 8	.27/ 8	.22/ 9	.18/ 10	.16/ 12	.14/ 13	.14/ 13
18	11	.46/ 8	.46/ 8	.44/ 7	.41/ 7	.35/ 7	.27/ 6	.20/ 10	.22/ 10	.19/ 10	.17/ 12	.15/ 13	.14/ 13	.14/ 13
19	13	.39/ 8	.39/ 8	.38/ 8	.36/ 8	.30/ 8	.28/ 7	.24/ 7	.19/ 13	.15/ 13	.15/ 13	.14/ 13	.13/ 13	.13/ 13
20	15	.32/ 8	.32/ 8	.32/ 8	.30/ 8	.28/ 8	.23/ 7	.20/ 14	.16/ 14	.13/ 15	.12/ 16	.12/ 15	.12/ 15	.12/ 15
21	17	.27/ 8	.26/ 8	.26/ 8	.25/ 8	.23/ 7	.20/ 14	.16/ 14	.13/ 14	.13/ 15	.12/ 16	.12/ 17	.11/ 17	.10/ 17
22	19	.23/ 8	.22/ 8	.21/ 8	.20/ 16	.17/ 16	.14/ 16	.12/ 16	.12/ 16	.11/ 17	.10/ 18	.10/ 19	.10/ 20	.10/ 20
23	21	.20/ 16	.19/ 16	.18/ 18	.17/ 18	.15/ 18	.12/ 18	.11/ 18	.10/ 20	.09/ 20	.09/ 21	.09/ 22	.09/ 22	.09/ 22
24	7	.52/ 8	.53/ 7	.55/ 7	.56/ 7	.54/ 7	.44/ 7	.27/ 6	.28/ 7	.19/ 10	.11/ 14	.08/ 17	.06/ 20	.06/ 20
25	9	.60/ 8	.60/ 8	.59/ 7	.56/ 7	.49/ 7	.37/ 6	.24/ 6	.23/ 9	.18/ 10	.13/ 14	.10/ 17	.08/ 20	.08/ 20
26	11	.54/ 8	.53/ 8	.51/ 7	.47/ 7	.40/ 7	.30/ 6	.20/ 10	.19/ 10	.16/ 10	.12/ 14	.10/ 17	.09/ 20	.09/ 20
27	13	.45/ 8	.44/ 8	.44/ 8	.42/ 7	.38/ 7	.32/ 7	.24/ 10	.18/ 11	.16/ 12	.14/ 10	.11/ 14	.09/ 20	.09/ 20
28	15	.37/ 8	.37/ 8	.35/ 8	.35/ 8	.31/ 8	.27/ 7	.20/ 13	.15/ 13	.14/ 14	.12/ 15	.11/ 17	.09/ 17	.09/ 20
29	17	.31/ 8	.31/ 8	.29/ 8	.29/ 8	.26/ 7	.22/ 7	.17/ 14	.13/ 14	.12/ 15	.11/ 17	.09/ 14	.08/ 20	.08/ 20
30	19	.26/ 8	.26/ 8	.25/ 8	.25/ 8	.22/ 7	.19/ 16	.12/ 16	.11/ 17	.10/ 19	.08/ 14	.08/ 20	.08/ 20	.08/ 20
31	21	.23/ 8	.22/ 8	.21/ 8	.21/ 8	.19/ 16	.16/ 18	.13/ 18	.10/ 20	.09/ 21	.08/ 22	.07/ 20	.07/ 20	.07/ 20
32	7	.53/ 8	.54/ 8	.57/ 8	.60/ 7	.57/ 7	.50/ 6	.28/ 6	.24/ 7	.14/ 13	.07/ 19	.04/ 26	.03/ 31	.03/ 35
33	9	.69/ 8	.69/ 8	.67/ 8	.64/ 8	.57/ 7	.42/ 6	.25/ 6	.21/ 10	.14/ 13	.08/ 19	.06/ 23	.05/ 26	.05/ 27
34	11	.63/ 8	.62/ 8	.59/ 8	.55/ 7	.46/ 7	.34/ 6	.27/ 6	.21/ 10	.13/ 13	.09/ 19	.07/ 23	.06/ 26	.06/ 27
35	13	.53/ 8	.52/ 8	.49/ 8	.45/ 7	.37/ 7	.30/ 7	.23/ 13	.16/ 13	.10/ 13	.08/ 19	.07/ 23	.06/ 26	.06/ 27
36	15	.44/ 8	.43/ 8	.41/ 8	.41/ 8	.37/ 7	.30/ 7	.25/ 7	.19/ 14	.14/ 14	.12/ 16	.09/ 19	.07/ 23	.06/ 27
37	17	.37/ 8	.36/ 8	.34/ 8	.32/ 8	.28/ 8	.26/ 7	.21/ 7	.17/ 16	.12/ 16	.10/ 18	.09/ 13	.07/ 19	.06/ 27
38	19	.31/ 8	.30/ 8	.28/ 8	.28/ 8	.26/ 7	.21/ 7	.17/ 16	.10/ 18	.09/ 13	.07/ 19	.06/ 23	.06/ 26	.06/ 27
39	21	.26/ 8	.26/ 8	.24/ 8	.24/ 8	.22/ 7	.19/ 7	.14/ 18	.11/ 18	.09/ 20	.08/ 22	.07/ 19	.06/ 23	.06/ 27
40	7	.52/ 8	.54/ 8	.58/ 8	.63/ 8	.66/ 7	.56/ 6	.29/ 6	.22/ 9	.10/ 17	.05/ 27	.05/ 52	.05/ 6	.05/ 6
41	9	.77/ 9	.78/ 8	.77/ 8	.73/ 8	.65/ 7	.48/ 6	.25/ 8	.19/ 9	.10/ 17	.06/ 24	.05/ 33	.04/ 39	.04/ 40
42	11	.73/ 9	.73/ 8	.70/ 8	.63/ 8	.53/ 7	.38/ 6	.21/ 10	.16/ 9	.10/ 17	.07/ 24	.05/ 30	.04/ 33	.04/ 35
43	13	.62/ 9	.62/ 8	.59/ 8	.52/ 8	.48/ 8	.43/ 7	.31/ 6	.18/ 11	.14/ 13	.09/ 17	.07/ 24	.05/ 30	.05/ 33
44	15	.52/ 9	.51/ 9	.49/ 8	.45/ 8	.42/ 8	.35/ 7	.25/ 6	.16/ 13	.12/ 15	.09/ 17	.07/ 24	.05/ 30	.05/ 33
45	17	.43/ 9	.42/ 9	.40/ 8	.40/ 8	.35/ 8	.29/ 8	.24/ 7	.14/ 14	.11/ 17	.08/ 17	.06/ 24	.05/ 30	.05/ 33
46	19	.36/ 9	.36/ 9	.34/ 8	.34/ 8	.29/ 8	.24/ 7	.18/ 16	.12/ 16	.10/ 18	.08/ 17	.06/ 24	.05/ 30	.05/ 33
47	21	.31/ 9	.30/ 9	.29/ 8	.29/ 8	.25/ 8	.21/ 7	.16/ 18	.11/ 18	.09/ 20	.07/ 17	.06/ 24	.05/ 30	.05/ 33

## ASR

RMS VER ACC IN G'S/ENCOUNTERED MODAL PERIOD, T' IN SECONDS  
(ACC. X 100)

ROLLER CHOCK - 8.0 FT AFT OF AP., ON CL. AND 26.07 FT ABOVE KEEL

V	T	0	15	30	45	60	75	90	SHIP HEADING ANGLE IN DEGREES					
									105	120	135	150	165	180
0	7	.95/ 7	.99/ 7	1.11/ 6	1.33/ 6	1.51/ 5	1.18/ 5	.86/ 5	1.62/ 5	1.64/ 5	1.36/ 6	1.13/ 6	1.02/ 7	.98/ 7
9	.89/ 7	.91/ 7	.97/ 7	1.09/ 6	1.15/ 6	.89/ 6	.67/ 6	1.16/ 5	1.23/ 6	1.10/ 6	.98/ 7	.91/ 7	.89/ 7	.89/ 7
11	.73/ 7	.74/ 7	.78/ 7	.84/ 6	.86/ 6	.67/ 6	.51/ 6	.85/ 5	.70/ 6	.65/ 6	.65/ 6	.78/ 7	.74/ 7	.73/ 7
13	.58/ 8	.59/ 8	.61/ 7	.65/ 6	.65/ 6	.51/ 6	.40/ 9	.64/ 5	.50/ 5	.54/ 6	.52/ 6	.49/ 7	.59/ 7	.58/ 8
15	.47/ 8	.47/ 8	.49/ 7	.51/ 6	.51/ 6	.41/ 6	.33/ 10	.33/ 10	.50/ 5	.54/ 6	.52/ 6	.49/ 7	.47/ 8	.47/ 8
17	.38/ 8	.39/ 8	.40/ 7	.41/ 6	.41/ 6	.33/ 6	.27/ 10	.27/ 10	.40/ 5	.43/ 6	.42/ 6	.40/ 7	.38/ 8	.38/ 8
19	.32/ 8	.32/ 8	.33/ 7	.34/ 6	.34/ 6	.27/ 6	.22/ 12	.33/ 5	.33/ 5	.36/ 6	.34/ 6	.33/ 7	.32/ 8	.32/ 8
21	.27/ 8	.27/ 8	.27/ 7	.28/ 6	.28/ 6	.23/ 6	.19/ 13	.27/ 5	.30/ 6	.28/ 6	.28/ 6	.27/ 7	.27/ 8	.27/ 8
5	7	1.56/ 7	1.59/ 7	1.66/ 7	1.74/ 6	1.71/ 6	1.29/ 6	.87/ 5	1.38/ 5	1.06/ 6	.71/ 7	.53/ 8	.44/ 9	.41/ 9
9	1.46/ 7	1.48/ 7	1.48/ 7	1.35/ 6	.99/ 6	.68/ 6	.98/ 5	.68/ 5	.72/ 5	.61/ 7	.61/ 8	.50/ 9	.44/ 10	.42/ 10
11	1.19/ 7	1.18/ 7	1.17/ 7	1.14/ 7	1.02/ 6	.74/ 6	.52/ 6	.52/ 6	.49/ 6	.49/ 8	.49/ 8	.42/ 10	.36/ 10	.37/ 10
13	.94/ 7	.93/ 7	.92/ 7	.88/ 7	.78/ 6	.57/ 6	.41/ 9	.54/ 5	.47/ 7	.39/ 9	.39/ 9	.34/ 10	.32/ 10	.31/ 10
15	.74/ 7	.74/ 7	.72/ 7	.69/ 7	.69/ 7	.61/ 6	.45/ 6	.33/ 10	.42/ 5	.37/ 7	.31/ 9	.28/ 10	.26/ 10	.26/ 10
17	.60/ 7	.60/ 7	.58/ 7	.55/ 7	.49/ 7	.49/ 6	.36/ 6	.27/ 10	.34/ 5	.30/ 7	.26/ 9	.23/ 10	.22/ 11	.22/ 11
19	.49/ 7	.49/ 7	.49/ 7	.45/ 7	.45/ 7	.40/ 6	.30/ 6	.23/ 12	.28/ 5	.25/ 7	.21/ 9	.20/ 10	.19/ 11	.18/ 11
21	.41/ 7	.41/ 7	.40/ 7	.38/ 7	.38/ 7	.33/ 6	.25/ 6	.19/ 13	.23/ 5	.21/ 7	.18/ 9	.17/ 10	.16/ 11	.16/ 11
10	7	1.94/ 7	1.97/ 7	2.02/ 7	2.06/ 7	1.95/ 6	1.48/ 6	.89/ 5	1.10/ 6	.59/ 6	.35/ 10	.22/ 12	.17/ 13	.16/ 13
9	1.94/ 7	1.94/ 7	1.90/ 7	1.81/ 7	1.42/ 7	1.21/ 6	1.14/ 6	.70/ 6	.79/ 6	.49/ 6	.33/ 10	.24/ 12	.19/ 13	.19/ 13
11	1.60/ 7	1.58/ 7	1.53/ 7	1.42/ 7	1.20/ 7	1.10/ 7	.93/ 6	.86/ 6	.54/ 6	.58/ 6	.39/ 9	.28/ 11	.22/ 12	.19/ 13
13	1.27/ 7	1.25/ 7	1.20/ 7	1.20/ 7	1.19/ 7	.96/ 6	.66/ 6	.42/ 6	.44/ 6	.31/ 9	.23/ 11	.19/ 13	.17/ 13	.16/ 13
15	1.01/ 7	1.01/ 7	.99/ 7	.95/ 7	.86/ 7	.73/ 6	.52/ 6	.34/ 10	.35/ 6	.25/ 10	.20/ 11	.16/ 13	.15/ 13	.14/ 13
17	.81/ 7	.80/ 7	.76/ 7	.69/ 7	.69/ 7	.58/ 6	.42/ 6	.28/ 10	.28/ 6	.21/ 10	.16/ 12	.14/ 13	.13/ 13	.12/ 13
19	.67/ 7	.65/ 7	.62/ 7	.57/ 7	.47/ 7	.39/ 6	.34/ 6	.23/ 11	.23/ 6	.17/ 10	.14/ 12	.12/ 13	.11/ 13	.11/ 13
21	.55/ 7	.54/ 7	.52/ 7	.52/ 7	.47/ 7	.39/ 6	.29/ 6	.20/ 13	.20/ 6	.15/ 10	.12/ 12	.11/ 13	.10/ 13	.09/ 13
15	7	2.25/ 7	2.28/ 7	2.34/ 7	2.38/ 7	2.27/ 6	1.74/ 6	.93/ 5	.79/ 6	.79/ 6	.35/ 10	.16/ 14	.08/ 17	.06/ 20
9	2.44/ 8	2.42/ 8	2.36/ 8	2.22/ 7	1.92/ 7	1.36/ 6	.73/ 6	.59/ 6	.45/ 7	.31/ 7	.17/ 14	.11/ 17	.08/ 20	.08/ 20
11	2.05/ 8	2.02/ 8	1.94/ 7	1.76/ 7	1.47/ 7	1.02/ 6	.56/ 6	.45/ 7	.26/ 10	.26/ 10	.16/ 14	.11/ 17	.09/ 20	.08/ 20
13	1.64/ 8	1.61/ 8	1.53/ 8	1.37/ 7	1.13/ 7	.88/ 6	.78/ 6	.44/ 6	.35/ 10	.28/ 10	.18/ 10	.12/ 14	.09/ 17	.09/ 20
15	1.30/ 8	1.28/ 8	1.21/ 7	1.08/ 7	.86/ 7	.61/ 6	.35/ 10	.35/ 10	.28/ 10	.28/ 10	.18/ 10	.12/ 14	.09/ 17	.08/ 20
17	1.05/ 8	1.03/ 8	.97/ 7	.86/ 7	.71/ 7	.49/ 6	.29/ 10	.29/ 10	.15/ 11	.15/ 11	.11/ 14	.08/ 17	.07/ 20	.07/ 20
19	.86/ 8	.84/ 8	.79/ 7	.79/ 7	.71/ 7	.58/ 7	.40/ 6	.24/ 10	.24/ 10	.13/ 10	.09/ 14	.08/ 17	.07/ 20	.07/ 20
21	.72/ 8	.70/ 8	.66/ 7	.59/ 7	.48/ 7	.33/ 6	.20/ 12	.16/ 14	.11/ 10	.08/ 14	.07/ 17	.06/ 20	.06/ 20	.06/ 20
20	7	2.43/ 8	2.46/ 8	2.58/ 8	2.69/ 7	2.61/ 7	2.30/ 7	1.61/ 6	.75/ 5	.59/ 7	.20/ 13	.06/ 19	.05/ 25	.07/ 3
9	2.95/ 8	2.92/ 8	2.85/ 8	2.68/ 7	2.18/ 7	1.79/ 7	1.21/ 6	.58/ 6	.36/ 7	.19/ 13	.08/ 19	.05/ 23	.05/ 26	.05/ 27
11	2.58/ 8	2.53/ 8	2.40/ 8	2.18/ 7	1.70/ 7	1.38/ 7	.92/ 6	.45/ 6	.29/ 10	.15/ 13	.08/ 19	.06/ 23	.05/ 26	.05/ 27
13	2.08/ 8	2.04/ 8	1.91/ 8	1.70/ 7	1.08/ 7	.88/ 7	.61/ 6	.36/ 10	.23/ 11	.13/ 13	.08/ 19	.06/ 23	.05/ 26	.05/ 27
15	1.67/ 8	1.63/ 8	1.52/ 8	1.34/ 7	1.08/ 7	.72/ 6	.47/ 6	.30/ 10	.25/ 10	.16/ 13	.07/ 19	.05/ 23	.05/ 26	.05/ 27
17	1.35/ 8	1.31/ 8	1.22/ 8	1.08/ 7	.88/ 7	.70/ 7	.58/ 6	.30/ 10	.25/ 10	.19/ 12	.07/ 19	.05/ 23	.05/ 26	.05/ 27
19	1.10/ 8	1.07/ 8	1.00/ 8	.88/ 7	.73/ 7	.58/ 7	.39/ 6	.21/ 12	.14/ 14	.09/ 13	.06/ 19	.05/ 23	.04/ 27	.04/ 27
21	.92/ 8	.89/ 8	.83/ 8	.73/ 7	.59/ 7	.48/ 7	.33/ 6	.20/ 12	.16/ 14	.11/ 10	.08/ 14	.07/ 17	.05/ 24	.04/ 27
25	7	2.50/ 8	2.58/ 8	2.73/ 8	2.91/ 8	2.95/ 7	2.38/ 6	1.01/ 5	.47/ 5	.10/ 17	.06/ 3	.14/ 4	.15/ 4	.15/ 4
9	3.44/ 8	3.46/ 8	3.40/ 8	3.16/ 8	2.74/ 7	1.91/ 6	.78/ 5	.38/ 5	.11/ 17	.05/ 24	.09/ 4	.10/ 4	.10/ 4	.10/ 4
11	3.13/ 8	3.11/ 8	2.63/ 8	2.16/ 7	1.43/ 6	.60/ 5	.30/ 5	.11/ 17	.06/ 24	.06/ 24	.07/ 33	.07/ 33	.07/ 33	.07/ 33
13	2.57/ 9	2.54/ 8	2.39/ 8	2.08/ 8	1.67/ 7	1.09/ 6	.47/ 5	.24/ 9	.10/ 17	.06/ 24	.05/ 30	.05/ 33	.05/ 33	.05/ 33
15	2.07/ 9	2.04/ 8	1.91/ 8	1.64/ 8	1.30/ 7	.85/ 6	.37/ 10	.20/ 9	.09/ 17	.05/ 24	.05/ 30	.04/ 33	.04/ 33	.04/ 33
17	1.68/ 9	1.65/ 8	1.54/ 8	1.32/ 8	1.04/ 7	.68/ 6	.30/ 10	.17/ 9	.08/ 17	.05/ 24	.04/ 30	.04/ 33	.04/ 33	.04/ 33
19	1.37/ 9	1.35/ 8	1.26/ 8	1.08/ 8	.85/ 7	.55/ 6	.25/ 11	.14/ 9	.07/ 17	.05/ 24	.04/ 30	.04/ 33	.04/ 33	.04/ 33

RMS ROLL IN DEGREES/ENCOUNTERED MODAL PERIOD, T, IN SECONDS  
DE

V	T0	0	15	30	45	60	75	90	SHIP HEADING ANGLE IN DEGREES				150	165	180
									105	120	135	150			
0	7	0.00/**	.10/10	.18/10	.23/10	.20/10	.18/10	.20/10	.22/10	.21/10	.17/10	.09/10	.00/10		
0	9	0.00/**	.24/10	.44/10	.45/10	.43/10	.43/10	.44/10	.45/10	.43/10	.36/10	.23/10	.00/10		
11	0.00/**	.28/10	.43/10	.51/10	.53/10	.52/10	.52/10	.53/10	.53/10	.50/10	.43/10	.28/10	.00/10		
13	0.00/**	.26/10	.40/10	.47/10	.49/10	.49/10	.49/10	.49/10	.49/10	.46/10	.46/10	.25/10	.00/10		
15	0.00/**	.22/10	.34/10	.40/10	.42/10	.42/10	.42/10	.42/10	.42/10	.42/10	.39/10	.33/10	.22/10	.00/10	
17	0.00/**	.18/10	.28/10	.33/10	.35/10	.35/10	.35/10	.35/10	.35/10	.35/10	.33/10	.33/10	.18/10	.00/10	
19	0.00/**	.15/10	.23/10	.28/10	.29/10	.29/10	.30/10	.30/10	.30/10	.29/10	.27/10	.23/10	.15/10	.00/10	
21	0.00/**	.13/10	.20/10	.23/10	.25/10	.25/10	.25/10	.25/10	.25/10	.25/10	.23/10	.19/10	.12/10	.00/10	
5	7	0.00/**	.05/ 8	.09/ 8	.13/ 8	.15/ 8	.16/ 10	.18/10	.28/10	.39/10	.49/10	.51/10	.39/10	.00/10	
9	9	0.00/**	.12/11	.23/11	.31/11	.35/11	.39/10	.43/10	.57/10	.73/10	.70/10	.51/10	.00/10		
11	0.00/**	.19/12	.35/12	.45/11	.50/11	.53/10	.52/10	.63/11	.69/10	.70/10	.63/10	.45/10	.00/10		
13	0.00/**	.19/12	.36/12	.46/12	.50/11	.51/11	.49/10	.42/10	.47/10	.41/10	.58/10	.51/10	.00/10		
15	0.00/**	.17/12	.32/12	.41/12	.44/11	.45/11	.42/10	.47/11	.49/10	.47/10	.47/10	.29/10	.00/10		
17	0.00/**	.15/12	.27/12	.35/12	.38/11	.38/11	.35/10	.39/11	.40/10	.39/10	.33/10	.23/10	.00/10		
19	0.00/**	.13/12	.23/12	.32/12	.32/11	.32/11	.32/10	.33/10	.32/10	.32/10	.32/10	.19/10	.00/10		
21	0.00/**	.11/12	.20/12	.25/12	.27/11	.27/11	.25/10	.27/11	.25/10	.25/10	.26/10	.23/10	.16/10	.00/10	
10	7	0.00/**	.03/ 8	.06/ 7	.09/ 7	.11/ 7	.12/ 8	.12/ 8	.17/10	.32/10	.66/10	.11/10	.39/10	.00/13	
9	9	0.00/**	.06/13	.11/13	.16/12	.22/11	.26/11	.32/12	.32/12	.52/10	.51/10	.62/12	.19/13	.00/13	
11	0.00/**	.11/13	.19/13	.24/13	.32/13	.37/11	.41/10	.46/10	.54/10	.62/10	.61/10	.47/12	.15/13	.00/13	
13	0.00/**	.13/13	.22/13	.27/13	.34/13	.37/11	.39/10	.46/10	.54/10	.62/10	.61/10	.36/12	.16/13	.00/13	
15	0.00/**	.13/13	.21/13	.25/13	.31/13	.33/12	.34/10	.38/10	.43/10	.48/10	.48/10	.28/12	.10/13	.00/13	
17	0.00/**	.10/13	.17/13	.20/13	.23/13	.27/13	.29/12	.32/10	.35/10	.38/10	.38/10	.22/12	.08/13	.00/13	
19	0.00/**	.10/13	.17/13	.20/13	.23/13	.24/13	.24/12	.24/10	.25/10	.29/10	.31/10	.18/12	.06/13	.00/13	
21	0.00/**	.09/13	.14/13	.17/13	.20/13	.20/13	.21/12	.21/10	.22/10	.24/10	.26/10	.15/12	.05/13	.00/13	
10	7	0.00/**	.03/ 8	.06/ 7	.09/ 7	.11/ 7	.12/ 8	.12/ 8	.17/10	.32/10	.66/10	.11/10	.39/10	.00/13	
9	9	0.00/**	.06/13	.11/13	.16/12	.22/11	.26/11	.32/12	.32/12	.52/10	.51/10	.62/12	.19/13	.00/13	
11	0.00/**	.11/13	.19/13	.24/13	.32/13	.37/11	.41/10	.46/10	.54/10	.62/10	.61/10	.47/12	.15/13	.00/13	
13	0.00/**	.13/13	.22/13	.27/13	.34/13	.37/11	.39/10	.46/10	.54/10	.62/10	.61/10	.36/12	.16/13	.00/13	
15	0.00/**	.13/13	.21/13	.25/13	.31/13	.33/12	.34/10	.38/10	.43/10	.48/10	.48/10	.28/12	.10/13	.00/13	
17	0.00/**	.10/13	.17/13	.20/13	.23/13	.27/13	.29/12	.32/10	.35/10	.38/10	.38/10	.22/12	.08/13	.00/13	
19	0.00/**	.10/13	.17/13	.20/13	.23/13	.24/13	.24/12	.24/10	.25/10	.29/10	.31/10	.18/12	.06/13	.00/13	
21	0.00/**	.09/13	.14/13	.17/13	.20/13	.20/13	.21/12	.21/10	.22/10	.24/10	.26/10	.15/12	.05/13	.00/13	
15	7	0.00/**	.02/ 8	.04/ 8	.06/ 7	.08/ 7	.09/ 8	.15/ 9	.36/10	.10/ 9	.43/14	.17/17	.07/20	.00/21	
9	9	0.00/**	.04/11	.07/11	.10/11	.13/11	.18/11	.27/10	.46/10	.46/10	.39/14	.17/17	.08/20	.00/20	
11	0.00/**	.08/14	.12/14	.15/14	.19/14	.21/13	.26/12	.32/10	.43/10	.43/10	.32/14	.15/17	.07/20	.00/20	
13	0.00/**	.12/14	.16/14	.19/14	.21/14	.21/13	.26/12	.30/10	.37/10	.53/10	.53/14	.13/17	.06/20	.00/20	
15	0.00/**	.13/14	.16/14	.19/14	.21/14	.24/12	.27/10	.31/11	.41/10	.41/10	.20/14	.10/17	.05/20	.00/20	
17	0.00/**	.12/14	.15/14	.18/14	.19/13	.21/13	.23/10	.26/11	.33/10	.33/10	.17/14	.09/17	.04/20	.00/20	
19	0.00/**	.11/14	.13/14	.16/14	.17/14	.17/13	.18/13	.20/10	.21/10	.27/10	.14/14	.07/17	.03/20	.00/20	
21	0.00/**	.09/14	.12/14	.14/14	.14/13	.16/13	.17/11	.18/11	.22/10	.12/14	.12/14	.06/17	.03/20	.00/20	
20	7	0.00/**	.02/ 8	.03/ 8	.05/ 8	.06/ 7	.08/ 8	.14/ 8	.47/10	.66/13	.32/19	.14/31	.27/ 4	.00/ 4	
9	9	0.00/**	.03/10	.05/11	.07/11	.10/11	.15/11	.25/10	.52/10	.56/13	.26/19	.13/23	.18/ 4	.00/ 4	
11	0.00/**	.05/14	.09/14	.12/14	.16/13	.21/12	.30/10	.46/10	.44/13	.44/13	.21/19	.12/23	.13/ 4	.00/ 4	
13	0.00/**	.07/16	.13/14	.16/14	.19/13	.22/13	.29/10	.38/11	.34/13	.34/13	.17/19	.10/23	.10/26	.00/27	
15	0.00/**	.08/16	.15/14	.16/14	.19/14	.21/13	.25/10	.31/11	.27/13	.14/19	.08/23	.08/26	.00/27		
17	0.00/**	.08/16	.14/14	.15/14	.17/14	.17/14	.19/13	.22/11	.26/11	.22/13	.12/19	.07/23	.06/26	.00/27	
19	0.00/**	.07/16	.13/14	.14/14	.15/14	.15/14	.16/13	.19/11	.21/11	.18/13	.10/19	.06/23	.05/26	.00/27	
21	0.00/**	.07/16	.11/14	.12/14	.14/14	.14/13	.16/11	.18/11	.15/13	.09/19	.05/23	.04/26	.00/27		
25	7	0.00/**	.01/ 8	.02/ 8	.04/ 8	.05/ 8	.07/ 8	.14/ 8	.68/ 9	.37/17	.21/35	.14/ 7	.11/ 5	.00/ 6	
9	9	0.00/**	.02/10	.04/10	.06/11	.08/11	.12/11	.12/11	.23/10	.63/10	.33/17	.19/24	.13/45	.08/ 5	
11	0.00/**	.03/16	.06/14	.09/14	.12/13	.18/13	.28/10	.52/11	.28/17	.11/30	.17/24	.11/42	.07/48	.00/ 6	
13	0.00/**	.06/16	.09/16	.13/14	.16/14	.20/13	.26/10	.41/11	.23/17	.14/24	.09/30	.05/33	.00/33		
15	0.00/**	.07/16	.10/16	.14/16	.16/14	.16/14	.19/13	.23/11	.33/11	.18/17	.12/24	.08/30	.04/33	.00/33	
17	0.00/**	.07/16	.10/16	.14/16	.15/14	.17/14	.17/13	.20/11	.27/11	.15/17	.10/24	.06/30	.04/33	.00/33	
19	0.00/**	.07/16	.09/16	.12/16	.14/14	.15/13	.17/11	.22/11	.13/17	.13/17	.08/24	.06/30	.03/33	.00/33	
21	0.00/**	.06/16	.09/16	.12/16	.12/14	.13/13	.15/11	.19/11	.19/11	.19/11	.05/24	.05/30	.04/24	.00/24	

## ASR

 RMS ROLL VEL IN DPS/ENCOUNTERED MODAL PERIOD, T, IN SECONDS  
 LONGCRESTED  
 Q.E.

V	T0	0	15	30	45	60	75	90	105	120	135	150	165	180	SHIP HEADING ANGLE IN DEGREES	
															DE	
0	7	0.00/**	.08/10	.14/ 8	.19/ 7	.20/ 8	.16/10	.15/10	.17/10	.19/ 8	.17/ 8	.13/ 8	.07/10	.00/10		
0	9	0.00/**	.15/10	.24/10	.29/10	.30/10	.28/10	.28/10	.29/10	.30/10	.28/10	.24/10	.15/10	.00/10		
11	0.00/**	.17/10	.32/10	.32/10	.33/10	.32/10	.32/10	.32/10	.33/10	.33/10	.32/10	.27/10	.17/10	.00/10		
13	0.00/**	.16/10	.24/10	.29/10	.30/10	.30/10	.29/10	.29/10	.30/10	.30/10	.28/10	.24/10	.15/10	.00/10		
15	0.00/**	.13/10	.20/10	.24/10	.25/10	.25/10	.25/10	.25/10	.25/10	.25/10	.24/10	.20/10	.13/10	.00/10		
17	0.00/**	.11/10	.17/10	.20/10	.21/10	.21/10	.21/10	.21/10	.21/10	.21/10	.20/10	.17/10	.11/10	.00/10		
19	0.00/**	.09/10	.14/10	.17/10	.17/10	.17/10	.17/10	.17/10	.17/10	.17/10	.16/10	.14/10	.09/10	.00/10		
21	0.00/**	.08/10	.12/10	.14/10	.15/10	.15/10	.15/10	.15/10	.15/10	.15/10	.14/10	.12/10	.07/10	.00/10		
8	7	0.00/**	.05/ 7	.10/ 7	.14/ 7	.16/ 7	.14/ 8	.15/10	.15/10	.22/10	.29/10	.34/10	.33/10	.25/10	.00/10	
9	11	0.00/**	.09/11	.16/11	.22/11	.24/11	.26/10	.28/10	.28/10	.37/10	.43/10	.46/10	.43/10	.31/10	.00/10	
13	0.00/**	.12/12	.23/12	.29/11	.31/11	.32/10	.32/10	.32/10	.39/10	.42/10	.43/10	.38/10	.27/10	.00/10		
15	0.00/**	.12/12	.23/12	.28/11	.31/11	.31/10	.29/10	.29/10	.34/11	.36/10	.35/10	.31/10	.22/10	.00/10		
17	0.00/**	.11/12	.20/12	.25/12	.27/11	.27/10	.27/10	.27/10	.28/11	.28/10	.25/10	.25/10	.17/10	.00/10		
19	0.00/**	.09/12	.17/12	.21/12	.23/11	.22/11	.21/10	.21/10	.23/11	.24/10	.23/10	.20/10	.14/10	.00/10		
21	0.00/**	.08/12	.14/12	.18/12	.19/11	.19/11	.17/11	.17/11	.19/11	.20/10	.19/10	.16/10	.11/10	.00/10		
21	0.00/**	.07/12	.12/12	.15/12	.16/11	.16/11	.14/10	.14/10	.16/11	.16/10	.16/10	.13/10	.09/10	.00/10		
10	7	0.00/**	.04/ 7	.07/ 7	.11/ 7	.13/ 6	.12/ 8	.14/ 8	.14/ 8	.24/10	.44/10	.72/10	.40/12	.10/13	.00/13	
9	11	0.00/**	.05/13	.07/13	.13/13	.13/11	.17/13	.21/12	.23/11	.23/10	.33/10	.48/10	.62/10	.33/12	.09/13	
13	0.00/**	.08/13	.14/13	.17/13	.17/13	.22/12	.23/11	.23/10	.23/10	.32/10	.41/10	.48/10	.25/12	.07/13		
15	0.00/**	.08/13	.13/13	.16/13	.16/13	.19/13	.19/12	.20/11	.20/10	.23/10	.28/10	.36/10	.19/12	.06/13		
17	0.00/**	.07/13	.12/13	.14/13	.14/13	.17/13	.17/13	.17/13	.17/13	.20/10	.23/10	.26/10	.15/12	.04/13		
19	0.00/**	.06/13	.10/13	.12/13	.12/13	.14/13	.14/13	.14/13	.14/13	.14/10	.18/10	.21/10	.12/12	.04/13		
21	0.00/**	.05/13	.09/13	.10/13	.10/13	.12/13	.12/13	.12/13	.12/10	.13/10	.15/10	.15/10	.09/12	.03/13		
15	7	0.00/**	.03/ 8	.06/ 8	.06/ 7	.08/ 7	.10/ 7	.10/ 8	.13/ 8	.13/ 8	.26/10	.66/10	.19/14	.06/17	.00/20	
9	11	0.00/**	.04/ 8	.07/ 8	.10/10	.12/10	.14/10	.14/10	.14/10	.14/10	.14/10	.14/10	.17/14	.06/17	.02/20	
11	0.00/**	.06/14	.09/14	.12/13	.14/13	.17/13	.17/13	.17/13	.17/13	.20/10	.27/10	.40/10	.14/14	.05/17		
13	0.00/**	.08/14	.10/14	.13/13	.14/13	.16/12	.16/12	.18/10	.18/10	.22/10	.30/10	.30/10	.11/14	.04/17		
15	0.00/**	.08/14	.10/14	.12/14	.13/13	.15/12	.15/12	.16/10	.16/10	.18/10	.23/10	.09/14	.04/17	.01/20		
17	0.00/**	.07/14	.09/14	.11/14	.11/13	.13/12	.13/12	.13/10	.15/10	.15/10	.19/10	.07/14	.03/17	.01/20		
19	0.00/**	.06/14	.08/14	.09/14	.10/13	.11/12	.11/12	.11/10	.12/10	.12/10	.15/10	.06/14	.02/17	.01/20		
21	0.00/**	.06/14	.07/14	.08/14	.08/13	.09/12	.09/12	.09/10	.10/10	.12/10	.05/14	.02/17	.01/20	.00/20		
20	7	0.00/**	.02/ 8	.05/ 7	.07/ 7	.09/ 7	.09/ 8	.13/ 8	.13/ 8	.33/10	.30/13	.14/ 3	.06/ 4	.16/ 4	.00/ 4	
9	11	0.00/**	.03/ 9	.06/ 8	.08/ 8	.10/10	.12/10	.17/10	.17/10	.17/10	.17/10	.10/19	.04/23	.10/ 4	.00/ 4	
11	0.00/**	.04/14	.08/14	.10/13	.12/13	.14/12	.14/12	.19/10	.19/10	.28/10	.20/13	.08/19	.03/23	.07/ 4		
13	0.00/**	.05/14	.09/14	.11/14	.12/13	.14/13	.14/13	.17/10	.17/10	.23/10	.15/13	.06/19	.03/23	.05/ 4		
15	0.00/**	.05/16	.10/14	.11/14	.11/14	.12/13	.13/13	.15/10	.15/10	.18/10	.12/13	.05/19	.02/23	.04/ 4		
17	0.00/**	.05/16	.09/14	.10/14	.11/14	.11/14	.11/13	.12/10	.12/10	.15/11	.10/13	.04/19	.02/23	.03/ 4		
19	0.00/**	.05/16	.08/14	.09/14	.09/13	.09/13	.10/13	.10/10	.12/10	.12/10	.08/13	.03/19	.03/19	.02/27		
21	0.00/**	.04/16	.07/14	.07/14	.08/14	.08/14	.08/13	.09/10	.10/10	.10/11	.07/13	.03/19	.02/23	.02/ 4		
25	7	0.00/**	.02/ 7	.04/ 7	.06/ 7	.07/ 7	.07/ 7	.12/ 8	.12/ 8	.45/ 9	.12/17	.07/ 4	.05/ 5	.05/ 5	.00/ 6	
9	11	0.00/**	.02/ 9	.05/ 9	.07/ 8	.08/10	.10/10	.16/10	.16/10	.16/10	.11/17	.05/24	.03/ 5	.04/ 5	.00/ 6	
11	0.00/**	.03/16	.06/14	.08/14	.10/13	.12/12	.12/12	.13/13	.13/13	.13/13	.13/13	.31/10	.04/24	.03/ 5	.00/ 6	
13	0.00/**	.04/16	.06/16	.06/16	.09/14	.11/14	.11/14	.16/10	.16/10	.24/10	.08/17	.04/24	.02/30	.02/ 5	.00/ 6	
15	0.00/**	.05/16	.07/16	.07/16	.09/14	.10/14	.12/13	.14/13	.14/13	.14/13	.14/13	.06/11	.03/24	.02/30	.02/ 5	
17	0.00/**	.05/16	.09/14	.09/14	.10/14	.10/13	.12/13	.12/13	.12/13	.12/13	.12/13	.05/17	.01/33	.01/33	.00/33	
19	0.00/**	.04/16	.06/16	.06/16	.08/14	.08/14	.09/13	.10/10	.12/11	.12/11	.04/17	.02/24	.01/30	.01/33	.00/33	
21	0.00/**	.04/16	.05/16	.05/16	.07/16	.07/16	.08/13	.08/10	.10/11	.04/17	.02/24	.01/33	.01/33	.00/33		

RMS ROLL ACC IN DS2/ENCOUNTERED MODAL PERIOD, T, IN SECONDS  
LONGCRESTED  
SHIP HEADING ANGLE IN DEGREES  
DE

V	T0	0	15	30	45	60	75	90	105	120	135	150	165	180
0	7	0.00/**	.07/ 7	.13/ 7	.18/ 6	.20/ 6	.16/ 8	.14/ 8	.16/ 7	.17/ 7	.15/ 7	.11/ 7	.06/ 7	.00/10
9	0.00/**	.00/10	.17/10	.21/10	.22/10	.20/10	.19/10	.20/10	.21/10	.20/10	.16/10	.16/10	.10/10	.00/10
11	0.00/**	.11/10	.18/10	.21/10	.22/10	.21/10	.20/10	.21/10	.22/10	.21/10	.17/10	.17/10	.11/10	.00/10
13	0.00/**	.10/10	.19/10	.18/10	.19/10	.19/10	.18/10	.19/10	.18/10	.19/10	.18/10	.18/10	.10/10	.00/10
15	0.00/**	.08/10	.13/10	.15/10	.16/10	.15/10	.15/10	.16/10	.16/10	.16/10	.15/10	.15/10	.13/10	.08/10
17	0.00/**	.07/10	.11/10	.13/10	.13/10	.13/10	.13/10	.13/10	.13/10	.13/10	.12/10	.12/10	.10/10	.07/10
19	0.00/**	.06/10	.09/10	.10/10	.11/10	.11/10	.11/10	.11/10	.11/10	.11/10	.10/10	.10/10	.09/10	.05/10
21	0.00/**	.05/10	.07/10	.09/10	.09/10	.09/10	.09/10	.09/10	.09/10	.09/10	.08/10	.08/10	.07/10	.00/10
<b>6</b>	<b>7</b>	<b>0.00/**</b>	<b>.05/ 7</b>	<b>.11/ 7</b>	<b>.15/ 6</b>	<b>.18/ 6</b>	<b>.15/ 7</b>	<b>.14/ 8</b>	<b>.18/10</b>	<b>.22/10</b>	<b>.24/10</b>	<b>.16/10</b>	<b>.00/10</b>	
<b>9</b>	<b>0.00/**</b>	<b>.00/12</b>	<b>.08/12</b>	<b>.15/11</b>	<b>.20/11</b>	<b>.21/11</b>	<b>.21/10</b>	<b>.20/10</b>	<b>.25/10</b>	<b>.27/10</b>	<b>.24/10</b>	<b>.17/10</b>	<b>.00/10</b>	
<b>11</b>	<b>0.00/**</b>	<b>.00/12</b>	<b>.08/12</b>	<b>.15/12</b>	<b>.20/12</b>	<b>.21/12</b>	<b>.20/11</b>	<b>.19/10</b>	<b>.21/10</b>	<b>.22/10</b>	<b>.19/10</b>	<b>.15/10</b>	<b>.00/10</b>	
<b>13</b>	<b>0.00/**</b>	<b>.00/12</b>	<b>.08/12</b>	<b>.13/12</b>	<b>.16/11</b>	<b>.17/11</b>	<b>.16/11</b>	<b>.16/10</b>	<b>.15/10</b>	<b>.17/10</b>	<b>.18/10</b>	<b>.17/10</b>	<b>.10/10</b>	<b>.00/10</b>
<b>15</b>	<b>0.00/**</b>	<b>.00/12</b>	<b>.07/12</b>	<b>.13/12</b>	<b>.16/11</b>	<b>.17/11</b>	<b>.16/11</b>	<b>.16/10</b>	<b>.15/10</b>	<b>.17/10</b>	<b>.18/10</b>	<b>.17/10</b>	<b>.10/10</b>	<b>.00/10</b>
<b>17</b>	<b>0.00/**</b>	<b>.00/12</b>	<b>.06/12</b>	<b>.11/12</b>	<b>.13/11</b>	<b>.14/11</b>	<b>.14/11</b>	<b>.13/10</b>	<b>.13/10</b>	<b>.14/10</b>	<b>.15/10</b>	<b>.14/10</b>	<b>.08/10</b>	<b>.00/10</b>
<b>19</b>	<b>0.00/**</b>	<b>.00/12</b>	<b>.05/12</b>	<b>.09/12</b>	<b>.11/11</b>	<b>.12/11</b>	<b>.11/11</b>	<b>.10/10</b>	<b>.10/10</b>	<b>.11/10</b>	<b>.12/10</b>	<b>.11/10</b>	<b>.07/10</b>	<b>.00/10</b>
<b>21</b>	<b>0.00/**</b>	<b>.04/12</b>	<b>.08/12</b>	<b>.09/11</b>	<b>.10/11</b>	<b>.10/11</b>	<b>.10/10</b>	<b>.10/10</b>	<b>.10/10</b>	<b>.10/10</b>	<b>.09/10</b>	<b>.08/10</b>	<b>.06/10</b>	<b>.00/10</b>
<b>10</b>	<b>7</b>	<b>0.00/**</b>	<b>.05/ 7</b>	<b>.10/ 7</b>	<b>.14/ 7</b>	<b>.16/ 6</b>	<b>.13/ 6</b>	<b>.13/ 8</b>	<b>.19/ 9</b>	<b>.31/10</b>	<b>.45/10</b>	<b>.21/12</b>	<b>.05/13</b>	<b>.00/13</b>
<b>9</b>	<b>0.00/**</b>	<b>.05/ 7</b>	<b>.10/ 7</b>	<b>.14/ 7</b>	<b>.16/ 6</b>	<b>.15/ 6</b>	<b>.16/10</b>	<b>.22/10</b>	<b>.21/10</b>	<b>.31/10</b>	<b>.38/10</b>	<b>.18/12</b>	<b>.04/13</b>	<b>.00/13</b>
<b>11</b>	<b>0.00/**</b>	<b>.06/13</b>	<b>.10/13</b>	<b>.13/13</b>	<b>.16/12</b>	<b>.17/10</b>	<b>.15/11</b>	<b>.15/10</b>	<b>.20/10</b>	<b>.26/10</b>	<b>.29/10</b>	<b>.13/12</b>	<b>.03/13</b>	<b>.00/13</b>
<b>13</b>	<b>0.00/**</b>	<b>.06/13</b>	<b>.10/13</b>	<b>.13/13</b>	<b>.15/12</b>	<b>.15/11</b>	<b>.15/10</b>	<b>.17/10</b>	<b>.20/10</b>	<b>.20/10</b>	<b>.22/10</b>	<b>.10/12</b>	<b>.03/13</b>	<b>.00/13</b>
<b>15</b>	<b>0.00/**</b>	<b>.05/13</b>	<b>.09/13</b>	<b>.11/13</b>	<b>.13/12</b>	<b>.13/12</b>	<b>.13/11</b>	<b>.12/10</b>	<b>.14/10</b>	<b>.16/10</b>	<b>.17/10</b>	<b>.17/10</b>	<b>.08/12</b>	<b>.00/13</b>
<b>17</b>	<b>0.00/**</b>	<b>.04/13</b>	<b>.07/13</b>	<b>.08/13</b>	<b>.09/13</b>	<b>.11/12</b>	<b>.11/12</b>	<b>.10/11</b>	<b>.10/10</b>	<b>.11/10</b>	<b>.13/10</b>	<b>.13/10</b>	<b>.06/12</b>	<b>.00/13</b>
<b>19</b>	<b>0.00/**</b>	<b>.04/13</b>	<b>.07/13</b>	<b>.08/13</b>	<b>.09/13</b>	<b>.09/12</b>	<b>.09/12</b>	<b>.08/10</b>	<b>.09/10</b>	<b>.10/10</b>	<b>.11/10</b>	<b>.11/10</b>	<b>.05/12</b>	<b>.00/13</b>
<b>21</b>	<b>0.00/**</b>	<b>.03/13</b>	<b>.06/13</b>	<b>.07/13</b>	<b>.08/12</b>	<b>.08/12</b>	<b>.07/11</b>	<b>.07/10</b>	<b>.08/10</b>	<b>.08/10</b>	<b>.09/10</b>	<b>.09/10</b>	<b>.04/12</b>	<b>.00/13</b>
<b>15</b>	<b>7</b>	<b>0.00/**</b>	<b>.04/ 7</b>	<b>.09/ 7</b>	<b>.13/ 7</b>	<b>.15/ 6</b>	<b>.12/ 6</b>	<b>.12/ 6</b>	<b>.13/ 8</b>	<b>.20/10</b>	<b>.40/10</b>	<b>.08/14</b>	<b>.02/17</b>	<b>.00/20</b>
<b>9</b>	<b>0.00/**</b>	<b>.05/ 8</b>	<b>.09/ 8</b>	<b>.12/ 7</b>	<b>.13/ 7</b>	<b>.12/10</b>	<b>.12/10</b>	<b>.12/10</b>	<b>.12/10</b>	<b>.32/10</b>	<b>.32/10</b>	<b>.07/14</b>	<b>.02/17</b>	<b>.00/20</b>
<b>11</b>	<b>0.00/**</b>	<b>.05/14</b>	<b>.08/13</b>	<b>.11/13</b>	<b>.12/12</b>	<b>.12/11</b>	<b>.11/12</b>	<b>.11/12</b>	<b>.11/12</b>	<b>.17/10</b>	<b>.23/10</b>	<b>.06/14</b>	<b>.02/17</b>	<b>.00/20</b>
<b>13</b>	<b>0.00/**</b>	<b>.05/14</b>	<b>.08/14</b>	<b>.10/13</b>	<b>.11/13</b>	<b>.11/12</b>	<b>.11/11</b>	<b>.12/10</b>	<b>.14/10</b>	<b>.18/10</b>	<b>.05/14</b>	<b>.02/17</b>	<b>.01/20</b>	<b>.00/20</b>
<b>15</b>	<b>0.00/**</b>	<b>.05/14</b>	<b>.07/14</b>	<b>.09/13</b>	<b>.09/13</b>	<b>.10/12</b>	<b>.10/12</b>	<b>.10/10</b>	<b>.11/10</b>	<b>.14/10</b>	<b>.04/14</b>	<b>.01/17</b>	<b>.00/20</b>	
<b>17</b>	<b>0.00/**</b>	<b>.05/14</b>	<b>.06/14</b>	<b>.08/13</b>	<b>.08/13</b>	<b>.08/12</b>	<b>.08/12</b>	<b>.08/10</b>	<b>.09/10</b>	<b>.11/10</b>	<b>.03/14</b>	<b>.01/17</b>	<b>.00/20</b>	
<b>19</b>	<b>0.00/**</b>	<b>.04/14</b>	<b>.06/14</b>	<b>.06/13</b>	<b>.07/13</b>	<b>.07/13</b>	<b>.07/13</b>	<b>.07/10</b>	<b>.07/10</b>	<b>.09/10</b>	<b>.02/14</b>	<b>.01/17</b>	<b>.00/20</b>	
<b>21</b>	<b>0.00/**</b>	<b>.04/14</b>	<b>.05/14</b>	<b>.05/13</b>	<b>.06/13</b>	<b>.06/12</b>	<b>.06/12</b>	<b>.06/10</b>	<b>.06/10</b>	<b>.07/10</b>	<b>.02/14</b>	<b>.01/17</b>	<b>.00/20</b>	
<b>20</b>	<b>7</b>	<b>0.00/**</b>	<b>.04/ 7</b>	<b>.08/ 7</b>	<b>.12/ 6</b>	<b>.14/ 6</b>	<b>.12/ 6</b>	<b>.13/ 7</b>	<b>.24/ 9</b>	<b>.14/13</b>	<b>.08/ 3</b>	<b>.04/ 4</b>	<b>.00/ 4</b>	
<b>9</b>	<b>0.00/**</b>	<b>.04/ 8</b>	<b>.08/ 8</b>	<b>.11/ 8</b>	<b>.12/ 7</b>	<b>.11/ 7</b>	<b>.11/ 7</b>	<b>.12/10</b>	<b>.12/10</b>	<b>.12/13</b>	<b>.05/ 3</b>	<b>.03/ 4</b>	<b>.00/ 4</b>	
<b>11</b>	<b>0.00/**</b>	<b>.04/14</b>	<b>.08/14</b>	<b>.10/13</b>	<b>.11/13</b>	<b>.11/11</b>	<b>.11/11</b>	<b>.12/10</b>	<b>.12/10</b>	<b>.18/10</b>	<b>.04/19</b>	<b>.02/23</b>	<b>.04/ 4</b>	
<b>13</b>	<b>0.00/**</b>	<b>.04/14</b>	<b>.08/14</b>	<b>.09/14</b>	<b>.10/13</b>	<b>.10/12</b>	<b>.10/12</b>	<b>.11/10</b>	<b>.11/10</b>	<b>.14/10</b>	<b>.07/13</b>	<b>.03/19</b>	<b>.03/ 4</b>	
<b>15</b>	<b>0.00/**</b>	<b>.04/14</b>	<b>.07/14</b>	<b>.08/14</b>	<b>.09/14</b>	<b>.09/13</b>	<b>.09/12</b>	<b>.09/10</b>	<b>.11/10</b>	<b>.14/10</b>	<b>.06/13</b>	<b>.02/19</b>	<b>.02/ 4</b>	
<b>17</b>	<b>0.00/**</b>	<b>.04/16</b>	<b>.06/14</b>	<b>.06/14</b>	<b>.07/14</b>	<b>.07/13</b>	<b>.07/13</b>	<b>.08/10</b>	<b>.09/10</b>	<b>.09/10</b>	<b>.04/13</b>	<b>.02/13</b>	<b>.02/ 4</b>	
<b>19</b>	<b>0.00/**</b>	<b>.03/16</b>	<b>.03/16</b>	<b>.04/16</b>	<b>.05/14</b>	<b>.05/14</b>	<b>.05/14</b>	<b>.05/13</b>	<b>.05/13</b>	<b>.06/10</b>	<b>.03/13</b>	<b>.01/19</b>	<b>.01/ 4</b>	
<b>21</b>	<b>0.00/**</b>	<b>.03/16</b>	<b>.03/16</b>	<b>.04/16</b>	<b>.04/16</b>	<b>.04/16</b>	<b>.04/16</b>	<b>.04/16</b>	<b>.04/16</b>	<b>.05/13</b>	<b>.05/13</b>	<b>.01/17</b>	<b>.01/24</b>	
<b>25</b>	<b>7</b>	<b>0.00/**</b>	<b>.04/ 7</b>	<b>.08/ 7</b>	<b>.11/ 7</b>	<b>.13/ 6</b>	<b>.11/ 6</b>	<b>.12/ 7</b>	<b>.30/ 9</b>	<b>.04/17</b>	<b>.05/ 4</b>	<b>.03/ 4</b>	<b>.03/ 5</b>	<b>.00/ 6</b>
<b>9</b>	<b>0.00/**</b>	<b>.04/ 8</b>	<b>.07/ 9</b>	<b>.09/12</b>	<b>.10/12</b>	<b>.10/11</b>	<b>.10/10</b>	<b>.12/10</b>	<b>.12/10</b>	<b>.19/10</b>	<b>.04/17</b>	<b>.02/24</b>	<b>.01/ 4</b>	<b>.02/ 5</b>
<b>13</b>	<b>0.00/**</b>	<b>.04/16</b>	<b>.06/14</b>	<b>.08/14</b>	<b>.07/14</b>	<b>.08/14</b>	<b>.08/14</b>	<b>.09/13</b>	<b>.10/10</b>	<b>.15/10</b>	<b>.03/17</b>	<b>.02/24</b>	<b>.01/ 4</b>	<b>.01/ 5</b>
<b>15</b>	<b>0.00/**</b>	<b>.03/16</b>	<b>.03/16</b>	<b>.05/16</b>	<b>.05/16</b>	<b>.05/16</b>	<b>.05/16</b>	<b>.06/14</b>	<b>.06/14</b>	<b>.08/13</b>	<b>.02/17</b>	<b>.01/24</b>	<b>.01/ 30</b>	<b>.01/ 5</b>
<b>17</b>	<b>0.00/**</b>	<b>.03/16</b>	<b>.03/16</b>	<b>.04/16</b>	<b>.04/16</b>	<b>.04/16</b>	<b>.04/16</b>	<b>.05/14</b>	<b>.05/14</b>	<b>.07/13</b>	<b>.02/17</b>	<b>.01/24</b>	<b>.01/30</b>	<b>.01/ 5</b>
<b>19</b>	<b>0.00/**</b>	<b>.03/16</b>	<b>.03/16</b>	<b>.04/16</b>	<b>.04/16</b>	<b>.04/16</b>	<b>.04/16</b>	<b>.05/14</b>	<b>.05/14</b>	<b>.06/13</b>	<b>.06/13</b>	<b>.07/10</b>	<b>.01/24</b>	<b>.01/ 5</b>
<b>21</b>	<b>0.00/**</b>	<b>.03/16</b>	<b>.03/16</b>	<b>.04/16</b>	<b>.04/16</b>	<b>.04/16</b>	<b>.04/16</b>	<b>.05/13</b>	<b>.05/13</b>	<b>.06/10</b>	<b>.06/10</b>	<b>.07/10</b>	<b>.01/24</b>	<b>.01/ 5</b>
													<b>.00/ 5</b>	<b>.00/ 6</b>

ASR  
LONGCRESTED  
RMS PITCH IN DEGREES/ENCOUNTERED MODAL PERIOD, T<sub>1</sub>, IN SECONDS  
DE

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										180
		15	30	45	60	75	90	105	120	135	150	
0	7	.17/.7	.18/.7	.19/.7	.20/.6	.14/.6	.02/.5	.15/.5	.19/.6	.19/.7	.17/.7	.16/.7
1	9	.19/.8	.19/.8	.19/.8	.19/.7	.17/.6	.02/.5	.11/.6	.16/.7	.18/.7	.18/.8	.18/.8
11	.17/.9	.17/.9	.17/.9	.16/.9	.14/.8	.08/.6	.01/.5	.09/.6	.13/.7	.18/.7	.17/.9	.17/.9
13	.15/.10	.15/.10	.14/.10	.13/.9	.11/.9	.07/.6	.01/.5	.07/.6	.11/.9	.13/.10	.14/.10	.15/.10
15	.13/.10	.13/.10	.12/.10	.11/.10	.09/.10	.05/.6	.01/.5	.05/.6	.09/.10	.11/.10	.12/.10	.13/.11
17	.11/.12	.11/.12	.10/.12	.09/.11	.07/.10	.04/.10	.01/.5	.04/.10	.07/.10	.09/.11	.10/.12	.11/.12
19	.10/.13	.09/.13	.09/.13	.08/.13	.06/.12	.04/.10	.00/.5	.04/.11	.06/.12	.08/.13	.09/.13	.09/.13
21	.08/.14	.08/.14	.08/.14	.08/.14	.07/.14	.05/.13	.03/.13	.00/.5	.03/.13	.05/.13	.07/.14	.08/.14
5	7	.21/.7	.21/.7	.22/.7	.22/.7	.14/.6	.01/.5	.14/.6	.17/.7	.16/.8	.14/.9	.13/.10
9	.23/.8	.23/.8	.23/.8	.21/.7	.21/.7	.18/.6	.01/.5	.11/.6	.15/.8	.15/.9	.15/.10	.15/.10
11	.20/.8	.20/.8	.19/.8	.19/.8	.18/.7	.14/.7	.08/.6	.01/.5	.09/.6	.12/.9	.14/.10	.15/.11
13	.17/.9	.17/.9	.17/.9	.16/.9	.15/.8	.11/.7	.07/.6	.01/.5	.07/.10	.10/.10	.12/.11	.13/.12
15	.15/.10	.14/.10	.14/.10	.14/.10	.12/.10	.10/.10	.08/.10	.04/.10	.05/.10	.08/.11	.10/.12	.11/.13
17	.12/.11	.12/.11	.11/.10	.11/.10	.10/.10	.08/.10	.00/.13	.04/.11	.07/.12	.08/.13	.10/.13	.10/.13
19	.11/.13	.10/.13	.10/.13	.10/.12	.08/.11	.06/.10	.04/.6	.00/.13	.04/.12	.06/.13	.08/.14	.09/.15
21	.09/.14	.09/.14	.08/.13	.08/.13	.05/.12	.03/.6	.00/.13	.03/.13	.05/.13	.06/.14	.07/.14	.08/.16
10	7	.21/.7	.21/.7	.22/.7	.22/.7	.14/.6	.01/.4	.14/.6	.15/.8	.14/.10	.12/.12	.11/.13
13	.24/.8	.24/.8	.24/.8	.21/.8	.19/.7	.15/.7	.09/.6	.01/.0	.09/.9	.13/.9	.14/.12	.13/.13
15	.19/.9	.19/.9	.19/.9	.17/.8	.15/.8	.12/.7	.07/.6	.01/.1	.07/.10	.11/.10	.12/.12	.13/.13
17	.13/.10	.13/.10	.12/.9	.12/.9	.10/.8	.08/.7	.04/.6	.01/.2	.05/.12	.08/.12	.11/.13	.12/.13
19	.11/.11	.11/.11	.10/.10	.10/.10	.09/.8	.07/.7	.04/.6	.00/.13	.04/.12	.07/.13	.09/.14	.09/.13
21	.10/.12	.09/.12	.09/.12	.09/.11	.07/.10	.06/.7	.03/.6	.00/.13	.03/.13	.05/.13	.07/.14	.07/.16
15	7	.19/.8	.20/.8	.20/.7	.21/.7	.20/.7	.15/.6	.02/.4	.13/.7	.14/.10	.12/.14	.11/.13
17	.25/.8	.25/.8	.25/.8	.24/.8	.22/.8	.19/.7	.12/.6	.02/.10	.11/.8	.13/.10	.12/.17	.12/.20
19	.23/.8	.23/.8	.23/.8	.21/.8	.19/.7	.15/.7	.09/.6	.01/.0	.08/.10	.11/.10	.11/.17	.12/.20
21	.20/.8	.19/.8	.18/.8	.18/.8	.16/.8	.12/.7	.07/.6	.01/.1	.07/.10	.09/.10	.10/.17	.11/.20
15	.17/.8	.16/.8	.16/.8	.15/.8	.13/.8	.10/.7	.06/.6	.01/.12	.06/.11	.08/.10	.09/.17	.10/.20
17	.14/.9	.14/.9	.14/.8	.13/.8	.11/.8	.08/.7	.04/.6	.01/.12	.06/.12	.06/.10	.07/.14	.09/.20
19	.12/.9	.12/.9	.11/.9	.11/.8	.09/.8	.07/.7	.04/.6	.01/.13	.04/.13	.05/.10	.06/.14	.08/.20
21	.10/.9	.10/.9	.09/.8	.09/.8	.06/.7	.03/.6	.01/.13	.03/.13	.05/.13	.06/.10	.06/.17	.07/.20
20	7	.17/.8	.18/.8	.19/.8	.20/.7	.16/.6	.03/.4	.13/.7	.14/.13	.11/.19	.10/.30	.09/**
9	.25/.8	.25/.8	.24/.8	.23/.8	.20/.7	.13/.6	.02/.4	.11/.8	.13/.13	.12/.19	.11/.23	.11/.30
11	.24/.8	.24/.8	.22/.8	.20/.8	.16/.7	.10/.6	.02/.10	.09/.10	.11/.13	.11/.19	.11/.26	.11/.27
13	.21/.8	.20/.8	.19/.8	.17/.7	.13/.7	.08/.6	.02/.11	.07/.11	.09/.13	.10/.19	.10/.23	.11/.27
15	.18/.8	.17/.8	.17/.8	.16/.8	.14/.8	.10/.7	.06/.6	.01/.12	.06/.12	.08/.13	.09/.19	.09/.26
17	.15/.8	.15/.8	.14/.8	.13/.8	.11/.8	.08/.7	.04/.6	.01/.13	.05/.13	.06/.13	.07/.19	.10/.27
19	.12/.8	.12/.8	.11/.8	.09/.8	.07/.7	.04/.6	.01/.13	.04/.13	.05/.13	.06/.19	.07/.23	.08/.27
21	.11/.8	.10/.8	.09/.8	.08/.8	.06/.7	.03/.6	.01/.13	.03/.13	.05/.13	.05/.19	.06/.23	.07/.27
25	7	.15/.8	.16/.8	.18/.8	.19/.8	.21/.7	.17/.6	.03/.4	.14/.9	.15/.17	.14/.35	.11/**
9	.25/.9	.25/.9	.25/.9	.24/.8	.21/.8	.14/.6	.02/.4	.11/.9	.13/.17	.14/.24	.13/**	.12/**
11	.25/.9	.25/.9	.25/.9	.24/.8	.21/.8	.11/.6	.02/.10	.09/.9	.11/.17	.12/.24	.12/.30	.12/.37
13	.22/.9	.21/.9	.20/.8	.18/.8	.14/.7	.08/.6	.02/.11	.07/.9	.09/.17	.10/.24	.11/.30	.12/.33
15	.18/.9	.18/.9	.18/.9	.17/.8	.15/.8	.11/.7	.07/.6	.01/.12	.06/.9	.07/.17	.10/.30	.10/.33
17	.15/.9	.15/.9	.15/.9	.14/.8	.12/.8	.09/.7	.05/.6	.01/.13	.05/.9	.06/.17	.08/.14	.09/.33
19	.13/.9	.13/.9	.13/.9	.12/.8	.10/.8	.08/.7	.04/.6	.01/.13	.04/.9	.05/.17	.07/.30	.08/.33
21	.11/.9	.11/.9	.10/.8	.10/.8	.09/.8	.06/.7	.03/.6	.03/.13	.05/.13	.05/.17	.06/.30	.07/.33

RMS PITCH VEL IN DPS/ENCOUNTERED MODAL PERIOD,  $T_m$ , IN SECONDS  
 LONGCRESTED  
 Q.E.

V	T <sub>0</sub>	0	15	30	45	60	75	90	105	120	135	150	165	180
0	7	.16/ 7	.16/ 7	.18/ 6	.21/ 6	.22/ 6	.16/ 5	.03/ 5	.17/ 5	.21/ 6	.19/ 6	.16/ 7	.15/ 7	.15/ 7
1	9	.16/ 7	.16/ 7	.17/ 6	.17/ 6	.12/ 6	.13/ 6	.09/ 5	.02/ 5	.16/ 6	.16/ 6	.16/ 7	.15/ 7	.15/ 7
11	13	.13/ 8	.13/ 7	.14/ 7	.14/ 7	.12/ 6	.12/ 6	.09/ 5	.09/ 5	.12/ 6	.13/ 7	.13/ 8	.13/ 8	.13/ 8
13	11	.11/ 8	.11/ 8	.11/ 7	.11/ 7	.10/ 6	.06/ 6	.01/ 5	.07/ 5	.09/ 6	.10/ 7	.10/ 8	.10/ 8	.10/ 8
15	09	.09/ 8	.09/ 8	.08/ 7	.08/ 7	.08/ 6	.04/ 6	.01/ 5	.05/ 5	.04/ 5	.06/ 6	.08/ 7	.08/ 9	.08/ 9
17	07	.07/ 9	.07/ 9	.07/ 7	.07/ 7	.06/ 6	.04/ 6	.01/ 4	.01/ 4	.04/ 5	.06/ 6	.07/ 8	.07/ 9	.07/ 9
19	06	.06/ 9	.06/ 8	.06/ 8	.06/ 7	.05/ 6	.03/ 6	.01/ 5	.03/ 5	.03/ 5	.05/ 6	.06/ 7	.06/ 9	.06/ 9
21	05	.05/ 9	.05/ 8	.05/ 7	.05/ 7	.04/ 6	.03/ 6	.00/ 5	.03/ 5	.03/ 5	.04/ 6	.04/ 8	.05/ 9	.05/ 10
8	7	.23/ 7	.23/ 7	.24/ 7	.25/ 6	.24/ 6	.16/ 6	.02/ 4	.16/ 5	.16/ 5	.12/ 8	.10/ 8	.09/ 9	.09/ 9
9	9	.23/ 7	.23/ 7	.23/ 7	.22/ 7	.21/ 7	.19/ 6	.12/ 6	.01/ 4	.11/ 5	.13/ 7	.11/ 8	.10/ 10	.10/ 10
11	19	.19/ 7	.19/ 7	.18/ 7	.18/ 7	.17/ 7	.15/ 6	.09/ 6	.01/ 4	.08/ 6	.10/ 7	.09/ 9	.09/ 10	.09/ 10
13	15	.15/ 7	.15/ 7	.15/ 7	.15/ 7	.14/ 7	.13/ 7	.11/ 6	.07/ 6	.01/ 4	.06/ 6	.07/ 9	.07/ 11	.07/ 11
15	12	.12/ 8	.12/ 7	.12/ 7	.11/ 7	.11/ 7	.09/ 6	.05/ 6	.01/ 4	.05/ 6	.06/ 6	.06/ 10	.06/ 11	.06/ 11
17	10	.10/ 8	.10/ 7	.09/ 7	.09/ 7	.07/ 7	.07/ 6	.04/ 6	.00/ 4	.04/ 6	.05/ 6	.05/ 10	.05/ 11	.05/ 12
19	08	.08/ 8	.08/ 8	.07/ 7	.07/ 7	.06/ 7	.06/ 6	.03/ 6	.00/ 4	.03/ 6	.04/ 6	.04/ 10	.04/ 12	.04/ 12
21	07	.07/ 8	.07/ 8	.06/ 7	.06/ 7	.05/ 6	.03/ 6	.00/ 4	.03/ 6	.03/ 6	.03/ 10	.04/ 11	.04/ 12	.04/ 12
10	7	.26/ 7	.26/ 7	.27/ 7	.27/ 7	.25/ 6	.17/ 6	.02/ 4	.15/ 6	.15/ 6	.10/ 8	.08/ 10	.06/ 12	.05/ 13
11	9	.28/ 7	.27/ 7	.27/ 7	.25/ 7	.21/ 6	.13/ 6	.01/ 4	.10/ 6	.09/ 6	.08/ 8	.08/ 10	.06/ 13	.06/ 13
13	19	.19/ 8	.19/ 8	.18/ 8	.18/ 8	.16/ 7	.16/ 7	.10/ 6	.01/ 4	.08/ 6	.07/ 9	.07/ 11	.06/ 13	.06/ 13
15	15	.15/ 8	.15/ 8	.14/ 7	.14/ 7	.12/ 7	.12/ 7	.07/ 6	.01/ 4	.06/ 6	.06/ 9	.06/ 11	.05/ 13	.05/ 13
17	12	.12/ 8	.12/ 8	.11/ 7	.11/ 7	.10/ 7	.08/ 7	.04/ 6	.00/ 0	.04/ 6	.05/ 10	.05/ 11	.04/ 13	.04/ 13
19	10	.10/ 8	.10/ 8	.09/ 7	.09/ 7	.08/ 7	.06/ 7	.04/ 6	.00/ 1	.03/ 6	.03/ 10	.03/ 12	.03/ 13	.03/ 13
21	08	.08/ 8	.08/ 8	.08/ 7	.08/ 7	.07/ 7	.05/ 7	.03/ 6	.00/ 1	.02/ 6	.03/ 10	.03/ 12	.03/ 13	.03/ 13
15	7	.26/ 8	.26/ 8	.27/ 7	.28/ 7	.26/ 7	.19/ 6	.02/ 4	.12/ 6	.09/ 10	.05/ 14	.03/ 17	.03/ 20	.03/ 20
9	30	.30/ 8	.29/ 8	.29/ 7	.27/ 7	.23/ 7	.14/ 6	.02/ 4	.09/ 7	.07/ 10	.05/ 14	.04/ 17	.04/ 20	.03/ 20
11	27	.26/ 8	.26/ 8	.25/ 8	.22/ 8	.18/ 7	.11/ 7	.01/ 4	.07/ 7	.05/ 10	.05/ 14	.04/ 17	.04/ 20	.04/ 20
13	22	.21/ 8	.21/ 8	.20/ 8	.17/ 7	.14/ 7	.08/ 6	.01/ 4	.05/ 7	.05/ 10	.04/ 14	.04/ 17	.03/ 20	.03/ 20
15	18	.17/ 8	.17/ 8	.16/ 8	.14/ 7	.11/ 7	.06/ 6	.01/ 4	.04/ 7	.04/ 10	.03/ 14	.03/ 17	.03/ 20	.03/ 20
17	14	.14/ 8	.14/ 8	.13/ 8	.13/ 8	.11/ 7	.08/ 7	.05/ 6	.01/ 10	.03/ 7	.03/ 10	.03/ 14	.03/ 20	.03/ 20
19	12	.11/ 8	.11/ 8	.11/ 8	.09/ 7	.09/ 7	.04/ 6	.01/ 10	.03/ 7	.03/ 10	.02/ 14	.02/ 17	.02/ 20	.02/ 20
21	10	.10/ 8	.10/ 8	.09/ 8	.08/ 7	.06/ 7	.03/ 6	.00/ 11	.02/ 7	.02/ 10	.02/ 14	.02/ 17	.02/ 20	.02/ 20
20	7	.25/ 8	.25/ 8	.27/ 8	.28/ 7	.27/ 7	.21/ 6	.03/ 4	.10/ 7	.06/ 13	.03/ 19	.02/ 26	.02/ 35	.02/ 35
9	33	.32/ 8	.32/ 8	.30/ 7	.32/ 8	.25/ 7	.16/ 6	.02/ 4	.08/ 7	.06/ 13	.04/ 19	.03/ 23	.02/ 26	.02/ 29
11	30	.29/ 8	.29/ 8	.28/ 8	.25/ 8	.20/ 7	.12/ 6	.02/ 4	.06/ 7	.05/ 13	.03/ 19	.03/ 23	.02/ 26	.02/ 27
13	25	.24/ 8	.24/ 8	.22/ 8	.20/ 7	.15/ 7	.09/ 6	.01/ 4	.05/ 7	.04/ 13	.03/ 19	.03/ 23	.02/ 26	.02/ 27
15	20	.19/ 8	.19/ 8	.16/ 8	.16/ 8	.12/ 7	.07/ 6	.01/ 4	.04/ 7	.03/ 13	.03/ 19	.02/ 23	.02/ 26	.02/ 27
17	16	.16/ 8	.16/ 8	.15/ 8	.15/ 8	.12/ 8	.09/ 7	.05/ 6	.01/ 11	.03/ 7	.02/ 13	.02/ 19	.02/ 23	.02/ 27
19	13	.13/ 8	.13/ 8	.12/ 8	.12/ 8	.10/ 8	.08/ 7	.04/ 6	.01/ 11	.02/ 7	.02/ 13	.02/ 19	.02/ 23	.02/ 27
21	11	.11/ 8	.11/ 8	.10/ 8	.08/ 8	.08/ 8	.06/ 7	.04/ 6	.01/ 11	.02/ 7	.02/ 13	.02/ 19	.02/ 23	.01/ 27
25	7	.23/ 8	.24/ 8	.26/ 8	.28/ 8	.29/ 7	.23/ 6	.04/ 4	.09/ 9	.05/ 17	.02/ 30	.02/ 57	.02/ 6	.02/ 6
9	34	.35/ 8	.34/ 8	.34/ 8	.32/ 8	.28/ 8	.18/ 6	.03/ 4	.07/ 9	.04/ 17	.03/ 24	.02/ 45	.02/ 48	
11	33	.32/ 9	.31/ 9	.31/ 8	.27/ 8	.22/ 8	.14/ 6	.02/ 4	.05/ 9	.04/ 17	.03/ 24	.02/ 35	.02/ 37	
13	27	.27/ 9	.27/ 9	.25/ 8	.22/ 8	.17/ 7	.10/ 6	.02/ 4	.04/ 9	.03/ 17	.02/ 24	.02/ 33	.02/ 33	
15	22	.22/ 9	.22/ 9	.21/ 8	.21/ 8	.17/ 8	.13/ 7	.08/ 6	.01/ 4	.03/ 9	.03/ 17	.02/ 24	.02/ 30	
17	18	.18/ 9	.18/ 9	.17/ 8	.17/ 8	.14/ 7	.11/ 7	.06/ 6	.01/ 4	.03/ 9	.02/ 17	.02/ 24	.02/ 30	
19	15	.15/ 9	.15/ 9	.14/ 8	.14/ 8	.11/ 8	.09/ 7	.05/ 6	.01/ 4	.02/ 9	.02/ 17	.02/ 24	.01/ 33	
21	12	.12/ 9	.12/ 9	.11/ 8	.11/ 8	.11/ 8	.09/ 7	.04/ 6	.01/ 4	.02/ 9	.02/ 17	.01/ 33	.01/ 33	

ASR  
LONGCRESTED  
RMS PITCH ACC IN DS2/ENCOUNTERED MODAL PERIOD, T' IN SECONDS

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										DE
		15	30	45	60	75	90	105	120	135	150	
0	7	.15/ 6	.17/ 6	.21/ 6	.25/ 5	.19/ 5	.04/ 5	.21/ 5	.23/ 5	.19/ 6	.16/ 6	.14/ 7
9		.13/ 7	.14/ 7	.15/ 7	.17/ 6	.18/ 5	.13/ 5	.03/ 5	.15/ 5	.17/ 5	.15/ 6	.14/ 7
11		.11/ 7	.11/ 7	.12/ 7	.13/ 6	.13/ 6	.09/ 5	.02/ 5	.10/ 5	.12/ 6	.12/ 6	.13/ 7
13		.08/ 7	.09/ 7	.09/ 7	.10/ 6	.10/ 6	.07/ 5	.01/ 5	.08/ 5	.09/ 6	.09/ 6	.10/ 7
15		.07/ 7	.07/ 7	.07/ 7	.07/ 6	.08/ 6	.05/ 5	.01/ 5	.06/ 5	.07/ 6	.07/ 6	.08/ 7
17		.05/ 7	.05/ 7	.06/ 7	.06/ 6	.06/ 6	.04/ 5	.01/ 5	.04/ 5	.06/ 6	.05/ 6	.06/ 8
19		.04/ 7	.04/ 7	.05/ 7	.05/ 6	.05/ 6	.03/ 5	.01/ 5	.04/ 5	.04/ 6	.04/ 6	.05/ 8
21		.04/ 7	.04/ 7	.04/ 7	.04/ 6	.04/ 6	.03/ 5	.01/ 5	.03/ 5	.04/ 6	.04/ 6	.04/ 8
<b>8</b>	<b>7</b>	<b>.28/ 7</b>	<b>.27/ 7</b>	<b>.24/ 7</b>	<b>.25/ 7</b>	<b>.24/ 6</b>	<b>.30/ 6</b>	<b>.29/ 6</b>	<b>.20/ 5</b>	<b>.03/ 4</b>	<b>.19/ 5</b>	<b>.15/ 6</b>
11		.19/ 7	.19/ 7	.19/ 7	.19/ 7	.18/ 6	.18/ 6	.16/ 6	.10/ 6	.01/ 4	.09/ 5	.11/ 6
13		.15/ 7	.15/ 7	.15/ 7	.15/ 7	.14/ 6	.14/ 6	.12/ 6	.09/ 6	.01/ 4	.07/ 5	.08/ 6
15		.12/ 7	.12/ 7	.12/ 7	.12/ 7	.11/ 6	.11/ 6	.09/ 6	.06/ 6	.01/ 4	.05/ 5	.06/ 7
17		.09/ 7	.09/ 7	.09/ 7	.09/ 7	.09/ 6	.09/ 6	.07/ 6	.05/ 6	.01/ 4	.04/ 5	.05/ 8
19		.08/ 7	.08/ 7	.08/ 7	.08/ 7	.07/ 6	.07/ 6	.06/ 6	.04/ 6	.01/ 4	.03/ 5	.03/ 10
21		.06/ 7	.06/ 7	.06/ 7	.06/ 7	.06/ 6	.06/ 6	.05/ 6	.04/ 6	.01/ 4	.03/ 5	.02/ 10
10	7	.33/ 7	.33/ 7	.34/ 7	.34/ 7	.32/ 6	.32/ 6	.22/ 6	.02/ 4	.16/ 5	.69/ 6	.05/ 10
11	9	.33/ 7	.33/ 7	.32/ 7	.32/ 7	.30/ 7	.25/ 6	.16/ 6	.02/ 4	.11/ 6	.07/ 6	.05/ 10
13		.27/ 7	.26/ 7	.25/ 7	.25/ 7	.20/ 7	.18/ 7	.14/ 6	.09/ 6	.01/ 4	.08/ 6	.04/ 10
15		.16/ 7	.16/ 7	.16/ 7	.16/ 7	.15/ 7	.14/ 7	.11/ 6	.06/ 6	.01/ 4	.06/ 6	.03/ 10
17		.13/ 7	.13/ 7	.13/ 7	.13/ 7	.12/ 7	.11/ 7	.09/ 6	.05/ 6	.00/ 4	.03/ 6	.02/ 10
19		.11/ 7	.10/ 7	.10/ 7	.10/ 7	.09/ 7	.07/ 7	.07/ 6	.04/ 6	.00/ 4	.03/ 6	.02/ 12
21		.09/ 7	.09/ 7	.08/ 7	.08/ 7	.07/ 7	.06/ 6	.03/ 6	.00/ 4	.02/ 6	.02/ 6	.01/ 13
<b>15</b>	<b>7</b>	<b>.36/ 8</b>	<b>.36/ 7</b>	<b>.37/ 7</b>	<b>.38/ 7</b>	<b>.35/ 7</b>	<b>.38/ 7</b>	<b>.29/ 7</b>	<b>.18/ 6</b>	<b>.03/ 4</b>	<b>.12/ 6</b>	<b>.05/ 10</b>
11		.33/ 8	.33/ 8	.32/ 8	.31/ 8	.28/ 7	.28/ 7	.22/ 7	.13/ 6	.02/ 4	.08/ 6	.04/ 10
13		.26/ 8	.26/ 8	.26/ 8	.24/ 7	.24/ 7	.21/ 7	.17/ 7	.10/ 6	.01/ 4	.06/ 6	.03/ 10
15		.21/ 8	.20/ 8	.19/ 7	.19/ 7	.16/ 7	.13/ 7	.10/ 7	.07/ 6	.01/ 4	.03/ 6	.02/ 10
17		.17/ 8	.16/ 8	.15/ 7	.13/ 7	.13/ 7	.10/ 7	.06/ 6	.01/ 4	.03/ 6	.02/ 10	.01/ 20
19		.13/ 8	.13/ 8	.12/ 7	.11/ 7	.11/ 7	.08/ 7	.05/ 6	.01/ 4	.02/ 6	.01/ 10	.01/ 17
21		.11/ 8	.11/ 8	.10/ 7	.09/ 7	.09/ 7	.07/ 7	.04/ 6	.00/ 4	.02/ 6	.01/ 10	.01/ 17
20	7	.36/ 8	.37/ 8	.38/ 8	.40/ 7	.38/ 7	.28/ 7	.05/ 4	.08/ 7	.03/ 13	.01/ 19	.01/ 20
9		.45/ 8	.44/ 8	.43/ 8	.43/ 8	.36/ 8	.32/ 7	.33/ 7	.21/ 6	.03/ 4	.04/ 7	.01/ 27
11		.39/ 8	.38/ 8	.38/ 8	.38/ 8	.31/ 8	.25/ 7	.26/ 7	.16/ 6	.02/ 4	.04/ 7	.01/ 26
13		.31/ 8	.31/ 8	.31/ 8	.29/ 8	.29/ 8	.19/ 7	.12/ 6	.02/ 4	.03/ 7	.02/ 13	.01/ 27
15		.25/ 8	.24/ 8	.23/ 8	.23/ 8	.20/ 7	.16/ 7	.15/ 7	.09/ 6	.01/ 4	.03/ 7	.01/ 26
17		.20/ 8	.20/ 8	.18/ 8	.18/ 8	.16/ 7	.12/ 7	.07/ 6	.01/ 4	.02/ 7	.01/ 13	.01/ 27
19		.16/ 8	.16/ 8	.15/ 8	.15/ 8	.13/ 7	.10/ 7	.06/ 6	.01/ 4	.02/ 7	.01/ 13	.01/ 26
21		.14/ 8	.13/ 8	.12/ 8	.12/ 8	.10/ 7	.08/ 7	.05/ 6	.01/ 4	.01/ 7	.01/ 13	.00/ 27
<b>25</b>	<b>7</b>	<b>.36/ 8</b>	<b>.37/ 8</b>	<b>.39/ 8</b>	<b>.42/ 8</b>	<b>.42/ 8</b>	<b>.38/ 7</b>	<b>.32/ 6</b>	<b>.06/ 4</b>	<b>.07/ 9</b>	<b>.02/ 17</b>	<b>.01/ 3</b>
9		.49/ 8	.49/ 8	.49/ 8	.45/ 8	.45/ 8	.37/ 8	.30/ 7	.18/ 6	.03/ 4	.04/ 9	.02/ 4
11		.45/ 9	.45/ 9	.45/ 8	.42/ 8	.42/ 8	.34/ 8	.29/ 8	.23/ 7	.13/ 6	.02/ 4	.01/ 4
13		.37/ 9	.36/ 8	.36/ 8	.36/ 8	.32/ 8	.27/ 8	.23/ 8	.18/ 7	.08/ 6	.03/ 9	.01/ 33
15		.29/ 9	.29/ 9	.29/ 9	.29/ 8	.27/ 8	.23/ 8	.23/ 8	.19/ 7	.02/ 9	.01/ 17	.01/ 33
17		.24/ 9	.23/ 8	.22/ 8	.22/ 8	.18/ 8	.18/ 8	.14/ 7	.08/ 6	.01/ 4	.02/ 9	.00/ 24
19		.19/ 9	.19/ 8	.18/ 8	.18/ 8	.15/ 8	.11/ 7	.07/ 6	.01/ 4	.01/ 9	.01/ 17	.00/ 33
21		.16/ 9	.16/ 8	.15/ 8	.15/ 8	.12/ 8	.09/ 7	.05/ 6	.01/ 4	.01/ 9	.01/ 17	.00/ 33

## ASR

 RMS YAW IN DEGREES/ENCOUNTERED MODAL PERIOD, T' IN SECONDS  
 LONGRESTED

V	T <sub>0</sub>	0	SHIP HEADING ANGLE IN DEGREES										DE		
			15	30	45	60	75	90	105	120	135	150	165		
0	7	0.00/**	.02/ 8	.04/ 7	.06/ 7	.07/ 7	.06/ 6	.01/ 6	.06/ 6	.07/ 7	.06/ 7	.04/ 7	.02/ 8	.00/ 8	
0	9	0.00/**	.03/10	.05/10	.07/ 8	.07/ 8	.05/10	.01/10	.05/ 7	.07/ 8	.06/ 8	.05/ 9	.02/ 9	.00/ 9	
11	0.00/**	.03/10	.05/10	.07/ 8	.07/ 8	.05/10	.01/10	.04/ 9	.06/ 9	.06/ 9	.05/10	.03/10	.00/10	.00/10	
13	0.00/**	.03/10	.05/10	.07/ 8	.07/ 8	.05/10	.01/10	.04/ 9	.06/ 9	.06/ 9	.05/10	.02/12	.00/12	.00/12	
15	0.00/**	.02/10	.04/10	.05/10	.06/10	.06/10	.03/10	.01/10	.03/13	.05/13	.05/13	.04/13	.02/13	.00/12	.00/12
17	0.00/**	.02/10	.04/10	.05/10	.05/10	.05/10	.03/10	.01/10	.03/13	.04/13	.04/13	.04/13	.02/13	.00/13	.00/13
19	0.00/**	.02/10	.04/10	.05/10	.04/10	.04/10	.02/10	.01/10	.02/14	.03/14	.04/14	.04/14	.02/14	.00/14	.00/14
21	0.00/**	.02/10	.03/10	.04/10	.04/10	.03/10	.02/10	.00/10	.02/14	.03/14	.03/14	.03/14	.02/14	.00/14	.00/14
5	7	0.00/**	.02/ 8	.03/ 7	.05/ 7	.05/ 7	.06/ 7	.05/ 6	.01/ 6	.06/ 6	.08/ 7	.07/ 8	.05/ 9	.03/ 9	.00/10
9	0.00/**	.02/ 9	.04/ 9	.06/ 8	.06/ 8	.06/ 8	.05/ 8	.01/10	.05/ 8	.08/ 9	.08/ 9	.06/10	.03/11	.00/11	.00/11
11	0.00/**	.02/11	.04/11	.06/11	.06/11	.06/11	.04/10	.01/10	.05/ 9	.07/ 9	.08/12	.06/12	.03/12	.00/12	.00/12
13	0.00/**	.02/13	.04/12	.05/12	.05/12	.05/12	.04/11	.01/10	.04/12	.06/12	.07/12	.06/12	.03/12	.00/12	.00/12
15	0.00/**	.02/13	.04/12	.05/12	.05/12	.05/12	.03/11	.01/10	.03/13	.05/13	.06/13	.05/13	.02/13	.00/13	.00/13
17	0.00/**	.02/13	.04/12	.05/12	.04/12	.04/12	.03/12	.01/10	.03/13	.05/13	.06/13	.05/13	.02/13	.00/13	.00/13
19	0.00/**	.01/13	.03/13	.03/13	.03/13	.03/13	.03/12	.02/11	.00/10	.02/13	.04/13	.04/14	.02/13	.00/13	.00/13
21	0.00/**	.01/13	.02/13	.03/12	.03/12	.03/12	.02/11	.00/10	.02/14	.03/13	.04/14	.03/14	.02/14	.00/14	.00/14
10	7	0.00/**	.01/ 8	.03/ 7	.04/ 7	.05/ 7	.05/ 6	.05/ 6	.01/ 6	.07/ 7	.10/ 8	.09/10	.08/12	.04/13	.00/13
9	0.00/**	.02/ 9	.03/ 9	.05/ 8	.05/ 8	.05/ 8	.04/ 8	.01/10	.05/ 8	.09/ 9	.10/11	.09/12	.05/13	.00/13	.00/13
11	0.00/**	.02/10	.04/10	.05/10	.05/10	.05/10	.04/10	.01/10	.05/ 9	.08/12	.09/12	.08/12	.04/13	.00/13	.00/13
13	0.00/**	.02/13	.03/13	.04/13	.04/13	.04/13	.04/12	.03/11	.01/10	.04/12	.07/12	.07/12	.04/13	.00/13	.00/13
15	0.00/**	.02/13	.03/13	.04/13	.04/13	.04/13	.04/13	.03/11	.01/10	.03/13	.06/13	.06/13	.03/13	.00/13	.00/13
17	0.00/**	.02/13	.03/13	.03/13	.03/13	.03/13	.03/13	.02/11	.01/10	.03/13	.05/13	.05/13	.03/13	.00/13	.00/13
19	0.00/**	.01/14	.03/13	.03/13	.03/13	.03/13	.03/13	.02/11	.00/10	.02/13	.04/13	.05/13	.04/13	.02/13	.00/13
21	0.00/**	.01/14	.02/13	.02/13	.02/13	.02/13	.02/13	.00/10	.02/14	.03/13	.04/13	.04/13	.02/13	.00/13	.00/13
15	7	0.00/**	.01/ 8	.02/ 8	.04/ 7	.05/ 7	.05/ 6	.05/ 6	.01/ 6	.07/ 7	.10/ 8	.09/10	.08/12	.04/13	.00/13
9	0.00/**	.01/ 9	.03/ 9	.04/ 8	.05/ 8	.05/ 8	.04/ 8	.01/ 9	.06/ 8	.09/ 9	.10/11	.09/12	.05/13	.00/13	.00/13
11	0.00/**	.01/10	.03/10	.04/10	.04/10	.04/10	.03/10	.01/10	.05/ 9	.09/10	.10/11	.09/12	.05/20	.00/20	.00/20
13	0.00/**	.01/14	.03/12	.03/12	.03/12	.03/12	.03/12	.03/11	.01/14	.04/12	.07/10	.08/14	.04/20	.00/20	.00/20
15	0.00/**	.01/14	.02/14	.02/14	.02/14	.02/14	.02/14	.03/13	.02/11	.01/14	.03/13	.06/10	.07/14	.03/20	.00/20
17	0.00/**	.01/14	.02/14	.02/14	.02/14	.02/14	.02/14	.02/14	.01/14	.03/13	.05/12	.05/14	.04/17	.02/20	.00/20
19	0.00/**	.01/14	.02/14	.02/14	.02/14	.02/14	.02/14	.02/14	.00/14	.02/14	.04/14	.04/14	.02/20	.00/20	.00/20
21	0.00/**	.01/14	.02/14	.02/14	.02/14	.02/14	.02/14	.01/11	.00/14	.02/14	.03/12	.04/14	.03/17	.02/20	.00/20
20	7	0.00/**	.01/ 8	.02/ 8	.03/ 7	.04/ 7	.04/ 6	.04/ 6	.01/ 8	.06/ 8	.14/13	.11/14	.12/17	.07/20	.00/**
9	0.00/**	.01/ 9	.02/ 9	.03/ 8	.04/ 8	.04/ 8	.04/ 7	.01/ 8	.05/ 8	.11/13	.10/19	.10/17	.06/20	.00/**	.00/**
11	0.00/**	.01/10	.02/10	.03/10	.04/10	.04/10	.03/ 9	.01/ 9	.04/ 9	.09/13	.09/19	.08/17	.05/20	.00/20	.00/20
13	0.00/**	.01/11	.02/11	.03/11	.03/11	.03/11	.03/10	.02/10	.01/14	.03/13	.07/13	.05/19	.04/20	.00/20	.00/20
15	0.00/**	.01/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/12	.01/14	.03/13	.05/13	.04/19	.03/19	.00/20	.00/20
17	0.00/**	.01/14	.02/14	.02/14	.02/14	.02/14	.02/14	.02/13	.01/14	.02/13	.04/13	.03/19	.03/19	.00/20	.00/20
19	0.00/**	.01/16	.02/16	.02/16	.02/16	.02/16	.02/16	.01/14	.01/14	.02/13	.03/13	.02/19	.02/19	.00/20	.00/20
21	0.00/**	.01/16	.02/16	.02/16	.02/16	.02/16	.02/16	.01/13	.01/14	.02/13	.03/13	.02/19	.02/19	.00/20	.00/20
25	7	0.00/**	.01/ 8	.02/ 7	.03/ 7	.04/ 7	.04/ 6	.04/ 7	.01/ 8	.06/ 9	.14/13	.13/14	.14/17	.07/20	.00/**
9	0.00/**	.01/ 9	.02/ 9	.03/ 8	.04/ 8	.04/ 8	.04/ 7	.01/ 8	.05/ 8	.11/13	.10/19	.10/17	.08/63	.00/**	.00/**
11	0.00/**	.01/10	.02/10	.03/10	.04/10	.04/10	.03/ 9	.01/ 9	.04/ 9	.09/13	.09/19	.08/17	.08/63	.00/**	.00/**
13	0.00/**	.01/12	.02/12	.03/12	.04/12	.04/12	.03/12	.02/12	.01/14	.03/14	.07/13	.05/19	.04/63	.00/**	.00/**
15	0.00/**	.01/13	.02/13	.03/13	.04/13	.04/13	.03/13	.02/13	.01/14	.03/14	.05/13	.04/19	.03/19	.00/20	.00/20
17	0.00/**	.01/14	.02/14	.03/14	.04/14	.04/14	.03/14	.02/13	.01/14	.03/14	.04/13	.03/19	.03/19	.00/20	.00/20
19	0.00/**	.01/16	.02/16	.03/16	.04/16	.04/16	.03/16	.02/16	.01/14	.03/16	.04/16	.03/19	.03/19	.00/20	.00/20
21	0.00/**	.01/16	.02/16	.03/16	.04/16	.04/16	.03/16	.02/16	.01/14	.03/16	.04/16	.03/19	.03/19	.00/20	.00/20

V	T <sub>0</sub>	0	15	30	45	60	75	90	105	120	135	150	165	180	LONGCRESTED RMS YAW VEL IN DPPS/ENCOUNTERED MODAL PERIOD, T <sub>0</sub> , IN SECONDS	
															QE	ASR
6	7	0.00/++	.02/ 7	.04/ 7	.06/ 7	.07/ 6	.07/ 5	.01/ 5	.07/ 6	.07/ 6	.05/ 7	.03/ 7	.02/ 7	.06/ 7	.02/ 7	.06/ 7
9	9	0.00/++	.02/ 8	.04/ 8	.06/ 8	.06/ 7	.05/ 6	.01/ 10	.05/ 6	.06/ 7	.05/ 8	.04/ 8	.04/ 8	.02/ 8	.04/ 8	.02/ 8
11	0.00/++	.02/ 10	.04/ 10	.05/ 10	.05/ 10	.04/ 10	.04/ 10	.01/ 10	.04/ 7	.05/ 8	.05/ 8	.03/ 9	.03/ 9	.02/ 9	.03/ 9	.02/ 9
13	0.00/++	.02/ 10	.03/ 10	.04/ 10	.04/ 10	.03/ 10	.03/ 10	.01/ 10	.03/ 7	.04/ 8	.04/ 8	.03/ 9	.03/ 9	.02/ 9	.03/ 9	.02/ 9
15	0.00/++	.01/ 10	.03/ 10	.03/ 10	.04/ 10	.03/ 10	.04/ 10	.01/ 10	.02/ 8	.03/ 9	.03/ 9	.02/ 12	.02/ 12	.01/ 12	.01/ 12	.00/ 12
17	0.00/++	.01/ 10	.02/ 10	.03/ 10	.03/ 10	.03/ 10	.03/ 10	.02/ 10	.02/ 7	.03/ 9	.03/ 12	.02/ 12	.02/ 12	.01/ 12	.01/ 12	.00/ 12
19	0.00/++	.01/ 10	.02/ 10	.02/ 10	.02/ 10	.02/ 10	.02/ 10	.02/ 10	.02/ 9	.02/ 9	.02/ 9	.02/ 12	.02/ 12	.01/ 12	.01/ 12	.00/ 12
21	0.00/++	.01/ 10	.02/ 10	.02/ 10	.02/ 10	.02/ 10	.02/ 10	.01/ 10	.00/ 10	.01/ 9	.02/ 9	.02/ 13	.02/ 13	.01/ 12	.01/ 12	.00/ 12
8	7	0.00/++	.02/ 7	.03/ 7	.05/ 7	.05/ 7	.07/ 6	.07/ 6	.01/ 5	.07/ 6	.07/ 7	.06/ 8	.04/ 9	.02/ 9	.02/ 9	.00/ 10
9	9	0.00/++	.02/ 8	.04/ 8	.05/ 8	.05/ 8	.06/ 7	.06/ 7	.01/ 6	.05/ 6	.05/ 6	.06/ 9	.04/ 9	.02/ 10	.02/ 10	.00/ 11
11	0.00/++	.02/ 10	.03/ 11	.03/ 11	.04/ 11	.04/ 11	.04/ 11	.03/ 11	.04/ 10	.04/ 10	.04/ 7	.05/ 8	.04/ 11	.02/ 11	.02/ 11	.00/ 11
13	0.00/++	.01/ 10	.03/ 10	.03/ 10	.04/ 10	.04/ 10	.04/ 10	.03/ 11	.04/ 9	.04/ 9	.03/ 8	.04/ 9	.04/ 12	.03/ 12	.03/ 12	.00/ 12
15	0.00/++	.01/ 13	.02/ 12	.02/ 12	.03/ 11	.03/ 11	.03/ 11	.02/ 10	.02/ 10	.02/ 9	.03/ 9	.03/ 12	.03/ 12	.01/ 12	.01/ 12	.00/ 11
17	0.00/++	.01/ 13	.02/ 12	.02/ 12	.03/ 12	.03/ 12	.03/ 12	.02/ 11	.02/ 11	.02/ 10	.02/ 9	.02/ 12	.02/ 12	.01/ 12	.01/ 12	.00/ 12
19	0.00/++	.01/ 13	.02/ 12	.02/ 12	.03/ 12	.03/ 12	.03/ 12	.02/ 11	.02/ 11	.02/ 10	.02/ 9	.02/ 12	.02/ 12	.01/ 12	.01/ 12	.00/ 12
21	0.00/++	.01/ 13	.02/ 12	.02/ 12	.03/ 12	.03/ 12	.03/ 12	.02/ 11	.02/ 11	.02/ 10	.01/ 12	.02/ 12	.02/ 12	.01/ 12	.00/ 12	.00/ 12
10	7	0.00/++	.02/ 7	.03/ 7	.05/ 7	.05/ 7	.07/ 6	.07/ 6	.01/ 5	.07/ 6	.07/ 7	.06/ 8	.04/ 9	.02/ 9	.02/ 9	.00/ 10
9	9	0.00/++	.02/ 8	.03/ 8	.05/ 8	.05/ 8	.06/ 7	.06/ 7	.01/ 6	.05/ 6	.05/ 7	.06/ 9	.04/ 9	.02/ 10	.02/ 10	.00/ 11
11	0.00/++	.02/ 9	.03/ 9	.05/ 9	.05/ 9	.06/ 8	.06/ 8	.01/ 7	.05/ 7	.05/ 7	.05/ 9	.04/ 9	.02/ 11	.02/ 11	.00/ 11	.00/ 11
13	0.00/++	.01/ 10	.03/ 10	.03/ 10	.04/ 10	.04/ 10	.04/ 10	.03/ 11	.04/ 9	.04/ 9	.03/ 8	.04/ 9	.04/ 12	.03/ 12	.03/ 12	.00/ 12
15	0.00/++	.01/ 13	.02/ 13	.02/ 13	.03/ 13	.03/ 13	.03/ 13	.02/ 13	.03/ 12	.03/ 12	.02/ 11	.03/ 12	.03/ 12	.02/ 12	.02/ 12	.00/ 13
17	0.00/++	.01/ 13	.02/ 13	.02/ 13	.03/ 13	.03/ 13	.03/ 13	.02/ 13	.02/ 12	.02/ 11	.02/ 11	.02/ 13	.02/ 12	.02/ 12	.00/ 13	.00/ 13
19	0.00/++	.01/ 13	.02/ 13	.02/ 13	.03/ 13	.03/ 13	.03/ 13	.02/ 13	.02/ 12	.02/ 11	.02/ 11	.02/ 13	.02/ 12	.02/ 12	.00/ 13	.00/ 13
21	0.00/++	.01/ 13	.02/ 13	.02/ 13	.03/ 13	.03/ 13	.03/ 13	.02/ 13	.02/ 12	.02/ 11	.02/ 11	.02/ 13	.02/ 12	.02/ 12	.00/ 13	.00/ 13
15	7	0.00/++	.01/ 7	.03/ 7	.05/ 7	.05/ 7	.07/ 7	.07/ 7	.01/ 6	.06/ 6	.06/ 7	.06/ 7	.06/ 10	.03/ 17	.01/ 20	.00/ 22
9	9	0.00/++	.02/ 8	.03/ 8	.05/ 8	.05/ 8	.06/ 7	.06/ 7	.01/ 6	.05/ 6	.05/ 7	.06/ 9	.04/ 9	.02/ 13	.02/ 13	.00/ 13
11	0.00/++	.02/ 9	.03/ 9	.05/ 9	.05/ 9	.06/ 8	.06/ 8	.01/ 7	.05/ 7	.05/ 7	.05/ 9	.04/ 9	.02/ 13	.02/ 13	.00/ 13	.00/ 13
13	0.00/++	.01/ 10	.02/ 10	.03/ 10	.04/ 10	.04/ 10	.04/ 10	.03/ 11	.04/ 9	.04/ 9	.03/ 8	.04/ 9	.04/ 12	.03/ 12	.03/ 12	.00/ 13
15	0.00/++	.01/ 13	.02/ 13	.02/ 13	.03/ 13	.03/ 13	.03/ 13	.02/ 13	.03/ 12	.03/ 12	.02/ 11	.03/ 12	.03/ 12	.02/ 12	.02/ 12	.00/ 13
17	0.00/++	.01/ 13	.02/ 13	.02/ 13	.03/ 13	.03/ 13	.03/ 13	.02/ 13	.02/ 12	.02/ 11	.02/ 11	.02/ 13	.02/ 12	.02/ 12	.00/ 13	.00/ 13
19	0.00/++	.01/ 14	.02/ 14	.02/ 14	.03/ 14	.03/ 14	.03/ 14	.02/ 14	.02/ 13	.02/ 11	.02/ 11	.02/ 13	.02/ 12	.02/ 12	.00/ 13	.00/ 13
21	0.00/++	.01/ 14	.02/ 14	.02/ 14	.03/ 14	.03/ 14	.03/ 14	.02/ 14	.02/ 13	.02/ 11	.02/ 11	.02/ 13	.02/ 12	.02/ 12	.00/ 13	.00/ 13
20	7	0.00/++	.01/ 7	.03/ 7	.05/ 7	.05/ 7	.06/ 6	.06/ 6	.01/ 5	.05/ 5	.05/ 7	.06/ 13	.02/ 19	.01/ 57	.00/ **	.00/ **
9	9	0.00/++	.02/ 8	.03/ 8	.05/ 8	.05/ 8	.06/ 7	.06/ 7	.01/ 6	.05/ 6	.05/ 7	.06/ 13	.02/ 19	.01/ 48	.01/ 57	.00/ **
11	0.00/++	.02/ 9	.03/ 9	.05/ 9	.05/ 9	.06/ 8	.06/ 8	.01/ 7	.05/ 7	.05/ 7	.06/ 13	.02/ 19	.01/ 48	.01/ 52	.00/ **	.00/ **
13	0.00/++	.01/ 9	.02/ 9	.03/ 9	.04/ 9	.04/ 9	.04/ 9	.03/ 8	.03/ 7	.03/ 7	.03/ 8	.04/ 13	.01/ 19	.01/ 48	.01/ 52	.00/ **
15	0.00/++	.01/ 10	.02/ 10	.03/ 10	.04/ 10	.04/ 10	.04/ 10	.03/ 9	.03/ 8	.03/ 8	.02/ 8	.02/ 13	.01/ 19	.01/ 48	.01/ 52	.00/ **
17	0.00/++	.01/ 10	.02/ 10	.03/ 10	.04/ 10	.04/ 10	.04/ 10	.03/ 9	.03/ 8	.03/ 8	.02/ 8	.02/ 13	.01/ 19	.01/ 48	.01/ 52	.00/ **
19	0.00/++	.01/ 14	.02/ 14	.03/ 14	.04/ 14	.04/ 14	.04/ 14	.03/ 13	.03/ 12	.03/ 12	.02/ 11	.02/ 13	.01/ 19	.01/ 48	.01/ 52	.00/ **
21	0.00/++	.01/ 10	.02/ 10	.03/ 10	.04/ 10	.04/ 10	.04/ 10	.03/ 9	.03/ 8	.03/ 8	.02/ 8	.02/ 13	.01/ 19	.01/ 48	.01/ 52	.00/ **
25	7	0.00/++	.01/ 7	.03/ 7	.05/ 7	.05/ 7	.06/ 6	.06/ 6	.01/ 5	.04/ 5	.04/ 5	.02/ 17	.02/ 39	.01/ 45	.01/ 57	.00/ **
9	9	0.00/++	.01/ 8	.03/ 8	.05/ 8	.05/ 8	.06/ 7	.06/ 7	.01/ 6	.05/ 6	.05/ 7	.02/ 17	.02/ 37	.02/ 45	.01/ 57	.00/ **
11	0.00/++	.01/ 9	.02/ 9	.03/ 9	.04/ 9	.04/ 9	.04/ 9	.03/ 8	.03/ 7	.03/ 7	.02/ 8	.02/ 37	.02/ 45	.01/ 57	.00/ **	.00/ **
13	0.00/++	.01/ 10	.02/ 10	.03/ 10	.04/ 10	.04/ 10	.04/ 10	.03/ 9	.03/ 8	.03/ 8	.02/ 8	.02/ 37	.02/ 45	.01/ 57	.00/ **	.00/ **
15	0.00/++	.01/ 10	.02/ 10	.03/ 10	.04/ 10	.04/ 10	.04/ 10	.03/ 9	.03/ 8	.03/ 8	.02/ 8	.02/ 37	.02/ 45	.01/ 57	.00/ **	.00/ **
17	0.00/++	.01/ 10	.02/ 10	.03/ 10	.04/ 10	.04/ 10	.04/ 10	.03/ 9	.03/ 8	.03/ 8	.02/ 8	.02/ 37	.02/ 45	.01/ 57	.00/ **	.00/ **
19	0.00/++	.01/ 14	.02/ 14	.03/ 14	.04/ 14	.04/ 14	.04/ 14	.03/ 13	.03/ 12	.03/ 12	.02/ 11	.02/ 37	.02/ 45	.01/ 57	.00/ **	.00/ **
21	0.00/++	.01/ 10	.02/ 10	.03/ 10	.04/ 10	.04/ 10	.04/ 10	.03/ 9	.03/ 8	.03/ 8	.02/ 8	.02/ 37	.02/ 45	.01/ 57	.00/ **	.00/ **

ASR

RMS YAW ACC IN DS2/ENCOUNTERED MODAL PERIOD, T<sub>DE</sub>' IN SECONDS  
LONGCRESTED  
DE

V	T <sub>DE</sub>	SHIP HEADING ANGLE IN DEGREES										180	
		0	15	30	45	60	75	90	105	120	135		
0	7	.00/.**	.02/.7	.03/.7	.05/.6	.08/.6	.08/.5	.02/.4	.08/.5	.07/.6	.05/.7	.03/.7	.01/.7
9	0	.00/.**	.02/.8	.03/.7	.05/.7	.06/.6	.06/.5	.01/.5	.06/.5	.06/.6	.05/.7	.03/.7	.02/.8
11	.01/.0	.00/.**	.03/.8	.04/.7	.05/.6	.04/.5	.01/.10	.04/.5	.04/.5	.04/.5	.04/.7	.03/.8	.01/.8
13	.00/.**	.01/.0	.02/.10	.03/.10	.04/.7	.03/.5	.01/.10	.03/.6	.03/.7	.03/.8	.02/.8	.02/.8	.00/.9
15	0	.00/.**	.01/.10	.02/.10	.03/.10	.03/.7	.02/.5	.01/.10	.02/.6	.03/.7	.02/.8	.02/.8	.01/.9
17	.00/.**	.01/.0	.01/.10	.02/.10	.02/.10	.02/.10	.02/.10	.00/.10	.02/.6	.02/.7	.02/.8	.01/.9	.00/.9
19	0	.00/.**	.01/.10	.01/.10	.02/.10	.02/.10	.02/.10	.00/.10	.01/.6	.02/.7	.02/.8	.01/.9	.00/.9
21	.00/.**	.01/.10	.01/.10	.01/.10	.02/.10	.02/.10	.01/.10	.00/.10	.01/.6	.01/.7	.01/.8	.01/.9	.00/.9
5	7	.00/.**	.02/.7	.04/.7	.06/.8	.09/.6	.09/.5	.02/.4	.07/.6	.06/.7	.04/.8	.03/.9	.00/.9
9	0	.00/.**	.02/.8	.04/.7	.05/.7	.07/.6	.06/.5	.01/.5	.05/.6	.05/.7	.04/.8	.03/.9	.01/.0
11	.00/.**	.00/.8	.03/.8	.04/.7	.05/.6	.05/.6	.01/.10	.04/.6	.04/.6	.04/.6	.03/.9	.02/.9	.00/.11
13	0	.00/.**	.01/.8	.02/.8	.03/.7	.04/.7	.03/.5	.01/.10	.03/.6	.03/.6	.03/.9	.02/.9	.00/.11
15	.00/.**	.01/.8	.02/.8	.03/.7	.03/.7	.03/.5	.01/.10	.02/.6	.02/.6	.02/.6	.02/.9	.01/.11	.00/.12
17	0	.00/.**	.01/.10	.02/.8	.02/.7	.02/.7	.02/.6	.00/.10	.02/.6	.02/.6	.02/.9	.01/.12	.00/.11
19	.00/.**	.01/.0	.01/.11	.02/.11	.02/.11	.02/.7	.02/.6	.00/.10	.01/.6	.02/.8	.02/.9	.01/.12	.00/.11
21	0	.00/.**	.01/.10	.01/.11	.02/.11	.02/.7	.01/.6	.00/.10	.01/.6	.01/.6	.01/.9	.01/.12	.00/.11
10	7	0	.00/.**	.02/.7	.04/.7	.07/.7	.10/.7	.09/.5	.02/.5	.05/.6	.05/.7	.03/.10	.02/.12
9	0	.00/.**	.02/.8	.04/.7	.06/.7	.07/.6	.07/.6	.01/.5	.06/.6	.06/.6	.04/.8	.03/.11	.02/.13
11	.00/.**	.00/.8	.02/.8	.03/.8	.05/.7	.06/.6	.05/.6	.01/.10	.03/.6	.03/.6	.03/.8	.03/.11	.02/.12
13	0	.00/.**	.01/.8	.03/.8	.04/.7	.04/.6	.04/.6	.01/.10	.02/.6	.02/.6	.03/.9	.02/.11	.00/.13
15	.00/.**	.01/.8	.02/.8	.03/.7	.03/.7	.03/.5	.03/.5	.00/.10	.02/.6	.02/.6	.02/.9	.02/.11	.00/.13
17	0	.00/.**	.01/.8	.02/.8	.02/.8	.02/.7	.02/.7	.02/.6	.00/.10	.01/.6	.02/.8	.02/.12	.00/.13
19	.00/.**	.01/.8	.01/.8	.01/.8	.02/.7	.02/.7	.02/.7	.00/.10	.01/.6	.01/.6	.01/.9	.01/.11	.00/.13
21	0	.00/.**	.01/.8	.01/.8	.02/.7	.02/.7	.02/.7	.00/.10	.01/.6	.01/.6	.01/.9	.01/.11	.00/.13
15	7	0	.00/.**	.02/.7	.05/.7	.08/.6	.10/.6	.10/.5	.02/.5	.05/.7	.05/.7	.03/.14	.01/.17
9	0	.00/.**	.02/.8	.04/.7	.05/.7	.07/.7	.08/.7	.07/.5	.01/.5	.04/.7	.04/.7	.02/.14	.01/.17
11	.00/.**	.02/.8	.04/.8	.05/.7	.06/.7	.06/.7	.05/.6	.01/.5	.03/.5	.03/.7	.03/.10	.02/.14	.01/.17
13	0	.00/.**	.01/.8	.03/.8	.04/.7	.04/.6	.04/.6	.01/.5	.02/.7	.02/.7	.02/.10	.01/.14	.00/.20
15	.00/.**	.01/.8	.02/.8	.03/.7	.03/.7	.03/.6	.03/.6	.00/.10	.02/.7	.02/.7	.02/.10	.01/.14	.00/.20
17	0	.00/.**	.01/.8	.02/.8	.02/.8	.02/.7	.03/.7	.02/.6	.00/.9	.01/.7	.01/.7	.01/.14	.00/.17
19	.00/.**	.01/.8	.01/.8	.01/.8	.02/.7	.02/.7	.02/.7	.00/.10	.01/.6	.01/.7	.01/.10	.01/.14	.00/.17
21	0	.00/.**	.01/.8	.01/.8	.02/.7	.02/.7	.02/.7	.00/.10	.01/.6	.01/.7	.01/.10	.00/.17	.00/.20
20	7	0	.00/.**	.02/.7	.05/.7	.08/.6	.10/.6	.10/.5	.02/.5	.04/.7	.04/.7	.03/.13	.01/.19
9	0	.00/.**	.02/.8	.05/.7	.07/.7	.08/.6	.07/.5	.01/.5	.03/.5	.03/.7	.02/.13	.01/.19	.00/.23
11	.00/.**	.00/.8	.04/.8	.05/.8	.06/.7	.05/.6	.05/.5	.01/.10	.02/.7	.02/.7	.02/.13	.00/.19	.00/.23
13	0	.00/.**	.02/.8	.03/.8	.04/.7	.04/.6	.04/.5	.01/.10	.02/.6	.02/.7	.01/.13	.00/.19	.00/.23
15	.00/.**	.01/.8	.02/.8	.03/.8	.04/.7	.04/.6	.03/.6	.00/.8	.01/.7	.01/.7	.01/.13	.00/.19	.00/.23
17	0	.00/.**	.01/.8	.02/.8	.02/.8	.02/.8	.03/.7	.02/.6	.00/.14	.01/.7	.01/.7	.01/.13	.00/.19
19	.00/.**	.01/.8	.01/.8	.01/.8	.02/.8	.02/.8	.02/.8	.00/.10	.01/.6	.01/.7	.01/.13	.00/.19	.00/.23
21	0	.00/.**	.01/.9	.01/.9	.02/.8	.02/.8	.02/.7	.00/.10	.01/.6	.01/.7	.01/.13	.00/.19	.00/.23
25	7	0	.00/.**	.03/.7	.05/.7	.08/.6	.11/.6	.10/.5	.02/.5	.03/.9	.03/.9	.01/.37	.01/.4
9	0	.00/.**	.02/.7	.05/.7	.07/.7	.08/.6	.07/.5	.01/.5	.02/.5	.02/.5	.02/.17	.00/.31	.00/.52
11	.00/.**	.02/.8	.04/.7	.05/.7	.05/.7	.04/.7	.04/.6	.01/.5	.02/.5	.02/.5	.02/.17	.00/.37	.00/.42
13	0	.00/.**	.02/.8	.03/.7	.04/.7	.04/.6	.04/.5	.01/.5	.02/.5	.02/.5	.02/.17	.00/.30	.00/.33
15	.00/.**	.01/.9	.02/.9	.03/.8	.03/.7	.04/.6	.03/.6	.00/.8	.01/.7	.01/.7	.01/.17	.00/.24	.00/.30
17	0	.00/.**	.01/.9	.02/.9	.03/.8	.03/.7	.03/.6	.00/.9	.01/.8	.01/.8	.01/.17	.00/.24	.00/.33
19	.00/.**	.01/.9	.02/.9	.02/.9	.02/.8	.02/.8	.02/.7	.00/.10	.01/.6	.01/.7	.01/.17	.00/.24	.00/.33
21	0	.00/.**	.01/.9	.01/.9	.02/.8	.02/.8	.02/.7	.00/.10	.01/.6	.01/.7	.01/.17	.00/.24	.00/.33

## ASR

RMS LON DISP IN FEET/ENCOUNTERED MODAL PERIOD, T<sup>1</sup>, IN SECONDS  
 ROLLER CHOCK - 8.0 FT AFT OF AP. ON CL. AND 26.07 FT ABOVE KEEL

V	TO	0	15	30	45	60	75	90	105	120	135	150	165	180	SHIP HEADING ANGLE IN DEGREES	
															DE	DE
0	7	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.04/ 8	.03/ 5	.00/ 5	.03/ 8	.04/ 8	.05/ 8	.02/ 6	.05/ 8	.05/ 8	.05/ 8	.05/ 8
9	9	.09/ 0	.08/ 0	.08/ 0	.07/ 0	.05/ 0	.03/ 0	.00/ 0	.04/ 10	.06/ 10	.07/ 10	.02/ 10	.07/ 9	.09/ 10	.09/ 10	.09/ 10
11	11	.11/12	.11/12	.10/12	.09/12	.06/12	.03/12	.00/12	.04/12	.07/12	.09/12	.03/12	.09/11	.12/12	.12/12	.12/12
13	13	.13/14	.13/14	.12/14	.10/14	.07/14	.04/14	.01/14	.05/14	.08/14	.11/14	.03/14	.10/14	.14/14	.14/14	.14/14
15	15	.15/16	.15/16	.13/16	.11/16	.08/16	.04/16	.01/16	.05/16	.09/16	.12/16	.03/16	.10/16	.16/16	.16/16	.16/16
17	17	.16/18	.16/18	.14/18	.11/18	.08/18	.04/18	.01/18	.05/18	.09/18	.12/18	.04/18	.11/18	.17/18	.17/18	.17/18
19	19	.17/18	.16/18	.15/18	.12/18	.08/18	.04/18	.01/18	.05/18	.09/18	.13/18	.04/21	.11/18	.18/18	.18/18	.18/18
21	21	.17/21	.17/21	.15/21	.12/21	.09/21	.04/21	.01/21	.05/21	.10/21	.13/21	.04/21	.11/21	.18/21	.18/21	.18/21
8	7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.05/ 6	.04/ 6	.04/ 6	.03/ 5	.00/ 7	.04/ 8	.02/ 6	.06/ 8	.08/10	.08/10	.08/10
9	9	.06/10	.06/10	.06/10	.06/10	.06/10	.05/10	.05/10	.03/10	.00/10	.04/10	.02/10	.08/10	.12/11	.13/12	.14/12
11	11	.08/13	.08/13	.08/13	.07/12	.06/12	.03/12	.00/12	.01/11	.04/12	.02/13	.09/13	.15/13	.17/13	.17/13	.17/13
13	13	.10/14	.10/14	.09/14	.08/14	.06/14	.03/14	.00/14	.01/14	.05/14	.03/15	.09/14	.16/14	.20/15	.20/15	.20/15
15	15	.12/16	.11/16	.09/16	.07/16	.05/16	.03/16	.00/16	.01/16	.05/16	.03/17	.10/17	.17/17	.21/17	.21/17	.21/17
17	17	.13/18	.12/18	.11/18	.10/18	.07/18	.04/18	.01/18	.05/18	.03/18	.10/19	.17/19	.21/20	.22/20	.22/20	.22/20
19	19	.14/21	.13/21	.12/21	.10/21	.07/21	.04/21	.01/18	.05/18	.03/19	.10/20	.18/20	.21/20	.22/20	.22/20	.22/20
21	21	.14/21	.13/21	.11/21	.08/21	.04/21	.01/21	.00/21	.04/21	.06/22	.03/22	.11/22	.18/22	.22/22	.23/22	.23/22
10	7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 6	.04/ 6	.03/ 6	.00/ 6	.04/ 8	.07/10	.11/11	.15/12	.17/13	.19/13
9	9	.05/10	.05/10	.05/10	.05/10	.05/10	.04/10	.04/10	.03/10	.00/10	.04/10	.09/11	.15/12	.20/13	.24/13	.25/13
11	11	.07/13	.07/13	.06/13	.06/13	.06/13	.05/13	.05/13	.03/12	.00/12	.05/12	.11/13	.17/14	.23/14	.27/15	.28/15
13	13	.08/14	.08/14	.08/14	.08/14	.08/14	.07/14	.07/14	.03/14	.00/14	.05/14	.11/15	.18/15	.24/16	.28/16	.29/16
15	15	.09/16	.09/16	.09/16	.09/16	.09/16	.08/16	.08/16	.06/16	.00/16	.05/16	.12/16	.18/17	.24/17	.28/18	.30/18
17	17	.11/18	.10/18	.10/18	.08/18	.08/18	.06/18	.06/18	.04/18	.00/18	.06/18	.12/18	.18/18	.24/19	.28/20	.29/20
19	19	.11/21	.11/21	.10/21	.10/21	.09/21	.07/21	.07/21	.04/21	.01/18	.06/19	.12/20	.18/21	.24/22	.28/22	.29/22
21	21	.12/21	.11/21	.11/21	.10/21	.09/21	.07/21	.07/21	.04/21	.01/21	.06/22	.12/22	.18/23	.24/24	.27/24	.29/24
15	7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 6	.04/ 6	.03/ 6	.01/ 6	.04/ 9	.11/10	.25/14	.57/20	.57/20	.57/20
9	9	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.05/ 7	.05/ 7	.03/ 7	.03/ 6	.01/ 9	.13/12	.26/14	.41/17	.51/20	.58/20
11	11	.06/13	.06/13	.06/13	.06/13	.06/13	.05/13	.05/13	.03/12	.01/11	.05/13	.14/14	.26/14	.40/17	.50/20	.55/20
13	13	.07/14	.07/14	.06/14	.06/14	.06/14	.05/14	.05/14	.03/14	.01/13	.06/14	.14/16	.25/14	.38/17	.42/20	.52/20
15	15	.08/16	.08/16	.08/16	.07/16	.07/16	.05/16	.05/16	.03/16	.01/16	.06/17	.14/17	.24/18	.35/17	.44/20	.48/20
17	17	.09/18	.09/18	.08/18	.08/18	.07/18	.06/18	.03/18	.01/18	.06/19	.14/18	.23/20	.33/17	.41/20	.45/20	.45/20
19	19	.10/21	.10/21	.09/21	.08/21	.08/21	.06/21	.06/21	.04/21	.01/18	.06/20	.16/20	.22/21	.32/19	.39/20	.42/20
21	21	.11/21	.10/21	.10/21	.09/21	.07/21	.07/21	.07/21	.04/21	.01/21	.06/22	.13/23	.22/25	.30/24	.37/20	.40/20
20	7	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 7	.04/ 7	.03/ 6	.01/ 6	.05/ 9	.21/13	.48/19	.51/29	.54/42	.57/57
9	9	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.05/ 7	.04/ 7	.03/ 6	.01/ 6	.06/11	.20/13	.46/19	.56/23	.62/26	.68/27
11	11	.06/ 8	.06/ 8	.05/ 8	.05/ 8	.05/ 8	.04/ 8	.04/ 8	.03/ 8	.01/ 10	.06/13	.19/13	.42/19	.53/23	.64/26	.71/27
13	13	.06/14	.06/14	.06/14	.06/14	.06/14	.05/14	.04/14	.03/14	.01/13	.06/15	.18/13	.38/19	.53/23	.63/26	.70/27
15	15	.07/16	.07/16	.06/16	.06/16	.06/16	.05/16	.05/16	.03/16	.01/16	.06/16	.17/13	.35/19	.50/23	.60/26	.66/27
17	17	.08/18	.07/18	.07/18	.07/18	.05/18	.05/18	.03/18	.01/18	.06/18	.16/20	.32/19	.46/23	.56/26	.61/27	.65/27
19	19	.08/21	.08/21	.08/21	.08/21	.07/21	.06/21	.06/21	.04/21	.01/18	.06/20	.16/22	.30/19	.43/23	.52/26	.57/27
21	21	.09/21	.09/21	.09/21	.08/21	.08/21	.07/21	.07/21	.04/21	.01/21	.07/22	.15/24	.28/19	.40/23	.49/26	.53/27
25	7	.03/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 7	.04/ 7	.03/ 6	.01/ 6	.06/ 9	.44/17	.56/30	.55/90	.54/ 7	.57/ 7
9	9	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.04/ 7	.04/ 7	.03/ 6	.01/ 6	.07/11	.36/17	.61/24	.66/33	.70/45	.76/63
11	11	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.04/ 8	.04/ 8	.02/ 8	.01/ 8	.07/13	.26/17	.53/24	.68/33	.76/33	.83/37
13	13	.05/16	.05/16	.05/16	.05/16	.05/16	.04/14	.04/14	.03/14	.01/13	.07/15	.23/17	.47/24	.65/30	.76/33	.83/33
15	15	.06/18	.06/18	.06/18	.06/18	.06/18	.04/16	.04/16	.03/16	.01/16	.07/18	.21/17	.43/24	.61/30	.72/33	.79/33
17	17	.07/18	.07/18	.06/18	.06/18	.06/18	.05/18	.05/18	.03/18	.01/18	.07/20	.20/17	.39/24	.56/30	.68/33	.74/33
19	19	.07/21	.07/21	.07/21	.06/21	.06/21	.05/21	.05/21	.03/21	.01/18	.07/21	.19/17	.36/24	.52/30	.63/33	.69/32

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**LONGCRESTED**  
RMS LON VEL IN FPS/ENCOUNTERED MODAL PERIOD, T' IN SECONDS  
DOLLER CHOCK - 8.0 FT AFT OF AP. ON CL. AND 26.07 FT ABOVE KEEL

V		T		SHIP HEADING ANGLE IN DEGREES										
		0	15	30	45	60	75	90	105	120	135	150	165	180
0	7	.04/.8	.04/.8	.04/.8	.04/.8	.05/.5	.04/.5	.01/.4	.04/.5	.04/.5	.04/.5	.04/.5	.04/.5	.04/.5
0	9	.06/.10	.06/.10	.06/.10	.05/.9	.04/.9	.03/.5	.00/.4	.03/.9	.05/.9	.05/.9	.05/.9	.05/.9	.05/.9
11	.07/.11	.07/.11	.06/.10	.05/.10	.04/.10	.02/.10	.02/.13	.00/.13	.03/.13	.04/.13	.06/.13	.02/.13	.06/.10	.06/.10
13	.07/.13	.07/.13	.06/.13	.05/.13	.04/.13	.02/.13	.02/.14	.00/.14	.02/.14	.02/.14	.02/.14	.02/.14	.02/.14	.02/.14
15	.07/.14	.07/.14	.06/.14	.05/.14	.04/.14	.02/.14	.02/.16	.00/.16	.02/.16	.02/.16	.02/.16	.02/.16	.02/.16	.02/.16
17	.07/.16	.07/.16	.06/.16	.05/.16	.04/.16	.02/.16	.02/.18	.00/.16	.02/.18	.02/.18	.02/.18	.02/.18	.02/.18	.02/.18
19	.07/.18	.06/.18	.06/.18	.05/.18	.04/.18	.03/.18	.02/.18	.00/.16	.02/.18	.02/.18	.02/.18	.02/.18	.02/.18	.02/.18
21	.06/.18	.06/.18	.05/.18	.04/.18	.03/.18	.02/.18	.00/.18	.02/.18	.01/.18	.04/.19	.07/.19	.08/.18	.08/.18	.08/.18
8	7	.05/.7	.05/.6	.05/.6	.05/.6	.04/.5	.03/.5	.00/.4	.04/.5	.02/.6	.04/.6	.05/.10	.05/.10	.05/.10
9	.05/.10	.05/.10	.05/.10	.05/.10	.04/.5	.04/.5	.03/.9	.03/.9	.02/.6	.02/.6	.05/.10	.06/.11	.06/.11	.06/.11
11	.06/.11	.06/.11	.06/.11	.05/.11	.04/.10	.02/.10	.00/.10	.03/.11	.01/.11	.01/.12	.05/.12	.08/.12	.09/.13	.09/.13
13	.06/.13	.06/.13	.06/.13	.05/.13	.04/.13	.02/.13	.00/.13	.03/.13	.01/.13	.01/.13	.05/.13	.08/.13	.09/.14	.09/.14
15	.06/.14	.06/.14	.06/.14	.05/.14	.04/.14	.02/.14	.00/.14	.03/.14	.01/.14	.01/.15	.05/.15	.07/.15	.09/.16	.09/.16
17	.06/.16	.06/.16	.05/.16	.05/.16	.04/.16	.02/.16	.00/.16	.02/.16	.01/.17	.01/.17	.04/.17	.07/.17	.08/.17	.08/.17
19	.06/.18	.06/.18	.05/.18	.04/.18	.03/.18	.02/.18	.00/.18	.02/.18	.01/.18	.04/.19	.07/.19	.08/.18	.08/.18	.08/.18
21	.06/.21	.05/.21	.05/.21	.04/.18	.03/.18	.02/.18	.00/.18	.02/.18	.01/.19	.04/.19	.07/.20	.08/.20	.08/.20	.08/.20
10	7	.05/.7	.05/.7	.06/.7	.06/.7	.05/.6	.04/.5	.03/.5	.06/.6	.03/.8	.05/.9	.07/.10	.08/.12	.08/.13
9	.06/.7	.06/.7	.06/.7	.05/.7	.05/.6	.04/.11	.02/.10	.00/.10	.03/.10	.06/.10	.08/.12	.10/.12	.10/.13	.11/.13
11	.06/.12	.06/.12	.05/.12	.05/.11	.04/.11	.02/.13	.00/.13	.03/.11	.06/.12	.08/.13	.10/.14	.11/.13	.12/.13	.12/.13
13	.06/.13	.06/.13	.05/.13	.05/.13	.04/.13	.02/.13	.00/.13	.03/.13	.05/.13	.08/.14	.10/.14	.11/.15	.11/.15	.11/.15
15	.06/.14	.05/.14	.05/.14	.04/.14	.03/.14	.02/.14	.00/.14	.03/.15	.03/.15	.05/.16	.07/.16	.09/.16	.10/.17	.11/.17
17	.05/.16	.05/.16	.05/.16	.04/.16	.03/.16	.02/.16	.00/.16	.02/.17	.05/.17	.07/.17	.09/.17	.10/.18	.10/.18	.10/.18
19	.05/.18	.05/.18	.04/.18	.03/.18	.02/.18	.00/.18	.02/.18	.04/.18	.06/.18	.08/.19	.09/.20	.09/.22	.09/.22	.09/.22
21	.05/.21	.05/.21	.05/.21	.04/.21	.03/.18	.02/.18	.00/.18	.02/.19	.04/.20	.06/.20	.07/.21	.08/.22	.08/.22	.08/.22
15	7	.06/.7	.06/.7	.06/.7	.06/.7	.06/.6	.04/.6	.01/.6	.03/.8	.06/.10	.10/.14	.12/.17	.12/.20	.12/.20
9	.06/.8	.06/.7	.06/.7	.06/.7	.05/.6	.04/.6	.03/.6	.01/.6	.03/.10	.07/.11	.11/.14	.14/.17	.14/.20	.15/.20
11	.06/.8	.06/.8	.06/.8	.06/.8	.05/.7	.04/.6	.02/.6	.00/.10	.03/.12	.07/.13	.10/.14	.14/.17	.15/.20	.16/.20
13	.06/.14	.05/.14	.05/.14	.05/.13	.04/.13	.02/.13	.00/.11	.03/.13	.06/.14	.10/.14	.13/.17	.14/.20	.14/.20	.14/.20
15	.05/.16	.05/.16	.05/.16	.04/.16	.03/.14	.02/.14	.00/.14	.03/.15	.06/.16	.09/.14	.12/.17	.13/.20	.14/.20	.14/.20
17	.05/.16	.05/.16	.05/.16	.04/.16	.03/.16	.02/.16	.00/.16	.03/.17	.05/.17	.08/.14	.11/.17	.12/.20	.13/.20	.13/.20
19	.05/.18	.05/.18	.05/.18	.04/.18	.03/.18	.02/.18	.00/.18	.02/.17	.05/.18	.07/.20	.10/.17	.11/.20	.12/.20	.12/.20
21	.05/.21	.05/.21	.04/.21	.04/.21	.03/.21	.02/.18	.00/.18	.02/.20	.04/.21	.07/.22	.09/.17	.10/.20	.11/.20	.11/.20
20	7	.06/.8	.06/.8	.06/.8	.06/.7	.06/.7	.04/.6	.01/.6	.04/.9	.09/.13	.12/.19	.08/.26	.07/.35	.07/.35
9	.07/.8	.07/.8	.07/.8	.06/.8	.05/.7	.05/.7	.03/.6	.01/.6	.04/.10	.09/.13	.13/.19	.12/.23	.11/.26	.11/.27
11	.06/.8	.06/.8	.06/.8	.06/.8	.05/.8	.05/.7	.03/.6	.01/.10	.03/.12	.07/.14	.13/.19	.13/.23	.13/.26	.14/.27
13	.06/.8	.06/.8	.06/.8	.05/.8	.05/.8	.05/.7	.02/.13	.00/.11	.03/.13	.07/.13	.12/.19	.13/.23	.14/.26	.14/.27
15	.05/.16	.05/.16	.05/.16	.04/.16	.03/.14	.02/.14	.00/.13	.03/.16	.06/.13	.11/.19	.13/.23	.14/.26	.14/.26	.14/.27
17	.05/.18	.05/.18	.04/.18	.04/.18	.03/.16	.02/.16	.00/.16	.03/.17	.06/.13	.09/.19	.12/.23	.13/.26	.13/.27	.13/.27
19	.05/.18	.05/.18	.04/.18	.04/.18	.03/.16	.02/.18	.00/.18	.02/.18	.05/.13	.08/.19	.11/.23	.12/.26	.12/.27	.12/.27
21	.04/.21	.04/.21	.04/.21	.04/.21	.03/.21	.01/.18	.00/.18	.02/.20	.05/.22	.08/.19	.10/.23	.11/.26	.12/.27	.12/.27
25	7	.06/.8	.06/.8	.06/.8	.06/.8	.06/.7	.04/.6	.01/.5	.04/.9	.12/.17	.09/.27	.07/.45	.07/.7	.06/.7
9	.07/.8	.07/.8	.07/.8	.06/.8	.05/.7	.05/.7	.03/.6	.01/.6	.04/.11	.11/.17	.12/.24	.09/.31	.09/.39	.09/.42
11	.07/.8	.07/.8	.06/.8	.06/.8	.05/.8	.04/.7	.02/.6	.00/.10	.04/.12	.10/.17	.12/.24	.11/.30	.11/.33	.11/.33
13	.06/.8	.06/.8	.06/.8	.05/.8	.05/.8	.04/.7	.02/.6	.00/.11	.03/.14	.09/.17	.13/.24	.13/.30	.13/.33	.13/.33
15	.05/.8	.05/.8	.05/.8	.05/.8	.04/.8	.04/.8	.03/.6	.00/.13	.03/.15	.08/.17	.12/.24	.13/.30	.13/.33	.13/.33
17	.05/.18	.05/.18	.04/.18	.04/.18	.03/.18	.02/.18	.00/.18	.02/.18	.05/.13	.08/.19	.11/.23	.12/.26	.12/.27	.12/.27
19	.04/.18	.04/.18	.04/.18	.04/.18	.03/.16	.02/.16	.00/.16	.03/.16	.06/.17	.07/.17	.10/.24	.11/.30	.11/.33	.11/.33
21	.04/.21	.04/.21	.04/.21	.04/.21	.03/.21	.01/.18	.00/.18	.02/.20	.05/.18	.06/.17	.09/.24	.10/.30	.10/.33	.10/.33

## ASR

LONGCRESTED  
RMS LDN ACC IN G'S/ENCOUNTERED MODAL PERIOD, T<sub>Q</sub>, IN SECONDS

(ACC. X 100)  
ROLLER CHOCK - 8.0 FT AFT OF AP. ON CL. AND 26.07 FT ABOVE KEEL

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										165	160
		0	15	30	45	60	75	90	105	120	135		
0	7	.10/ 8	.11/ 8	.11/ 7	.13/ 6	.16/ 5	.14/ 5	.03/ 4	.14/ 5	.15/ 5	.13/ 7	.08/ 6	.11/ 8
0	9	.13/ 9	.13/ 9	.13/ 9	.13/ 8	.13/ 5	.10/ 5	.02/ 4	.10/ 5	.12/ 8	.13/ 8	.06/ 6	.12/ 8
11	13/10	.13/10	.13/10	.12/10	.10/10	.07/ 5	.01/ 4	.08/ 5	.11/10	.12/10	.05/ 6	.14/ 9	.14/ 0
13	.13/11	.12/11	.12/11	.10/11	.09/10	.06/ 5	.01/ 4	.06/10	.09/10	.11/11	.04/ 6	.10/10	.13/11
15	.12/13	.11/13	.11/13	.09/13	.07/13	.05/ 5	.01/ 4	.05/10	.08/13	.10/13	.03/ 13	.09/12	.12/13
17	.10/14	.09/14	.08/14	.06/13	.04/13	.01/ 4	.04/13	.04/13	.07/13	.09/14	.03/ 14	.08/13	.11/14
19	.08/14	.08/14	.07/14	.05/14	.03/14	.01/ 4	.04/14	.04/14	.06/14	.08/14	.02/ 14	.07/14	.10/14
21	.08/16	.08/16	.07/16	.06/16	.05/16	.03/16	.00/14	.03/16	.05/16	.07/16	.02/16	.06/16	.09/16
21	.08/16	.08/16	.07/16	.06/16	.05/16	.03/16	.00/14	.03/16	.05/16	.07/16	.02/16	.06/16	.09/16
5	7	.16/ 6	.16/ 6	.17/ 6	.19/ 6	.20/ 6	.15/ 5	.02/ 4	.12/ 5	.07/ 6	.10/ 8	.11/ 9	.11/10
5	9	.16/ 7	.16/ 7	.16/ 6	.16/ 6	.15/ 6	.11/ 5	.01/ 4	.09/ 5	.05/ 6	.11/ 8	.14/10	.14/10
11	.15/10	.15/10	.14/10	.14/ 6	.12/ 6	.08/ 5	.01/ 4	.07/10	.04/ 6	.10/10	.13/11	.15/12	.14/12
13	.13/12	.13/12	.13/12	.12/11	.10/ 6	.06/ 5	.01/10	.06/11	.03/ 6	.08/12	.12/12	.14/13	.14/13
15	.12/13	.12/13	.12/13	.10/13	.08/13	.05/ 5	.01/12	.05/12	.02/13	.07/13	.11/13	.12/13	.13/13
17	.11/ 4	.10/ 4	.10/ 4	.09/14	.07/14	.04/ 5	.01/13	.04/13	.02/15	.06/14	.10/14	.11/15	.11/15
19	.09/16	.09/16	.09/16	.09/16	.07/16	.06/14	.03/14	.00/14	.04/14	.02/17	.06/15	.09/16	.10/16
21	.08/16	.08/16	.08/16	.08/16	.07/16	.05/16	.03/16	.00/16	.03/16	.02/17	.05/17	.08/17	.09/17
10	7	.22/ 7	.23/ 7	.23/ 7	.24/ 6	.23/ 6	.16/ 5	.02/ 4	.10/ 5	.11/ 9	.12/10	.12/12	.12/13
10	9	.21/ 7	.21/ 7	.21/ 7	.21/ 7	.20/ 6	.18/ 6	.11/ 5	.01/ 6	.08/ 9	.11/10	.15/12	.15/13
11	.18/ 7	.18/ 7	.18/ 7	.17/ 7	.16/ 6	.14/ 6	.08/ 5	.01/ 6	.07/10	.10/11	.13/12	.14/13	.15/13
13	.15/ 7	.15/ 7	.15/ 7	.15/ 7	.13/ 7	.11/ 6	.06/ 5	.01/10	.06/11	.09/12	.12/13	.14/13	.14/13
15	.13/13	.13/13	.13/13	.12/13	.11/ 7	.09/ 6	.05/ 5	.01/11	.05/13	.10/14	.12/14	.13/15	.13/15
17	.11/14	.11/14	.11/14	.11/14	.09/14	.07/14	.04/ 5	.01/13	.04/14	.07/14	.09/15	.10/15	.12/16
19	.10/16	.10/16	.10/16	.09/16	.08/16	.06/14	.04/ 5	.00/14	.03/15	.06/16	.08/17	.10/17	.10/17
21	.09/16	.09/16	.08/16	.08/16	.07/16	.05/16	.03/16	.00/16	.03/17	.05/17	.07/17	.08/17	.09/18
15	7	.26/ 7	.26/ 7	.27/ 7	.27/ 7	.25/ 6	.17/ 6	.02/ 6	.08/ 8	.12/10	.13/14	.12/17	.10/20
15	9	.26/ 7	.26/ 7	.26/ 7	.26/ 7	.24/ 6	.12/ 6	.02/ 6	.02/ 9	.15/10	.14/14	.15/17	.14/20
11	.22/ 7	.22/ 7	.21/ 7	.21/ 7	.19/ 7	.15/ 6	.09/ 6	.01/ 6	.06/10	.11/12	.13/14	.15/17	.15/20
13	.18/ 8	.18/ 8	.18/ 7	.17/ 7	.15/ 7	.12/ 6	.07/ 6	.01/ 6	.05/12	.09/13	.12/14	.14/20	.14/20
15	.15/ 8	.15/ 8	.14/ 7	.14/ 7	.12/ 7	.10/ 6	.04/ 6	.01/ 6	.04/14	.08/14	.10/14	.12/17	.13/20
17	.13/ 8	.13/ 8	.13/ 7	.12/ 7	.10/ 7	.08/ 7	.07/ 6	.01/ 6	.03/15	.07/15	.09/14	.11/17	.11/20
19	.11/ 8	.11/ 8	.11/ 7	.10/ 7	.09/ 7	.07/ 6	.04/ 6	.01/ 14	.03/15	.06/16	.08/14	.09/17	.10/20
21	.10/18	.09/18	.08/18	.08/18	.07/16	.06/ 6	.03/ 6	.00/16	.03/17	.05/17	.07/14	.08/17	.09/20
20	7	.28/ 8	.28/ 8	.29/ 7	.30/ 7	.28/ 7	.19/ 6	.03/ 5	.08/ 8	.12/13	.11/19	.05/ 25	.04/ 33
20	9	.31/ 8	.30/ 8	.29/ 8	.29/ 8	.27/ 7	.17/ 7	.14/ 6	.02/ 5	.02/10	.12/13	.13/19	.09/23
11	.28/ 8	.28/ 8	.25/ 8	.24/ 8	.21/ 7	.17/ 7	.10/ 6	.02/ 6	.06/10	.11/13	.13/19	.11/23	.09/27
13	.21/ 8	.21/ 8	.19/ 8	.19/ 8	.17/ 7	.13/ 7	.08/ 6	.01/ 6	.05/12	.09/13	.12/19	.10/27	
15	.17/ 8	.17/ 8	.17/ 8	.16/ 8	.14/ 8	.11/ 7	.06/ 6	.01/ 6	.05/13	.08/13	.10/19	.10/26	
17	.14/ 8	.14/ 8	.14/ 8	.13/ 8	.13/ 8	.11/ 7	.09/ 7	.05/ 6	.04/15	.07/13	.09/19	.09/27	
19	.12/ 8	.12/ 8	.12/ 8	.11/ 8	.11/ 8	.09/ 7	.07/ 7	.04/ 6	.01/11	.03/16	.08/19	.09/27	
21	.11/ 8	.11/ 8	.10/ 8	.09/ 8	.08/ 7	.06/ 7	.03/ 6	.01/12	.03/17	.05/13	.07/19	.08/26	
25	7	.28/ 8	.29/ 8	.30/ 8	.31/ 8	.29/ 7	.21/ 6	.03/ 4	.08/ 9	.12/17	.06/ 6	.06/ 7	
25	9	.34/ 8	.34/ 8	.33/ 8	.30/ 8	.25/ 8	.15/ 6	.02/ 5	.07/ 9	.12/17	.05/ 31	.05/ 37	
11	.30/ 8	.29/ 8	.27/ 8	.24/ 8	.19/ 7	.11/ 6	.02/ 5	.06/11	.11/17	.10/24	.07/30	.06/35	
13	.24/ 8	.24/ 8	.22/ 8	.19/ 8	.15/ 7	.08/ 6	.01/ 6	.05/12	.09/17	.10/24	.07/33	.07/33	
15	.20/ 8	.19/ 8	.18/ 8	.18/ 8	.15/ 8	.12/ 7	.07/ 6	.01/ 5	.05/13	.09/24	.08/36	.07/33	
17	.16/ 8	.16/ 8	.16/ 8	.15/ 8	.12/ 8	.09/ 7	.05/ 6	.01/10	.04/15	.07/17	.08/24	.07/33	
19	.14/ 8	.14/ 8	.13/ 8	.13/ 8	.12/ 8	.09/ 7	.04/ 6	.01/11	.03/16	.06/17	.07/24	.07/33	

## ASR

LONGCRESTED  
RMS LAT DISP IN FEET/ENCOUNTERED MODAL PERIOD, T<sub>o</sub> IN SECONDS  
ROLLER CHOCK - 8.0 FT AFT OF AP. ON CL. AND 26.07 FT ABOVE KEEL

V	T <sub>o</sub>	0	SHIP HEADING ANGLE IN DEGREES												180
			15	30	45	60	75	90	105	120	135	150	165		
0	7	.00//**	.05/ 8	.11/ 8	.16/ 7	.20/ 7	.18/ 7	.16/ 8	.21/ 7	.21/ 7	.17/ 7	.11/ 8	.05/ 8	.00/10	
9		.00//**	.07/10	.14/10	.19/10	.22/10	.21/10	.20/10	.24/10	.25/10	.22/10	.16/10	.08/10	.00/10	
11		.00//**	.08/10	.14/10	.19/10	.22/10	.21/10	.20/10	.24/10	.25/10	.22/10	.17/10	.09/10	.00/10	
13		.00//**	.07/10	.14/10	.19/10	.21/10	.21/14	.22/10	.23/10	.24/10	.21/10	.16/10	.09/10	.00/10	
15		.00//**	.07/14	.13/14	.18/14	.21/16	.22/16	.22/16	.23/16	.22/16	.20/10	.15/10	.08/10	.00/10	
17		.00//**	.07/16	.13/16	.18/16	.21/16	.22/18	.22/18	.23/18	.22/16	.19/16	.14/10	.08/10	.00/10	
19		.00//**	.07/18	.13/18	.17/18	.20/18	.20/18	.20/18	.23/18	.21/18	.18/18	.13/18	.07/10	.00/10	
21		.00//**	.07/21	.13/21	.17/21	.21/21	.22/21	.23/21	.23/21	.21/21	.18/21	.13/21	.07/21	.00/10	
5	7	.00//**	.04/ 8	.08/ 8	.13/ 7	.17/ 7	.17/ 7	.16/ 8	.23/ 8	.26/ 8	.24/ 9	.18/10	.11/10	.00/10	
9		.00//**	.06/10	.12/10	.17/10	.20/10	.20/10	.20/10	.26/10	.29/10	.28/10	.22/10	.13/10	.00/10	
11		.00//**	.07/11	.13/11	.18/11	.20/10	.21/10	.20/10	.26/10	.28/10	.26/10	.21/10	.12/10	.00/10	
13		.00//**	.07/11	.13/11	.17/11	.20/10	.21/10	.20/10	.25/10	.26/10	.24/10	.19/10	.11/10	.00/10	
15		.00//**	.07/11	.13/11	.17/16	.19/16	.21/16	.22/16	.24/15	.25/15	.22/10	.17/10	.10/10	.00/10	
17		.00//**	.06/16	.12/16	.16/16	.19/16	.21/16	.22/16	.24/17	.24/17	.21/17	.16/17	.09/10	.00/10	
19		.00//**	.06/18	.12/18	.16/18	.19/21	.21/18	.23/18	.23/18	.23/19	.20/19	.15/20	.08/20	.00/10	
21		.00//**	.06/21	.12/21	.16/21	.19/21	.22/21	.23/21	.23/22	.22/22	.20/22	.15/22	.08/22	.00/10	
10	7	.00//**	.03/ 8	.07/ 8	.11/ 7	.15/ 7	.16/ 7	.16/ 8	.25/ 8	.33/ 9	.37/ 0	.19/12	.09/13	.00/13	
9		.00//**	.05/10	.09/10	.14/10	.17/10	.19/10	.19/10	.27/10	.34/10	.34/10	.21/12	.11/13	.00/13	
11		.00//**	.06/13	.11/12	.15/11	.19/11	.20/10	.21/10	.26/10	.31/10	.20/12	.11/13	.00/13	.00/13	
13		.00//**	.06/13	.11/13	.15/12	.19/11	.20/10	.22/14	.25/14	.28/10	.27/10	.19/14	.09/13	.00/13	
15		.00//**	.06/13	.11/13	.15/13	.19/16	.21/16	.22/16	.25/15	.26/16	.25/16	.18/16	.10/13	.00/13	
17		.00//**	.05/13	.10/18	.15/18	.18/18	.21/16	.23/16	.24/19	.25/20	.23/18	.17/19	.09/20	.00/20	
19		.00//**	.05/18	.10/21	.15/21	.18/18	.21/21	.23/18	.24/20	.24/22	.22/21	.16/22	.09/22	.00/22	
21		.00//**	.05/21	.10/21	.15/21	.19/21	.21/21	.23/21	.24/22	.24/22	.21/23	.15/24	.08/24	.00/24	
15	7	.00//**	.03/ 8	.06/ 8	.09/ 7	.13/ 7	.14/ 7	.16/ 7	.27/ 9	.34/14	.32/17	.21/20	.00/**	.00/**	
9		.00//**	.04/10	.08/10	.12/10	.15/10	.17/10	.20/10	.28/10	.38/10	.33/14	.28/10	.18/20	.00/**	
11		.00//**	.05/13	.09/12	.13/12	.16/11	.19/11	.21/10	.27/10	.33/10	.30/14	.25/17	.15/20	.00/**	
13		.00//**	.05/14	.09/13	.13/13	.17/13	.20/12	.22/14	.26/14	.30/10	.27/14	.22/17	.13/20	.00/**	
15		.00//**	.05/14	.09/13	.13/13	.17/16	.20/16	.22/16	.26/15	.28/17	.26/14	.21/17	.12/20	.00/**	
17		.00//**	.05/14	.09/18	.13/18	.17/18	.20/16	.23/16	.25/19	.27/19	.25/14	.20/17	.11/20	.00/**	
19		.00//**	.05/18	.09/18	.13/18	.17/18	.20/18	.23/18	.25/20	.26/21	.24/22	.19/17	.11/20	.00/**	
21		.00//**	.05/21	.09/21	.14/21	.17/21	.21/21	.23/21	.25/22	.26/23	.23/25	.18/26	.10/20	.00/**	
20	7	.00//**	.02/ 8	.05/ 8	.08/ 8	.11/ 7	.13/ 7	.16/ 8	.29/ 9	.36/13	.45/19	.38/10	.25/63	.00/**	
9		.00//**	.03/10	.07/ 9	.10/10	.13/10	.16/10	.20/10	.29/10	.34/19	.41/19	.35/23	.24/63	.00/**	
11		.00//**	.04/13	.08/13	.11/12	.15/12	.18/11	.21/10	.28/13	.32/13	.37/19	.32/23	.22/26	.00/**	
13		.00//**	.04/14	.09/14	.12/13	.16/13	.19/13	.22/14	.27/15	.31/13	.34/19	.29/23	.19/26	.00/**	
15		.00//**	.04/14	.09/14	.12/14	.16/16	.19/16	.23/16	.27/16	.30/13	.32/19	.27/23	.18/26	.00/**	
17		.00//**	.04/14	.09/14	.12/18	.16/18	.19/18	.23/16	.26/20	.29/20	.30/19	.25/23	.16/26	.00/**	
19		.00//**	.04/21	.09/18	.13/18	.16/18	.20/18	.23/18	.26/20	.28/22	.28/19	.24/23	.14/26	.00/**	
21		.00//**	.04/21	.09/21	.13/21	.16/21	.20/21	.23/21	.26/22	.28/24	.28/19	.23/23	.14/26	.00/**	
25	7	.00//**	.02/ 8	.04/ 8	.07/ 8	.10/ 8	.12/ 7	.16/ 8	.32/ 9	.48/17	.51/39	.38/*	.21/ 7	.00/**	
9		.00//**	.03/10	.06/ 9	.09/ 9	.12/10	.15/10	.20/10	.31/10	.45/17	.48/24	.43/45	.27/57	.00/**	
11		.00//**	.03/12	.07/13	.10/13	.13/12	.17/12	.21/10	.30/13	.41/17	.44/24	.40/30	.27/57	.00/**	
13		.00//**	.04/14	.07/14	.11/14	.14/13	.18/13	.22/14	.29/15	.38/17	.41/24	.36/30	.24/33	.00/**	
15		.00//**	.04/16	.08/14	.11/14	.15/14	.19/16	.23/16	.28/17	.36/17	.38/24	.33/30	.22/33	.00/**	
17		.00//**	.04/16	.08/16	.12/18	.15/18	.19/18	.23/16	.28/18	.35/17	.37/24	.31/30	.21/33	.00/**	
19		.00//**	.04/16	.08/21	.12/18	.15/18	.19/18	.23/16	.28/20	.33/17	.35/24	.29/30	.19/33	.00/**	
21		.00//**	.04/21	.08/21	.12/21	.15/21	.19/21	.23/21	.28/23	.32/17	.32/17	.28/34	.18/33	.00/**	

ASR

LONGCRESTED  
RMS LAT VEL IN FPS/ENCOUNTERED MODAL PERIOD, T<sub>o</sub>, IN SECONDS  
ROLLER CHOCK - 8.0 FT AFT OF AP. ON CL. AND 26.07 FT ABOVE KEEL

V	T <sub>o</sub>	0	SHIP HEADING ANGLE IN DEGREES										150	165	180
			15	30	45	60	75	90	105	120	135	150			
0	7	0.00/**	.05/ 7	.09/ 7	.14/ 7	.19/ 7	.18/ 7	.15/ 7	.21/ 6	.20/ 7	.15/ 7	.09/ 7	.05/ 6	.00/ 6	
0	9	0.00/**	.06/ 9	.11/ 9	.15/ 8	.18/ 8	.16/ 9	.16/ 10	.20/ 10	.20/ 9	.16/ 9	.12/ 10	.06/ 10	.00/ 10	
11	0.00/**	.05/10	.10/10	.14/10	.16/10	.15/10	.16/10	.15/10	.18/10	.18/10	.15/10	.11/10	.06/10	.00/10	
13	0.00/**	.05/10	.09/10	.12/10	.14/10	.16/10	.14/10	.13/10	.15/10	.15/10	.13/10	.10/10	.05/10	.00/10	
15	0.00/**	.04/10	.08/10	.10/10	.12/10	.14/10	.12/10	.12/10	.13/10	.13/10	.12/10	.09/10	.05/10	.00/10	
17	0.00/**	.04/10	.07/10	.11/10	.11/16	.11/16	.11/16	.11/16	.12/10	.11/10	.10/10	.07/10	.04/10	.00/10	
19	0.00/**	.03/16	.06/16	.08/16	.09/16	.10/16	.10/16	.10/16	.10/16	.10/10	.09/10	.07/10	.04/10	.00/10	
21	0.00/**	.03/18	.05/18	.07/18	.06/18	.09/18	.09/18	.09/18	.09/18	.08/18	.08/18	.06/18	.03/18	.00/18	
0	7	0.00/**	.04/ 7	.09/ 7	.14/ 7	.18/ 7	.18/ 7	.15/ 7	.22/ 7	.21/ 7	.17/ 8	.12/10	.07/10	.00/10	
0	9	0.00/**	.05/ 8	.10/ 8	.15/ 8	.18/ 8	.17/ 9	.16/ 10	.21/10	.21/10	.19/10	.14/10	.08/10	.00/10	
11	0.00/**	.05/11	.10/11	.14/10	.18/10	.15/10	.16/10	.15/10	.18/10	.19/10	.17/10	.13/10	.07/10	.00/10	
13	0.00/**	.05/11	.09/11	.12/10	.14/10	.14/10	.13/10	.15/10	.16/10	.16/10	.14/10	.11/10	.06/10	.00/10	
15	0.00/**	.04/11	.08/11	.10/10	.12/10	.12/10	.12/10	.12/10	.13/10	.14/10	.12/10	.09/10	.05/10	.00/10	
17	0.00/**	.07/11	.07/11	.09/11	.10/10	.11/10	.11/10	.11/10	.12/10	.12/10	.12/10	.10/10	.08/10	.04/10	.00/10
19	0.00/**	.03/11	.06/11	.08/16	.09/16	.10/16	.10/16	.10/16	.11/16	.11/16	.10/17	.09/10	.07/10	.04/10	.00/10
21	0.00/**	.03/11	.05/11	.07/18	.09/18	.09/18	.09/18	.09/18	.10/18	.09/19	.08/10	.06/10	.03/10	.00/10	
10	7	0.00/**	.04/ 7	.08/ 7	.13/ 7	.17/ 7	.18/ 7	.15/ 7	.22/ 7	.24/ 9	.22/10	.10/12	.04/13	.00/13	
10	9	0.00/**	.05/ 8	.09/ 8	.14/ 8	.17/ 8	.17/ 9	.16/ 9	.20/10	.22/10	.20/10	.10/12	.05/13	.00/13	
11	0.00/**	.05/13	.09/10	.13/10	.15/10	.15/10	.15/10	.17/10	.19/10	.17/10	.19/10	.09/12	.05/13	.00/13	
13	0.00/**	.04/13	.08/12	.11/11	.14/11	.14/10	.13/10	.15/10	.16/10	.16/10	.14/10	.08/12	.04/13	.00/13	
15	0.00/**	.04/13	.07/11	.10/11	.12/11	.12/11	.12/10	.12/10	.13/10	.13/10	.12/10	.07/14	.04/13	.00/13	
17	0.00/**	.03/13	.06/13	.09/12	.11/11	.11/11	.11/11	.11/16	.12/15	.12/10	.10/10	.06/15	.03/13	.00/13	
19	0.00/**	.03/13	.06/13	.08/18	.09/16	.10/16	.10/16	.10/16	.10/17	.10/20	.09/10	.06/19	.03/13	.00/13	
21	0.00/**	.03/13	.05/13	.07/18	.09/18	.09/18	.09/18	.09/18	.09/19	.09/20	.08/10	.05/21	.03/13	.00/13	
15	7	0.00/**	.04/ 8	.08/ 7	.13/ 7	.17/ 7	.18/ 7	.15/ 7	.22/ 8	.24/ 9	.22/10	.10/12	.04/13	.00/13	
15	9	0.00/**	.04/ 8	.08/ 8	.13/ 8	.16/ 8	.16/ 9	.15/ 9	.20/10	.22/10	.20/10	.10/12	.05/13	.00/13	
11	0.00/**	.04/10	.09/10	.12/10	.15/10	.15/10	.14/10	.17/10	.18/10	.18/10	.12/14	.09/17	.04/20	.00/20	
13	0.00/**	.04/13	.08/13	.11/12	.13/11	.13/11	.13/10	.13/10	.15/10	.15/10	.11/14	.07/17	.04/20	.00/20	
15	0.00/**	.04/13	.07/13	.10/13	.11/12	.11/12	.12/11	.12/11	.13/14	.13/14	.13/10	.07/17	.03/20	.00/20	
17	0.00/**	.03/14	.06/13	.09/13	.10/13	.10/13	.11/16	.11/16	.11/16	.11/15	.11/10	.09/14	.06/17	.03/20	.00/20
19	0.00/**	.03/14	.06/13	.08/18	.09/18	.10/16	.10/16	.10/16	.10/19	.10/10	.08/14	.06/17	.03/20	.00/20	
21	0.00/**	.03/14	.05/18	.07/18	.08/18	.09/18	.09/18	.09/18	.09/20	.08/21	.07/14	.05/17	.03/20	.00/20	
20	7	0.00/**	.03/ 7	.07/ 7	.12/ 7	.16/ 7	.17/ 7	.15/ 7	.22/ 8	.26/10	.14/14	.08/17	.04/20	.00/20	
20	9	0.00/**	.04/ 8	.08/ 8	.12/ 8	.15/ 8	.16/ 9	.16/ 9	.20/10	.22/10	.22/10	.10/12	.05/13	.00/13	
11	0.00/**	.04/10	.08/10	.11/10	.14/10	.15/10	.14/10	.17/10	.17/10	.17/10	.11/19	.07/23	.04/26	.00/26	
13	0.00/**	.04/14	.08/13	.12/12	.13/11	.13/11	.13/10	.14/13	.12/13	.12/13	.10/19	.07/23	.04/26	.00/26	
15	0.00/**	.04/14	.07/14	.09/13	.11/13	.12/12	.12/12	.12/14	.13/15	.11/15	.10/19	.07/23	.04/26	.00/26	
17	0.00/**	.03/14	.06/14	.08/14	.10/13	.11/13	.11/13	.11/16	.11/16	.11/16	.09/19	.06/23	.03/26	.00/26	
19	0.00/**	.03/14	.05/14	.07/14	.09/18	.10/16	.10/16	.10/16	.10/20	.09/13	.08/19	.06/23	.03/26	.00/26	
21	0.00/**	.03/14	.05/14	.07/18	.08/18	.09/18	.09/18	.09/18	.09/20	.09/22	.08/19	.05/23	.03/26	.00/26	
25	7	0.00/**	.03/ 7	.07/ 7	.11/ 7	.15/ 7	.16/ 7	.15/ 7	.21/ 9	.14/17	.07/37	.04/45	.02/ 7	.00/**	
25	9	0.00/**	.04/ 9	.08/ 9	.11/ 8	.14/ 8	.15/ 9	.15/ 9	.19/ 9	.15/17	.09/24	.05/42	.03/52	.00/**	
11	0.00/**	.04/10	.08/10	.11/10	.14/10	.15/10	.14/10	.15/10	.16/10	.16/10	.14/17	.09/24	.05/30	.03/33	
13	0.00/**	.04/13	.07/13	.10/13	.12/13	.13/13	.13/12	.13/12	.13/12	.13/12	.13/17	.09/24	.06/30	.03/33	
15	0.00/**	.03/16	.06/14	.09/14	.11/13	.12/13	.12/13	.12/14	.13/15	.13/15	.12/17	.09/24	.06/30	.03/33	
17	0.00/**	.03/16	.06/14	.08/14	.10/14	.11/16	.11/16	.11/16	.11/17	.11/17	.11/17	.09/24	.06/30	.03/33	
19	0.00/**	.03/16	.05/14	.07/14	.09/18	.10/16	.10/16	.10/16	.10/17	.10/17	.10/24	.08/24	.06/30	.03/33	
21	0.00/**	.02/16	.05/16	.07/18	.08/18	.09/18	.09/18	.09/18	.09/18	.09/18	.09/18	.05/20	.05/30	.03/33	

## ASR

RMS LAT ACC IN G'S/ENCOUNTERED MODAL PERIOD, T', IN SECONDS  
 (ACC. X 100)  
 LONGCRESTED  
 ROLLER CHOCK - 8.0 FT AFT OF AP. ON CL. AND 26.07 FT ABOVE KEEL

V	T0	SHIP HEADING ANGLE IN DEGREES										165	180	
		0	15	30	45	60	75	90	105	120	135			
0	7	0.00/***	.12/. 7	.26/. 7	.43/. 7	.60/. 6	.63/. 6	.49/. 6	.75/. 5	.62/. 6	.42/. 7	.26/. 7	.12/. 7	
0	9	0.00/***	.13/. 8	.27/. 8	.40/. 7	.51/. 8	.51/. 8	.43/. 8	.59/. 6	.41/. 7	.42/. 7	.28/. 8	.14/. 8	
11	0.00/***	.12/. 10	.23/. 9	.33/. 9	.41/. 9	.41/. 10	.36/. 10	.47/. 10	.44/. 10	.36/. 10	.25/. 10	.13/. 10	.00/. 10	
13	0.00/***	.10/. 10	.19/. 10	.27/. 10	.33/. 10	.33/. 10	.30/. 10	.37/. 10	.35/. 10	.30/. 10	.29/. 10	.24/. 10	.11/. 10	.00/. 10
15	0.00/***	.08/. 10	.16/. 10	.22/. 10	.26/. 10	.24/. 10	.26/. 10	.24/. 10	.24/. 10	.24/. 10	.24/. 10	.24/. 10	.17/. 10	.00/. 10
17	0.00/***	.07/. 10	.13/. 10	.18/. 10	.22/. 10	.22/. 10	.20/. 10	.20/. 10	.20/. 10	.20/. 10	.20/. 10	.14/. 10	.08/. 10	.00/. 10
19	0.00/***	.06/. 10	.11/. 10	.15/. 10	.18/. 10	.18/. 10	.17/. 10	.17/. 10	.17/. 10	.17/. 10	.17/. 10	.12/. 10	.06/. 10	.00/. 10
21	0.00/***	.05/. 10	.09/. 10	.13/. 10	.15/. 10	.16/. 10	.15/. 10	.15/. 10	.17/. 10	.17/. 10	.17/. 10	.10/. 10	.05/. 10	.00/. 10
6	7	0.00/***	.14/. 7	.30/. 7	.48/. 7	.66/. 6	.68/. 6	.48/. 6	.70/. 6	.57/. 7	.41/. 8	.27/. 9	.14/. 10	.00/. 10
9	9	0.00/***	.15/. 8	.30/. 7	.45/. 7	.55/. 7	.43/. 8	.43/. 8	.56/. 7	.51/. 8	.41/. 10	.29/. 10	.16/. 10	.00/. 10
11	0.00/***	.14/. 9	.26/. 8	.37/. 8	.45/. 9	.43/. 10	.36/. 10	.45/. 10	.42/. 10	.34/. 10	.25/. 10	.14/. 10	.00/. 10	
13	0.00/***	.12/. 11	.22/. 11	.30/. 10	.36/. 10	.34/. 10	.30/. 10	.36/. 10	.33/. 10	.32/. 10	.28/. 10	.20/. 10	.11/. 10	.00/. 10
15	0.00/***	.10/. 11	.18/. 11	.25/. 10	.28/. 10	.28/. 10	.24/. 10	.28/. 10	.29/. 10	.27/. 10	.22/. 10	.16/. 10	.09/. 10	.00/. 10
17	0.00/***	.08/. 11	.15/. 11	.20/. 10	.24/. 10	.23/. 10	.20/. 10	.24/. 10	.22/. 10	.22/. 10	.18/. 10	.13/. 10	.07/. 10	.00/. 10
19	0.00/***	.07/. 11	.13/. 11	.17/. 10	.20/. 10	.19/. 10	.17/. 10	.17/. 10	.20/. 10	.18/. 10	.15/. 10	.11/. 10	.06/. 10	.00/. 10
21	0.00/***	.06/. 11	.11/. 11	.14/. 10	.17/. 10	.16/. 10	.15/. 10	.17/. 10	.16/. 10	.16/. 10	.13/. 10	.09/. 10	.05/. 10	.00/. 10
10	7	0.00/***	.16/. 7	.33/. 7	.53/. 7	.72/. 6	.71/. 6	.48/. 6	.64/. 6	.54/. 8	.43/. 10	.16/. 12	.07/. 13	.00/. 13
9	9	0.00/***	.16/. 8	.33/. 7	.48/. 7	.60/. 7	.56/. 7	.42/. 8	.52/. 9	.47/. 10	.38/. 10	.16/. 12	.07/. 13	.00/. 13
11	0.00/***	.15/. 8	.28/. 8	.40/. 8	.48/. 7	.45/. 10	.35/. 10	.41/. 10	.38/. 10	.30/. 10	.30/. 10	.14/. 12	.07/. 13	.00/. 13
13	0.00/***	.12/. 13	.23/. 10	.33/. 10	.38/. 10	.36/. 10	.36/. 10	.32/. 10	.32/. 10	.32/. 10	.24/. 10	.12/. 12	.05/. 13	.00/. 13
15	0.00/***	.10/. 13	.19/. 11	.26/. 11	.31/. 11	.29/. 10	.24/. 10	.26/. 10	.26/. 10	.26/. 10	.24/. 10	.19/. 10	.10/. 12	.05/. 13
17	0.00/***	.08/. 13	.16/. 12	.22/. 11	.25/. 11	.24/. 10	.20/. 10	.22/. 10	.22/. 10	.20/. 10	.16/. 10	.09/. 12	.04/. 13	.00/. 13
19	0.00/***	.07/. 13	.13/. 13	.18/. 11	.21/. 11	.20/. 10	.17/. 10	.18/. 10	.17/. 10	.17/. 10	.13/. 10	.04/. 12	.03/. 13	.00/. 13
21	0.00/***	.06/. 13	.11/. 13	.15/. 11	.18/. 11	.17/. 10	.15/. 10	.15/. 10	.15/. 10	.14/. 10	.11/. 10	.06/. 12	.03/. 13	.00/. 13
15	7	0.00/***	.17/. 7	.35/. 7	.56/. 7	.75/. 6	.73/. 6	.47/. 6	.57/. 7	.48/. 10	.18/. 14	.08/. 17	.03/. 20	.00/. 20
9	9	0.00/***	.18/. 8	.35/. 8	.51/. 7	.62/. 7	.58/. 7	.41/. 8	.46/. 9	.40/. 10	.18/. 14	.09/. 17	.04/. 20	.00/. 20
11	0.00/***	.16/. 8	.30/. 8	.42/. 7	.49/. 7	.46/. 9	.35/. 9	.37/. 10	.31/. 10	.25/. 10	.16/. 14	.09/. 17	.04/. 20	.00/. 20
13	0.00/***	.13/. 8	.25/. 8	.34/. 8	.39/. 10	.37/. 10	.29/. 10	.29/. 10	.25/. 10	.24/. 10	.20/. 10	.12/. 14	.08/. 17	.00/. 20
15	0.00/***	.11/. 13	.20/. 11	.28/. 11	.32/. 11	.30/. 10	.24/. 10	.24/. 10	.24/. 10	.20/. 10	.16/. 10	.08/. 17	.03/. 20	.00/. 20
17	0.00/***	.09/. 13	.17/. 13	.23/. 12	.26/. 11	.25/. 10	.20/. 10	.20/. 10	.17/. 10	.17/. 10	.14/. 10	.09/. 14	.05/. 17	.00/. 20
19	0.00/***	.08/. 13	.14/. 13	.19/. 13	.22/. 11	.21/. 11	.17/. 10	.17/. 10	.17/. 10	.12/. 10	.08/. 14	.05/. 17	.03/. 20	.00/. 20
21	0.00/***	.06/. 13	.12/. 13	.16/. 13	.18/. 12	.17/. 11	.15/. 14	.14/. 14	.14/. 14	.12/. 10	.08/. 14	.05/. 17	.02/. 20	.00/. 20
20	7	0.00/***	.18/. 7	.37/. 7	.59/. 6	.77/. 6	.75/. 6	.47/. 6	.50/. 8	.21/. 13	.09/. 19	.03/. 25	.04/. 4	.00/. 70
9	9	0.00/***	.19/. 8	.37/. 8	.53/. 8	.64/. 7	.59/. 7	.41/. 8	.41/. 9	.21/. 13	.11/. 19	.05/. 23	.03/. 26	.00/. 30
11	0.00/***	.16/. 8	.32/. 8	.44/. 8	.51/. 7	.47/. 9	.35/. 9	.33/. 10	.31/. 10	.18/. 13	.11/. 19	.05/. 23	.03/. 26	.00/. 27
13	0.00/***	.14/. 9	.26/. 8	.36/. 8	.40/. 7	.37/. 10	.29/. 10	.27/. 10	.27/. 10	.16/. 13	.10/. 19	.05/. 23	.03/. 26	.00/. 27
15	0.00/***	.11/. 9	.22/. 8	.29/. 8	.33/. 11	.30/. 11	.24/. 10	.22/. 10	.22/. 10	.14/. 13	.09/. 19	.05/. 23	.03/. 26	.00/. 27
17	0.00/***	.09/. 14	.18/. 14	.24/. 13	.27/. 12	.25/. 11	.20/. 10	.18/. 10	.18/. 10	.12/. 13	.08/. 19	.05/. 23	.03/. 26	.00/. 27
19	0.00/***	.08/. 14	.15/. 14	.20/. 13	.22/. 13	.21/. 11	.17/. 10	.16/. 15	.13/. 16	.11/. 13	.07/. 19	.05/. 23	.02/. 26	.00/. 27
21	0.00/***	.07/. 14	.13/. 14	.17/. 13	.19/. 13	.18/. 11	.15/. 14	.15/. 14	.13/. 16	.09/. 13	.07/. 19	.04/. 23	.02/. 26	.00/. 27
25	7	0.00/***	.19/. 7	.38/. 7	.60/. 7	.78/. 6	.76/. 6	.47/. 6	.45/. 9	.15/. 17	.06/. 27	.05/. 4	.03/. 4	.00/. 8
9	9	0.00/***	.19/. 8	.38/. 7	.54/. 7	.65/. 7	.60/. 7	.41/. 8	.37/. 9	.17/. 17	.07/. 24	.04/. 33	.02/. 42	.00/. 8*
11	0.00/***	.17/. 9	.32/. 9	.45/. 8	.52/. 8	.47/. 9	.35/. 9	.30/. 9	.16/. 17	.07/. 24	.04/. 30	.02/. 33	.00/. 8	.00/. 8
13	0.00/***	.14/. 9	.26/. 9	.36/. 8	.41/. 8	.38/. 10	.29/. 10	.24/. 9	.14/. 17	.07/. 24	.04/. 30	.02/. 33	.00/. 8	.00/. 8
15	0.00/***	.12/. 10	.22/. 9	.30/. 8	.33/. 12	.31/. 11	.24/. 10	.20/. 9	.13/. 17	.07/. 24	.04/. 30	.02/. 33	.00/. 8	.00/. 8
17	0.00/***	.10/. 10	.18/. 9	.22/. 9	.25/. 13	.26/. 11	.20/. 10	.17/. 9	.11/. 17	.07/. 24	.04/. 30	.02/. 33	.00/. 8	.00/. 8
19	0.00/***	.08/. 16	.15/. 14	.20/. 14	.23/. 13	.21/. 12	.17/. 10	.15/. 15	.10/. 17	.06/. 24	.04/. 30	.02/. 33	.00/. 8	.00/. 8

ASR

RMS VER DISP IN FEET/ENCOUNTERED MODAL PERIOD, T<sub>0</sub> IN SECONDS  
LONGCRESTED  
SHIP HEADING ANGLE IN DEGREES Q.E.

V	T <sub>0</sub>	0	15	30	45	60	75	90	105	120	135	150	165	180
6	7	.09/ 8	.09/ 8	.10/ 8	.13/ 8	.18/ 7	.23/ 7	.26/ 7	.22/ 7	.17/ 7	.13/ 8	.10/ 8	.09/ 8	.09/ 8
9	9	.15/10	.15/10	.16/10	.21/10	.21/ 9	.25/ 9	.26/ 9	.24/ 9	.21/ 9	.18/10	.16/10	.15/10	.15/10
11	11	.19/11	.19/11	.20/11	.21/11	.23/11	.25/10	.26/10	.25/10	.23/11	.21/11	.19/11	.19/11	.19/11
13	13	.21/13	.21/13	.22/13	.23/13	.24/ 3	.25/13	.26/13	.25/13	.24/13	.23/13	.22/13	.21/13	.21/13
15	15	.22/16	.23/16	.23/16	.24/16	.25/ 6	.25/16	.26/16	.25/16	.24/16	.23/16	.23/16	.23/16	.23/16
17	17	.23/18	.23/18	.24/18	.24/18	.24/18	.25/18	.26/18	.25/18	.25/18	.24/18	.24/18	.24/18	.24/18
19	19	.24/18	.24/18	.24/18	.24/18	.24/18	.25/18	.26/18	.25/18	.25/18	.24/18	.24/18	.24/18	.24/18
21	21	.24/21	.24/21	.24/21	.24/21	.25/21	.25/21	.25/21	.25/21	.25/21	.24/21	.24/21	.24/21	.24/21
6	7	.11/ 8	.12/ 8	.14/ 7	.14/ 7	.17/ 7	.21/ 7	.25/ 7	.25/ 7	.21/ 7	.16/ 8	.12/ 9	.10/10	.08/10
9	9	.17/10	.17/10	.19/10	.21/10	.24/ 9	.24/ 9	.26/ 9	.26/ 9	.23/10	.20/10	.17/11	.15/11	.14/12
11	11	.20/11	.20/11	.21/11	.23/11	.25/11	.26/10	.26/10	.25/11	.22/12	.20/13	.19/13	.18/13	.18/13
13	13	.22/13	.22/13	.23/13	.24/13	.25/13	.26/13	.26/13	.25/13	.23/13	.22/14	.21/14	.20/15	.20/15
15	15	.23/16	.23/16	.24/16	.24/16	.25/16	.26/16	.26/16	.25/16	.24/17	.23/17	.22/17	.22/17	.22/17
17	17	.24/18	.24/18	.24/18	.24/18	.25/18	.26/18	.26/18	.25/18	.24/18	.23/19	.23/20	.23/20	.23/20
19	19	.24/18	.24/18	.24/18	.24/18	.25/18	.25/18	.25/18	.25/18	.24/19	.24/19	.23/20	.23/20	.23/20
21	21	.25/21	.25/21	.25/21	.25/21	.25/21	.25/21	.25/21	.25/21	.25/22	.24/22	.24/22	.24/22	.24/22
10	7	.16/ 7	.17/ 7	.18/ 7	.21/ 7	.24/ 7	.27/ 6	.25/ 7	.20/ 6	.15/10	.11/11	.09/12	.08/13	.07/13
9	9	.22/ 8	.22/ 8	.23/ 8	.25/ 8	.26/ 9	.27/ 9	.26/ 9	.23/10	.20/11	.15/13	.15/13	.13/14	.13/14
11	11	.24/11	.24/11	.24/11	.25/11	.26/11	.27/11	.26/10	.24/12	.22/13	.20/14	.18/15	.17/15	.17/15
13	13	.25/13	.25/13	.25/13	.26/13	.26/13	.27/13	.26/13	.25/13	.23/15	.22/15	.20/16	.20/17	.20/17
15	15	.25/16	.25/16	.25/16	.26/16	.26/16	.26/16	.26/16	.25/16	.24/16	.23/17	.22/18	.21/18	.21/18
17	17	.25/18	.25/18	.25/18	.26/18	.26/18	.26/18	.26/18	.25/18	.24/20	.23/20	.22/20	.22/20	.22/20
19	19	.25/18	.25/18	.25/18	.26/18	.26/18	.26/18	.26/18	.25/18	.24/20	.23/22	.23/22	.23/22	.23/22
21	21	.25/21	.25/21	.25/21	.25/21	.26/21	.26/21	.25/21	.25/21	.25/22	.24/23	.24/24	.24/24	.24/24
15	7	.19/ 8	.20/ 8	.21/ 8	.24/ 7	.27/ 7	.27/ 7	.28/ 6	.25/ 7	.20/ 9	.15/11	.10/17	.07/20	.07/20
9	9	.27/ 8	.27/ 8	.28/ 8	.28/ 8	.29/ 7	.29/ 7	.29/ 7	.26/ 9	.23/10	.19/12	.16/14	.14/17	.13/20
11	11	.28/ 8	.28/ 8	.28/ 8	.28/11	.28/11	.28/11	.28/11	.26/10	.24/12	.21/14	.19/16	.17/17	.17/20
13	13	.27/13	.27/13	.28/13	.28/13	.28/13	.28/13	.27/13	.26/13	.24/14	.23/16	.20/17	.19/20	.19/20
15	15	.27/16	.27/16	.27/16	.27/16	.27/16	.27/16	.27/16	.26/16	.23/17	.22/19	.21/20	.21/20	.21/20
17	17	.27/18	.27/18	.27/18	.27/18	.27/18	.27/18	.26/18	.26/18	.25/19	.23/20	.22/22	.22/22	.22/22
19	19	.26/18	.26/18	.26/18	.26/18	.26/18	.26/18	.26/18	.25/18	.24/21	.23/22	.23/23	.23/24	.23/25
21	21	.26/21	.26/21	.26/21	.26/21	.26/21	.26/21	.26/21	.25/21	.25/22	.24/23	.24/25	.24/26	.24/27
20	7	.20/ 8	.21/ 8	.23/ 8	.26/ 7	.29/ 7	.30/ 6	.25/ 7	.19/ 7	.14/13	.10/19	.08/25	.07/31	.07/35
9	9	.31/ 8	.31/ 8	.32/ 8	.32/ 8	.32/ 8	.32/ 7	.30/ 7	.26/ 9	.22/11	.18/13	.15/19	.14/23	.12/27
11	11	.32/ 8	.32/ 8	.32/ 8	.32/ 8	.31/11	.32/11	.32/11	.26/10	.23/13	.21/13	.17/19	.16/26	.16/35
13	13	.31/13	.31/13	.30/13	.30/13	.29/13	.29/13	.28/13	.26/13	.24/15	.22/17	.21/19	.20/23	.19/27
15	15	.30/16	.29/16	.29/16	.29/16	.28/16	.27/16	.27/16	.26/16	.24/16	.23/18	.22/19	.21/26	.21/27
17	17	.28/18	.28/18	.28/18	.28/18	.27/18	.27/18	.27/18	.26/18	.25/18	.24/20	.23/22	.22/26	.22/27
19	19	.28/18	.27/18	.27/18	.27/18	.27/18	.27/18	.27/18	.26/18	.25/20	.24/22	.23/23	.22/26	.22/27
21	21	.27/21	.27/21	.27/21	.27/21	.26/21	.26/21	.26/21	.25/21	.25/22	.24/24	.24/26	.23/26	.23/27
25	7	.19/ 9	.20/ 8	.23/ 8	.26/ 8	.31/ 7	.32/ 6	.25/ 7	.19/10	.14/17	.10/27	.08/57	.07/**	.06/**
9	9	.33/ 9	.34/ 9	.35/ 8	.35/ 8	.35/ 7	.35/ 7	.32/ 6	.26/ 9	.22/12	.18/17	.15/24	.13/33	.12/48
11	11	.36/ 9	.36/ 9	.36/ 8	.36/ 8	.36/ 8	.36/ 8	.30/11	.26/11	.23/13	.20/17	.19/24	.17/30	.16/35
13	13	.34/ 9	.34/ 9	.34/ 8	.34/ 8	.34/ 8	.34/ 8	.31/13	.28/13	.26/13	.22/17	.21/24	.19/30	.19/33
15	15	.32/ 16	.32/ 16	.32/ 16	.32/ 16	.30/ 6	.29/ 6	.27/ 6	.26/ 6	.24/16	.23/17	.22/24	.21/30	.20/33
17	17	.30/18	.30/18	.30/18	.30/18	.29/18	.28/18	.28/18	.27/18	.24/18	.23/17	.23/30	.22/33	.22/33
19	19	.29/18	.29/18	.29/18	.29/18	.28/18	.28/18	.28/18	.26/18	.25/18	.24/20	.23/24	.22/33	.22/33
21	21	.28/21	.28/21	.28/21	.28/21	.27/21	.27/21	.27/21	.26/21	.25/21	.24/26	.23/26	.23/30	.23/33

ASR

RMS VEL VEL IN FPS/ENCOUNTERED MODAL PERIOD, T<sub>o</sub> IN SECONDS  
LONGCRESTED  
QE

V	T <sub>o</sub>	SHIP HEADING ANGLE IN DEGREES										150	155	160
		30	45	60	75	90	105	120	135	150	155			
0	0	.09/ 8	.09/ 8	.11/ 7	.17/ 7	.24/ 6	.27/ 6	.21/ 6	.15/ 7	.11/ 7	.08/ 8	.07/ 8	.07/ 8	.07/ 8
0	.7	.07/ 8	.08/ 8	.12/ 9	.14/ 9	.21/ 8	.23/ 8	.20/ 8	.16/ 8	.13/ 9	.11/ 9	.10/ 9	.10/ 9	.10/ 9
9	.10/ 9	.11/ 9	.12/ 9	.14/ 10	.16/ 10	.19/ 10	.20/ 10	.15/ 10	.14/ 10	.12/ 10	.12/ 10	.11/ 10	.11/ 10	.11/ 10
11	.11/ 10	.12/ 10	.12/ 10	.14/ 11	.16/ 11	.17/ 11	.16/ 11	.14/ 11	.13/ 11	.12/ 12	.12/ 12	.11/ 12	.11/ 12	.11/ 12
13	.11/ 12	.12/ 12	.13/ 12	.14/ 12	.15/ 12	.13/ 13	.14/ 13	.15/ 13	.14/ 13	.12/ 13	.11/ 14	.11/ 14	.11/ 14	.11/ 14
15	.11/ 14	.11/ 14	.11/ 14	.11/ 14	.12/ 13	.12/ 13	.13/ 14	.13/ 14	.12/ 14	.11/ 16	.11/ 16	.10/ 16	.10/ 16	.10/ 16
17	.10/ 16	.10/ 16	.11/ 16	.11/ 16	.12/ 14	.12/ 14	.13/ 14	.13/ 14	.12/ 14	.11/ 16	.10/ 16	.10/ 16	.10/ 16	.10/ 16
19	.10/ 18	.10/ 16	.10/ 16	.10/ 16	.11/ 16	.11/ 16	.12/ 16	.11/ 16	.11/ 16	.10/ 16	.10/ 16	.10/ 16	.10/ 16	.10/ 16
21	.09/ 18	.09/ 18	.10/ 18	.10/ 18	.10/ 18	.10/ 18	.10/ 18	.10/ 18	.10/ 18	.10/ 18	.09/ 18	.09/ 18	.09/ 18	.09/ 18
5	7	.12/ 7	.12/ 7	.14/ 7	.18/ 6	.22/ 6	.27/ 6	.26/ 6	.19/ 7	.12/ 6	.08/ 9	.06/ 10	.05/ 10	.05/ 10
9	.14/ 9	.15/ 9	.16/ 9	.19/ 8	.21/ 8	.24/ 7	.23/ 8	.18/ 9	.14/ 9	.11/ 10	.09/ 11	.08/ 11	.08/ 11	.08/ 11
11	.15/ 10	.16/ 10	.16/ 10	.17/ 10	.19/ 10	.20/ 10	.20/ 10	.16/ 10	.13/ 11	.10/ 12	.09/ 13	.09/ 13	.09/ 13	.09/ 13
13	.14/ 12	.14/ 12	.15/ 12	.16/ 12	.17/ 11	.18/ 11	.17/ 11	.15/ 12	.13/ 12	.11/ 13	.10/ 13	.09/ 14	.09/ 14	.09/ 14
15	.13/ 14	.13/ 14	.14/ 13	.14/ 13	.15/ 13	.15/ 13	.15/ 13	.13/ 13	.12/ 14	.11/ 14	.10/ 15	.09/ 16	.09/ 16	.09/ 16
17	.12/ 16	.12/ 16	.13/ 16	.13/ 16	.13/ 14	.14/ 14	.14/ 14	.13/ 14	.12/ 15	.11/ 17	.10/ 17	.09/ 17	.09/ 17	.09/ 17
19	.11/ 16	.11/ 16	.12/ 16	.12/ 16	.12/ 16	.12/ 16	.12/ 16	.12/ 16	.11/ 17	.10/ 17	.09/ 19	.08/ 20	.08/ 20	.08/ 20
21	.10/ 18	.11/ 18	.11/ 18	.11/ 18	.11/ 18	.11/ 18	.11/ 18	.11/ 18	.11/ 18	.09/ 19	.08/ 20	.08/ 20	.08/ 20	.08/ 20
10	7	.19/ 7	.20/ 7	.22/ 7	.24/ 7	.25/ 7	.28/ 6	.30/ 6	.26/ 6	.17/ 8	.10/ 9	.07/ 11	.05/ 12	.04/ 13
9	.23/ 7	.23/ 7	.22/ 7	.23/ 7	.23/ 7	.23/ 7	.27/ 7	.27/ 6	.23/ 8	.17/ 9	.12/ 10	.09/ 12	.06/ 14	.06/ 14
11	.21/ 8	.22/ 8	.22/ 8	.22/ 8	.22/ 8	.22/ 8	.22/ 8	.20/ 10	.15/ 10	.12/ 12	.09/ 13	.08/ 14	.07/ 15	.07/ 15
13	.19/ 12	.19/ 12	.20/ 12	.20/ 12	.20/ 11	.20/ 11	.19/ 11	.17/ 11	.14/ 12	.11/ 13	.09/ 14	.08/ 15	.08/ 16	.08/ 16
15	.17/ 13	.17/ 13	.17/ 13	.17/ 13	.17/ 13	.17/ 13	.17/ 13	.15/ 13	.12/ 14	.10/ 15	.09/ 17	.08/ 18	.07/ 18	.07/ 18
17	.15/ 14	.15/ 14	.15/ 14	.15/ 14	.15/ 14	.15/ 14	.15/ 14	.13/ 14	.11/ 15	.10/ 17	.09/ 18	.08/ 19	.07/ 20	.07/ 20
19	.14/ 16	.14/ 16	.14/ 16	.14/ 16	.14/ 16	.14/ 16	.13/ 16	.13/ 16	.12/ 16	.10/ 17	.09/ 18	.08/ 20	.07/ 22	.07/ 22
21	.13/ 18	.12/ 18	.12/ 18	.12/ 18	.12/ 18	.12/ 18	.12/ 18	.11/ 18	.09/ 19	.08/ 20	.08/ 21	.07/ 22	.07/ 22	.07/ 22
15	7	.25/ 8	.26/ 8	.28/ 7	.31/ 7	.33/ 7	.33/ 7	.33/ 6	.26/ 6	.15/ 8	.08/ 10	.05/ 14	.03/ 17	.02/ 20
9	.31/ 8	.32/ 8	.32/ 8	.32/ 8	.32/ 8	.32/ 7	.32/ 7	.29/ 6	.23/ 6	.15/ 8	.10/ 10	.05/ 17	.04/ 20	.04/ 20
11	.29/ 8	.29/ 8	.29/ 8	.29/ 8	.29/ 8	.29/ 7	.27/ 7	.25/ 6	.20/ 10	.14/ 11	.10/ 13	.08/ 14	.06/ 17	.05/ 20
13	.26/ 8	.25/ 8	.25/ 8	.25/ 8	.24/ 7	.23/ 7	.23/ 7	.21/ 7	.17/ 11	.13/ 13	.10/ 15	.08/ 17	.06/ 20	.06/ 20
15	.22/ 8	.22/ 8	.22/ 8	.22/ 8	.21/ 8	.20/ 8	.20/ 8	.18/ 8	.15/ 12	.12/ 14	.09/ 16	.08/ 18	.06/ 20	.06/ 20
17	.19/ 14	.19/ 14	.19/ 14	.19/ 14	.18/ 14	.17/ 14	.17/ 14	.15/ 14	.13/ 14	.11/ 16	.09/ 18	.08/ 20	.06/ 20	.06/ 20
19	.17/ 16	.17/ 16	.17/ 16	.17/ 16	.16/ 16	.15/ 16	.15/ 16	.14/ 16	.12/ 16	.10/ 17	.08/ 19	.07/ 20	.06/ 22	.06/ 23
21	.15/ 18	.15/ 18	.15/ 18	.15/ 18	.14/ 18	.13/ 18	.12/ 18	.11/ 18	.09/ 20	.08/ 21	.07/ 22	.06/ 23	.06/ 24	.06/ 25
20	7	.28/ 8	.28/ 8	.31/ 8	.34/ 7	.38/ 7	.37/ 7	.37/ 6	.26/ 5	.14/ 9	.07/ 13	.03/ 19	.02/ 25	.01/ 33
9	.39/ 8	.39/ 8	.39/ 8	.39/ 8	.39/ 8	.39/ 7	.32/ 7	.32/ 6	.23/ 6	.19/ 10	.08/ 13	.05/ 19	.03/ 26	.02/ 27
11	.37/ 8	.37/ 8	.36/ 8	.35/ 8	.35/ 8	.35/ 7	.32/ 7	.32/ 6	.21/ 6	.13/ 10	.09/ 13	.06/ 19	.04/ 23	.03/ 27
13	.32/ 8	.32/ 8	.32/ 8	.31/ 8	.31/ 8	.31/ 8	.29/ 8	.29/ 8	.22/ 7	.17/ 11	.12/ 13	.06/ 19	.05/ 23	.04/ 26
15	.28/ 8	.27/ 8	.27/ 8	.26/ 8	.26/ 8	.26/ 8	.25/ 8	.25/ 8	.22/ 7	.19/ 13	.15/ 13	.08/ 15	.05/ 23	.04/ 27
17	.24/ 8	.23/ 8	.23/ 8	.23/ 8	.23/ 8	.23/ 8	.21/ 8	.21/ 8	.19/ 8	.16/ 14	.13/ 14	.08/ 20	.06/ 23	.05/ 27
19	.21/ 8	.20/ 8	.20/ 8	.20/ 8	.18/ 16	.17/ 16	.17/ 16	.14/ 16	.12/ 16	.10/ 17	.09/ 18	.08/ 20	.06/ 23	.05/ 27
21	.18/ 18	.18/ 18	.17/ 18	.16/ 18	.15/ 18	.15/ 18	.15/ 18	.13/ 18	.11/ 18	.09/ 20	.07/ 22	.06/ 24	.05/ 23	.05/ 27
25	7	.28/ 8	.29/ 8	.32/ 8	.37/ 8	.41/ 7	.40/ 6	.37/ 5	.27/ 5	.12/ 9	.05/ 17	.02/ 26	.01/ 42	.01/ 7
9	.45/ 9	.45/ 9	.46/ 9	.46/ 9	.45/ 8	.43/ 8	.43/ 7	.36/ 6	.23/ 6	.12/ 11	.07/ 17	.04/ 24	.02/ 31	.02/ 39
11	.44/ 9	.44/ 9	.44/ 9	.44/ 9	.44/ 8	.41/ 8	.41/ 8	.36/ 7	.29/ 6	.19/ 10	.07/ 17	.05/ 24	.03/ 30	.02/ 33
13	.39/ 9	.39/ 9	.38/ 9	.38/ 9	.38/ 8	.34/ 8	.34/ 8	.30/ 7	.24/ 6	.17/ 11	.07/ 17	.05/ 24	.03/ 33	.02/ 33
15	.33/ 9	.33/ 9	.33/ 9	.32/ 9	.32/ 9	.32/ 8	.29/ 8	.25/ 7	.20/ 13	.15/ 13	.10/ 15	.07/ 17	.06/ 24	.04/ 30
17	.28/ 9	.28/ 9	.27/ 9	.27/ 9	.27/ 8	.24/ 8	.24/ 8	.21/ 7	.17/ 14	.13/ 14	.10/ 18	.07/ 17	.06/ 24	.04/ 33
19	.24/ 9	.24/ 9	.23/ 9	.23/ 9	.23/ 8	.21/ 8	.21/ 8	.18/ 8	.15/ 16	.12/ 16	.09/ 18	.07/ 17	.06/ 24	.04/ 33
21	.21/ 9	.21/ 9	.20/ 9	.20/ 9	.18/ 8	.17/ 8	.17/ 8	.16/ 8	.13/ 18	.11/ 18	.09/ 20	.07/ 23	.05/ 30	.04/ 33
25	7	.28/ 8	.29/ 8	.32/ 8	.37/ 8	.41/ 7	.40/ 6	.37/ 5	.27/ 5	.12/ 9	.05/ 17	.02/ 26	.01/ 57	.01/ 7
9	.45/ 9	.45/ 9	.46/ 9	.46/ 9	.45/ 8	.43/ 8	.43/ 7	.36/ 6	.23/ 6	.12/ 11	.07/ 17	.04/ 24	.02/ 31	.02/ 39
11	.44/ 9	.44/ 9	.44/ 9	.44/ 9	.44/ 8	.41/ 8	.41/ 8	.36/ 7	.29/ 6	.19/ 10	.07/ 17	.05/ 24	.03/ 30	.02/ 33
13	.39/ 9	.39/ 9	.38/ 9	.38/ 9	.38/ 8	.34/ 8	.34/ 8	.30/ 7	.24/ 6	.17/ 11	.07/ 17	.05/ 24	.03/ 33	.02/ 33
15	.33/ 9	.33/ 9	.33/ 9	.32/ 9	.32/ 9	.32/ 8	.29/ 8	.25/ 7	.20/ 13	.15/ 13	.10/ 15	.07/ 17	.06/ 24	.04/ 30
17	.28/ 9	.28/ 9	.27/ 9	.27/ 9	.27/ 8	.24/ 8	.24/ 8	.21/ 7	.17/ 14	.13/ 14	.10/ 18	.07/ 17	.06/ 24	.04/ 33
19	.24/ 9	.24/ 9	.23/ 9	.23/ 9	.23/ 8	.21/ 8	.21/ 8	.18/ 8	.15/ 16	.12/ 16	.09/ 18	.07/ 17	.06/ 24	.04/ 33
21	.21/ 9	.21/ 9	.20/ 9	.20/ 9	.18/ 8	.17/ 8	.17/ 8	.16/ 8	.13/ 18	.11/ 18	.09/ 20	.07/ 23	.05/ 30	.04/ 33

## ASR

RMS VER ACC IN G'S/ENCOUNTERED MODAL PERIOD, T, IN SECONDS  
(ACC. X 100)

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										DE			
		0	15	30	45	60	75	90	105	120	135	150	165	180	
0	7	.21/. 8	.22/. 8	.25/. 9	.33/. 7	.52/. 6	.81/. 5	.92/. 5	.69/. 6	.45/. 6	.30/. 7	.23/. 7	.20/. 8	.19/. 8	
9	.24/. 9	.25/. 9	.28/. 8	.34/. 8	.46/. 7	.64/. 6	.71/. 5	.57/. 6	.42/. 7	.32/. 8	.27/. 8	.24/. 9	.23/. 9		
11	.23/. 10	.24/. 10	.26/. 10	.23/. 10	.30/. 9	.38/. 8	.50/. 6	.55/. 6	.46/. 8	.36/. 8	.26/. 9	.24/. 10	.23/. 10		
13	.21/. 10	.22/. 10	.26/. 10	.26/. 10	.32/. 10	.39/. 9	.43/. 6	.37/. 9	.30/. 10	.26/. 10	.23/. 10	.22/. 10	.21/. 10		
15	.19/. 12	.19/. 11	.22/. 12	.19/. 12	.26/. 10	.32/. 10	.34/. 10	.30/. 10	.25/. 10	.22/. 10	.20/. 11	.19/. 11	.19/. 12		
17	.17/. 13	.18/. 13	.19/. 12	.19/. 12	.22/. 11	.26/. 10	.28/. 10	.25/. 10	.21/. 11	.19/. 12	.17/. 13	.17/. 13	.17/. 13		
19	.15/. 14	.15/. 14	.15/. 13	.17/. 13	.19/. 13	.22/. 13	.23/. 12	.23/. 12	.21/. 13	.18/. 13	.16/. 13	.15/. 13	.14/. 14		
21	.13/. 14	.13/. 14	.13/. 14	.14/. 14	.16/. 14	.19/. 14	.20/. 13	.18/. 14	.16/. 14	.14/. 14	.13/. 14	.13/. 14	.13/. 14		
8	7	.40/. 7	.42/. 7	.48/. 7	.61/. 6	.79/. 6	.97/. 5	.92/. 5	.57/. 6	.31/. 8	.19/. 8	.13/. 9	.11/. 10	.10/. 10	
9	.42/. 8	.44/. 8	.48/. 8	.56/. 8	.67/. 7	.77/. 6	.71/. 5	.48/. 7	.31/. 9	.22/. 10	.17/. 10	.15/. 11	.14/. 11		
11	.39/. 10	.42/. 9	.47/. 9	.54/. 9	.59/. 6	.54/. 6	.54/. 6	.39/. 9	.27/. 10	.21/. 10	.17/. 11	.15/. 12	.15/. 12		
13	.33/. 10	.34/. 10	.36/. 10	.39/. 10	.43/. 6	.46/. 6	.43/. 6	.32/. 10	.24/. 10	.19/. 12	.16/. 12	.14/. 13	.14/. 13		
15	.28/. 11	.29/. 11	.30/. 10	.32/. 10	.35/. 10	.37/. 6	.34/. 10	.26/. 11	.20/. 12	.16/. 13	.14/. 13	.13/. 13	.13/. 13		
17	.24/. 12	.25/. 12	.25/. 12	.27/. 11	.29/. 11	.30/. 10	.28/. 10	.22/. 12	.17/. 13	.14/. 14	.13/. 14	.12/. 15	.12/. 15		
19	.21/. 13	.21/. 13	.22/. 13	.23/. 13	.24/. 12	.25/. 12	.23/. 12	.18/. 13	.15/. 14	.13/. 15	.11/. 16	.10/. 16	.10/. 16		
21	.18/. 14	.18/. 14	.19/. 14	.20/. 13	.21/. 13	.21/. 13	.20/. 13	.16/. 14	.13/. 15	.11/. 15	.10/. 17	.09/. 17	.08/. 17		
10	7	.74/. 7	.77/. 7	.84/. 7	.95/. 7	.95/. 7	.97/. 6	.1.13/. 6	.92/. 5	.47/. 7	.22/. 9	.12/. 10	.07/. 13	.05/. 13	
9	.80/. 7	.81/. 7	.84/. 7	.89/. 7	.90/. 6	.90/. 6	.71/. 5	.40/. 7	.23/. 10	.14/. 12	.10/. 13	.08/. 14	.08/. 14		
11	.69/. 7	.69/. 7	.71/. 7	.72/. 7	.73/. 6	.69/. 6	.54/. 5	.33/. 9	.21/. 11	.14/. 13	.11/. 14	.09/. 15	.09/. 15		
13	.57/. 7	.57/. 7	.57/. 7	.57/. 7	.58/. 7	.58/. 6	.43/. 6	.34/. 9	.27/. 10	.18/. 12	.13/. 13	.09/. 16	.09/. 16		
15	.46/. 7	.47/. 7	.47/. 7	.47/. 7	.47/. 7	.46/. 6	.43/. 6	.34/. 10	.23/. 11	.16/. 13	.12/. 14	.10/. 15	.09/. 17		
17	.39/. 7	.39/. 7	.39/. 7	.39/. 7	.39/. 7	.38/. 6	.35/. 6	.28/. 10	.19/. 13	.14/. 14	.11/. 15	.09/. 17	.08/. 18		
19	.32/. 7	.32/. 7	.32/. 7	.32/. 7	.32/. 7	.31/. 6	.29/. 6	.23/. 12	.12/. 13	.12/. 16	.10/. 17	.08/. 18	.07/. 18		
21	.27/. 7	.27/. 7	.27/. 7	.27/. 7	.27/. 7	.26/. 6	.24/. 6	.20/. 13	.14/. 15	.11/. 17	.09/. 18	.07/. 19	.07/. 20		
15	7	1.03/. 8	1.06/. 8	1.13/. 7	1.24/. 7	1.33/. 7	1.33/. 7	1.29/. 6	.92/. 5	.39/. 8	.15/. 10	.06/. 14	.03/. 17	.02/. 20	
9	1.20/. 8	1.22/. 8	1.23/. 7	1.23/. 7	1.18/. 7	1.04/. 6	.71/. 5	.34/. 9	.17/. 11	.09/. 14	.05/. 17	.04/. 20	.04/. 20		
11	1.06/. 8	1.05/. 8	1.04/. 7	1.01/. 7	.94/. 7	.80/. 6	.54/. 5	.28/. 10	.16/. 13	.09/. 14	.07/. 17	.05/. 20	.05/. 20		
13	.86/. 8	.86/. 8	.84/. 8	.80/. 7	.73/. 7	.62/. 6	.43/. 9	.24/. 11	.14/. 14	.09/. 16	.07/. 17	.06/. 20	.05/. 20		
15	.70/. 8	.70/. 8	.69/. 8	.64/. 7	.58/. 7	.49/. 6	.34/. 10	.20/. 12	.13/. 15	.09/. 17	.07/. 17	.06/. 20	.05/. 20		
17	.58/. 8	.57/. 8	.55/. 8	.52/. 7	.47/. 7	.40/. 6	.28/. 10	.17/. 13	.11/. 16	.08/. 17	.06/. 17	.06/. 20	.05/. 20		
19	.48/. 8	.47/. 8	.46/. 8	.43/. 7	.39/. 7	.33/. 6	.23/. 13	.15/. 14	.10/. 17	.07/. 19	.06/. 20	.05/. 20	.05/. 20		
21	.40/. 8	.40/. 8	.38/. 8	.36/. 7	.33/. 7	.27/. 6	.20/. 13	.13/. 15	.09/. 18	.07/. 20	.06/. 22	.05/. 22	.05/. 20		
20	7	1.20/. 8	1.22/. 8	1.32/. 8	1.47/. 7	1.57/. 7	1.48/. 6	.93/. 5	.31/. 8	.10/. 13	.03/. 19	.01/. 24	.01/. 31		
9	1.60/. 8	1.59/. 8	1.58/. 8	1.56/. 7	1.45/. 7	1.20/. 6	.71/. 5	.28/. 10	.11/. 13	.05/. 19	.03/. 23	.02/. 26	.02/. 27		
11	1.45/. 8	1.43/. 8	1.38/. 8	1.31/. 7	1.16/. 7	.92/. 6	.54/. 5	.24/. 10	.11/. 13	.06/. 19	.04/. 23	.03/. 26	.03/. 27		
13	1.19/. 8	1.17/. 8	1.12/. 8	1.04/. 7	.91/. 7	.71/. 6	.43/. 9	.20/. 12	.11/. 13	.06/. 19	.04/. 23	.03/. 26	.03/. 27		
15	.97/. 8	.95/. 8	.90/. 8	.83/. 7	.72/. 7	.56/. 6	.34/. 10	.17/. 13	.10/. 13	.06/. 19	.04/. 23	.03/. 27	.03/. 27		
17	.79/. 8	.78/. 8	.74/. 8	.68/. 7	.58/. 7	.45/. 6	.28/. 11	.17/. 13	.15/. 14	.09/. 17	.06/. 19	.04/. 26	.03/. 27		
19	.66/. 8	.64/. 8	.61/. 8	.56/. 7	.48/. 7	.37/. 6	.23/. 13	.13/. 16	.08/. 18	.06/. 19	.04/. 23	.04/. 26	.03/. 27		
21	.55/. 8	.54/. 8	.51/. 8	.47/. 7	.40/. 7	.31/. 6	.20/. 14	.11/. 16	.07/. 20	.05/. 19	.04/. 23	.04/. 26	.03/. 27		
25	7	1.26/. 8	1.32/. 8	1.45/. 8	1.62/. 8	1.79/. 7	1.67/. 6	.95/. 5	.25/. 9	.06/. 17	.02/. 25	.04/. 4	.03/. 4		
9	1.91/. 9	1.94/. 9	1.96/. 8	1.88/. 8	1.74/. 7	1.38/. 6	.72/. 5	.23/. 10	.08/. 17	.03/. 24	.03/. 30	.02/. 37	.02/. 39		
11	1.81/. 9	1.81/. 8	1.77/. 8	1.61/. 8	1.40/. 7	1.05/. 6	.55/. 5	.20/. 11	.08/. 17	.04/. 24	.03/. 30	.02/. 33	.02/. 33		
13	1.51/. 9	1.51/. 9	1.45/. 8	1.29/. 8	1.10/. 7	.81/. 6	.43/. 9	.17/. 13	.08/. 17	.04/. 24	.03/. 30	.02/. 33	.02/. 33		
15	1.24/. 9	1.23/. 9	1.23/. 9	1.17/. 8	1.04/. 8	.84/. 8	.70/. 7	.64/. 6	.34/. 10	.08/. 17	.04/. 24	.03/. 30	.02/. 33		
17	1.01/. 9	1.00/. 9	.95/. 9	.84/. 8	.70/. 7	.51/. 6	.28/. 11	.13/. 15	.07/. 17	.04/. 24	.03/. 30	.02/. 33	.02/. 33		
19	.84/. 9	.83/. 9	.79/. 8	.69/. 8	.57/. 7	.42/. 6	.23/. 13	.11/. 17	.07/. 17	.04/. 24	.03/. 30	.02/. 33	.02/. 33		
21	.70/. 9	.69/. 9	.66/. 8	.58/. 8	.48/. 7	.35/. 6	.20/. 14	.10/. 18	.06/. 17	.04/. 24	.03/. 30	.02/. 33	.02/. 33		

RMS LONGITUDINAL DISPLACEMENT IN FEET/ENCOUNTERED MODAL PERIOD, T', IN SECONDS

V	T <sub>0</sub>	0	15	30	45	60	SHIP HEADING ANGLE IN DEGREES						165	160
							75	90	105	120	135	150		
0	7	.07/.8	.07/.8	.06/.8	.06/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.06/.8	.06/.8
9	.10/.10	.10/.10	.09/.10	.09/.10	.08/.10	.08/.10	.06/.10	.06/.10	.06/.10	.06/.10	.06/.10	.06/.10	.08/.10	.09/.10
11	.12/.11	.12/.11	.11/.11	.10/.11	.09/.11	.08/.11	.07/.11	.07/.11	.07/.11	.07/.11	.07/.11	.07/.11	.09/.11	.09/.10
13	.14/.14	.13/.14	.13/.14	.11/.14	.10/.14	.09/.14	.08/.13	.08/.13	.08/.13	.08/.13	.08/.13	.08/.13	.10/.13	.11/.13
15	.14/.16	.14/.16	.12/.16	.12/.16	.11/.16	.10/.16	.09/.16	.08/.16	.08/.16	.08/.16	.08/.16	.08/.16	.10/.16	.11/.16
17	.15/.18	.15/.18	.14/.18	.14/.18	.12/.18	.11/.18	.09/.18	.09/.18	.09/.18	.09/.18	.09/.18	.09/.18	.10/.18	.12/.18
19	.16/.18	.15/.18	.15/.18	.14/.18	.13/.18	.11/.18	.10/.18	.09/.18	.09/.18	.09/.18	.09/.18	.09/.18	.11/.18	.12/.18
21	.16/.21	.16/.21	.15/.21	.15/.21	.13/.21	.11/.21	.10/.21	.09/.21	.09/.21	.09/.21	.09/.21	.09/.21	.10/.21	.13/.21
5	7	.05/.8	.05/.8	.05/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.06/.10	.09/.10
9	.08/.10	.07/.10	.07/.10	.07/.10	.06/.10	.06/.10	.06/.10	.06/.10	.06/.10	.06/.10	.06/.10	.06/.10	.08/.10	.09/.10
11	.10/.12	.09/.12	.09/.12	.08/.12	.08/.12	.07/.12	.07/.12	.07/.12	.07/.12	.07/.12	.07/.12	.07/.12	.09/.11	.09/.10
13	.11/.14	.11/.14	.10/.14	.09/.14	.08/.14	.07/.14	.07/.14	.07/.14	.07/.14	.07/.14	.07/.14	.07/.14	.09/.14	.10/.13
15	.12/.16	.12/.16	.11/.16	.10/.16	.09/.16	.08/.16	.08/.16	.08/.16	.08/.16	.08/.16	.08/.16	.08/.16	.10/.16	.11/.16
17	.13/.18	.12/.18	.12/.18	.12/.18	.10/.18	.09/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.10/.18	.11/.18
19	.13/.21	.13/.21	.12/.21	.12/.21	.11/.21	.11/.21	.10/.21	.09/.21	.09/.21	.09/.21	.09/.21	.09/.21	.10/.20	.10/.20
21	.14/.21	.13/.21	.13/.21	.13/.21	.11/.21	.11/.21	.10/.21	.09/.21	.09/.21	.09/.21	.09/.21	.09/.21	.10/.20	.10/.20
10	7	.04/.8	.04/.8	.03/.8	.03/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.05/.12	.07/.12
9	.06/.10	.06/.10	.06/.10	.06/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.07/.12	.09/.13
11	.08/.12	.08/.12	.07/.12	.07/.12	.07/.12	.07/.12	.07/.12	.07/.13	.07/.13	.07/.13	.07/.13	.07/.13	.09/.13	.10/.13
13	.09/.14	.09/.14	.08/.14	.08/.14	.08/.14	.08/.14	.08/.14	.08/.14	.08/.14	.08/.14	.08/.14	.08/.14	.10/.14	.11/.14
15	.10/.16	.10/.16	.10/.16	.10/.16	.09/.16	.09/.16	.09/.16	.09/.16	.09/.16	.09/.16	.09/.16	.09/.16	.10/.16	.11/.16
17	.11/.18	.10/.18	.10/.18	.10/.18	.09/.18	.09/.18	.09/.18	.09/.18	.09/.18	.09/.18	.09/.18	.09/.18	.10/.17	.11/.17
19	.11/.21	.11/.21	.10/.21	.10/.21	.10/.21	.10/.21	.10/.21	.09/.21	.09/.21	.09/.21	.09/.21	.09/.21	.10/.20	.11/.20
21	.12/.21	.12/.21	.11/.21	.11/.21	.10/.21	.10/.21	.10/.21	.09/.21	.09/.21	.09/.21	.09/.21	.09/.21	.10/.20	.10/.20
15	7	.03/.8	.03/.8	.03/.8	.03/.8	.03/.10	.03/.10	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.06/.14	.07/.13
9	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.06/.13	.07/.13
11	.06/.12	.06/.12	.06/.12	.06/.12	.06/.12	.06/.13	.06/.13	.06/.13	.06/.13	.06/.13	.06/.13	.06/.13	.07/.13	.08/.13
13	.08/.14	.08/.14	.07/.14	.07/.14	.07/.14	.07/.14	.07/.14	.07/.14	.07/.14	.07/.14	.07/.14	.07/.14	.08/.14	.09/.14
15	.08/.16	.08/.16	.08/.16	.08/.16	.08/.16	.08/.16	.08/.16	.08/.16	.08/.16	.08/.16	.08/.16	.08/.16	.09/.16	.10/.16
17	.09/.18	.09/.18	.09/.18	.09/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.09/.17	.10/.17
19	.10/.21	.10/.21	.10/.21	.10/.21	.09/.21	.09/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.10/.20	.11/.20
21	.10/.21	.10/.21	.10/.21	.10/.21	.09/.21	.09/.21	.09/.21	.09/.21	.09/.21	.09/.21	.09/.21	.09/.21	.10/.20	.10/.20
15	7	.02/.8	.02/.8	.02/.8	.02/.8	.03/.13	.03/.13	.08/.13	.08/.13	.08/.13	.08/.13	.08/.13	.14/.13	.21/.13
9	.04/.10	.04/.10	.04/.10	.04/.10	.04/.13	.04/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.14/.13	.21/.13
11	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.14/.13	.21/.13
13	.06/.14	.06/.14	.06/.14	.06/.14	.06/.13	.06/.13	.06/.13	.06/.13	.06/.13	.06/.13	.06/.13	.06/.13	.14/.13	.21/.13
15	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.14/.16	.21/.16
17	.07/.18	.07/.18	.07/.18	.07/.18	.07/.16	.07/.16	.07/.16	.07/.16	.07/.16	.07/.16	.07/.16	.07/.16	.15/.16	.22/.16
19	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.14/.24	.22/.24
21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.15/.23	.22/.26
20	7	.02/.8	.02/.8	.02/.8	.02/.8	.02/.8	.02/.8	.03/.13	.03/.13	.03/.13	.03/.13	.03/.13	.14/.13	.21/.13
9	.04/.10	.04/.10	.04/.10	.04/.10	.03/.10	.03/.10	.03/.10	.03/.10	.03/.10	.03/.10	.03/.10	.03/.10	.14/.10	.21/.10
11	.05/.13	.05/.13	.05/.13	.05/.13	.04/.13	.04/.13	.04/.13	.04/.13	.04/.13	.04/.13	.04/.13	.04/.13	.14/.13	.21/.13
13	.06/.14	.06/.14	.06/.14	.06/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.14/.14	.21/.14
15	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.14/.16	.21/.16
17	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.14/.18	.21/.18
19	.08/.21	.08/.21	.08/.21	.08/.21	.07/.21	.07/.21	.07/.21	.07/.21	.07/.21	.07/.21	.07/.21	.07/.21	.13/.21	.20/.21
21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.13/.21	.20/.21
25	7	.02/.9	.02/.9	.02/.9	.02/.9	.02/.9	.02/.9	.05/.17	.05/.17	.05/.17	.05/.17	.05/.17	.12/.17	.27/.17
9	.03/.10	.03/.10	.03/.10	.03/.10	.03/.10	.03/.10	.03/.10	.05/.17	.05/.17	.05/.17	.05/.17	.05/.17	.12/.17	.27/.17
11	.05/.13	.05/.13	.05/.13	.05/.13	.04/.13	.04/.13	.04/.13	.04/.13	.04/.13	.04/.13	.04/.13	.04/.13	.12/.13	.27/.13
13	.06/.14	.06/.14	.06/.14	.06/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.12/.14	.27/.14
15	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.12/.16	.27/.16
17	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.12/.18	.27/.18
19	.08/.21	.08/.21	.08/.21	.08/.21	.07/.21	.07/.21	.07/.21	.07/.21	.07/.21	.07/.21	.07/.21	.07/.21	.12/.21	.27/.21
21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.12/.21	.27/.21

ASR

RMS LON VEL IN FPS/ENCOUNTERED MODAL PERIOD, T • IN SECONDS  
SHORTCRESTED  
V TO QE

V	T	0	SHIP HEADING ANGLE IN DEGREES						135	150	165	180
			15	30	45	60	75	90				
0	7	.05/ 8	.05/ 6	.05/ 7	.05/ 7	.04/ 7	.04/ 7	.04/ 7	.05/ 7	.05/ 8	.05/ 8	.05/ 8
0	9	.07/ 9	.07/ 9	.06/ 9	.06/ 9	.05/ 9	.05/ 9	.05/ 9	.05/ 8	.06/ 9	.06/ 9	.06/ 9
11	11	.08/10	.08/10	.07/10	.06/10	.05/10	.05/10	.05/10	.05/10	.06/10	.06/10	.07/10
13	13	.08/13	.07/13	.07/13	.06/13	.05/13	.05/12	.05/12	.05/12	.06/12	.06/12	.06/12
15	15	.07/14	.07/14	.06/14	.06/14	.05/14	.05/14	.05/14	.05/14	.06/14	.06/14	.06/14
17	17	.07/16	.07/16	.06/16	.06/16	.05/16	.04/16	.04/16	.04/16	.05/16	.05/16	.06/16
19	19	.06/18	.06/18	.06/18	.05/18	.05/18	.04/18	.04/18	.04/18	.05/18	.05/18	.05/18
21	21	.06/18	.06/18	.06/18	.05/18	.04/18	.04/18	.03/18	.04/18	.05/18	.05/18	.05/18
8	7	.05/ 8	.05/ 8	.04/ 8	.04/ 7	.04/ 7	.04/ 8	.04/ 8	.04/ 9	.05/ 9	.05/ 9	.06/10
8	9	.06/ 9	.06/ 9	.06/ 9	.05/ 9	.05/ 9	.05/ 9	.05/ 9	.05/10	.06/10	.06/10	.06/10
13	13	.07/10	.07/10	.06/10	.06/10	.05/10	.05/10	.05/10	.05/10	.06/12	.06/12	.06/12
15	15	.06/14	.06/14	.06/14	.05/14	.05/14	.04/14	.04/14	.04/14	.05/15	.06/15	.06/15
17	17	.06/16	.06/16	.06/16	.05/16	.04/16	.04/16	.04/16	.04/16	.05/16	.06/17	.06/17
19	19	.06/18	.06/18	.05/18	.05/18	.04/18	.04/18	.03/18	.04/17	.05/17	.06/17	.07/17
21	21	.05/18	.05/18	.05/18	.04/18	.03/18	.03/18	.03/19	.04/20	.05/20	.06/20	.07/20
10	7	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 10	.05/12	.06/13	.06/13	.06/13
9	9	.05/ 9	.05/ 9	.05/ 9	.05/ 9	.05/10	.05/10	.05/10	.06/13	.06/13	.06/13	.06/13
11	11	.06/10	.06/10	.06/10	.05/10	.05/11	.05/12	.05/13	.06/13	.06/13	.06/13	.06/13
13	13	.06/13	.06/13	.06/13	.05/13	.05/13	.05/13	.05/13	.05/14	.06/14	.06/15	.06/15
15	15	.06/14	.06/14	.05/14	.05/14	.04/14	.04/14	.04/14	.05/15	.06/16	.06/16	.06/16
17	17	.06/16	.06/16	.05/16	.05/16	.04/16	.04/16	.04/16	.05/15	.06/17	.06/17	.06/17
19	19	.05/18	.05/18	.05/18	.04/18	.04/18	.04/18	.04/18	.05/18	.06/17	.06/17	.07/17
21	21	.05/18	.05/18	.05/18	.04/18	.04/18	.04/18	.04/19	.05/19	.06/19	.06/19	.07/19
15	7	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.03/13	.04/13	.05/13	.06/13	.06/13
9	9	.05/ 9	.05/ 9	.05/ 9	.04/ 9	.04/ 9	.04/ 9	.04/14	.05/14	.06/14	.06/14	.06/14
11	11	.05/10	.05/10	.05/10	.05/10	.05/10	.05/10	.05/14	.06/17	.06/17	.06/17	.06/20
13	13	.06/13	.05/13	.05/13	.05/13	.05/13	.05/13	.05/14	.06/17	.06/17	.06/17	.06/20
15	15	.05/14	.05/14	.05/14	.05/14	.04/14	.04/14	.04/14	.05/17	.06/17	.06/17	.06/20
17	17	.05/16	.05/16	.05/16	.04/16	.04/16	.04/16	.04/16	.05/17	.06/20	.06/20	.06/20
19	19	.05/18	.05/18	.05/18	.04/18	.04/18	.04/18	.04/18	.04/17	.05/20	.05/20	.05/20
21	21	.05/21	.05/21	.04/21	.04/21	.04/21	.04/21	.03/19	.04/23	.05/23	.06/23	.07/23
20	7	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.03/13	.03/13	.04/13	.05/13	.06/13	.06/13	.06/13
9	9	.04/10	.04/10	.04/10	.04/10	.04/13	.04/13	.04/13	.05/19	.06/19	.06/19	.06/19
11	11	.05/11	.05/11	.05/11	.05/11	.04/13	.04/13	.04/13	.05/19	.06/23	.06/23	.06/23
13	13	.05/13	.05/13	.05/13	.04/13	.04/13	.04/13	.04/19	.05/19	.06/23	.06/23	.06/23
15	15	.05/14	.05/14	.05/14	.04/14	.04/14	.04/14	.04/19	.05/19	.06/23	.06/23	.06/23
17	17	.05/16	.05/16	.05/16	.04/16	.04/16	.04/16	.04/19	.05/19	.06/23	.06/23	.06/23
19	19	.05/18	.05/18	.05/18	.04/18	.04/18	.04/18	.04/19	.05/19	.06/23	.06/23	.06/23
21	21	.04/21	.04/21	.04/21	.04/21	.04/21	.04/21	.03/19	.04/23	.05/23	.06/23	.07/23
25	7	.03/ 8	.03/ 8	.03/ 9	.03/ 9	.03/17	.03/17	.04/17	.05/17	.06/17	.06/17	.06/17
9	9	.04/10	.04/10	.04/10	.04/10	.04/17	.04/17	.04/17	.05/17	.06/17	.06/17	.06/17
11	11	.04/11	.04/11	.04/11	.04/11	.04/17	.04/17	.04/17	.05/17	.06/17	.06/17	.06/17
13	13	.05/13	.05/13	.05/13	.04/13	.04/13	.04/13	.04/17	.05/17	.06/17	.06/17	.06/17
15	15	.05/14	.05/14	.05/14	.04/14	.04/14	.04/14	.04/17	.05/17	.06/17	.06/17	.06/17
17	17	.04/16	.04/16	.04/16	.04/16	.04/17	.04/17	.04/17	.05/24	.06/24	.06/24	.06/24
19	19	.04/18	.04/18	.04/18	.04/18	.04/17	.04/17	.04/17	.05/24	.06/33	.06/33	.06/33
21	21	.04/21	.04/21	.04/21	.04/21	.03/17	.03/17	.03/17	.04/24	.05/30	.06/33	.07/33

ASR

RMS LON ACC IN G'S/ENCOUNTERED MODAL PERIOD, T<sub>0</sub>, IN SECONDS  
(ACC. X 100)

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										DE	
		0	15	30	45	60	75	90	105	120	135	150	
0	7	.15/.7	.15/.7	.14/.7	.14/.7	.13/.7	.13/.7	.13/.7	.13/.7	.13/.7	.13/.7	.13/.7	.13/.7
9	.17/.8	.17/.8	.15/.8	.15/.8	.14/.8	.14/.8	.12/.8	.12/.8	.13/.8	.14/.8	.15/.8	.15/.8	.15/.8
11	.16/10	.16/10	.15/10	.15/10	.14/10	.14/10	.11/9	.11/9	.11/9	.12/9	.13/9	.14/9	.14/9
13	.14/10	.14/10	.13/10	.13/10	.12/10	.12/10	.10/10	.09/10	.09/10	.10/10	.11/10	.12/10	.12/10
15	.13/12	.12/12	.12/12	.12/12	.11/12	.10/11	.09/11	.08/11	.08/11	.09/11	.10/11	.11/11	.11/11
17	.11/13	.11/13	.10/13	.09/13	.08/13	.07/13	.07/13	.07/13	.07/13	.08/13	.09/13	.09/13	.09/13
19	.10/14	.10/14	.09/14	.08/14	.07/14	.06/14	.06/14	.06/14	.06/14	.07/14	.08/14	.08/14	.08/14
21	.09/16	.08/16	.07/16	.06/16	.05/16	.05/16	.05/16	.05/16	.05/16	.06/16	.07/16	.07/16	.07/16
8	7	.15/.7	.15/.7	.14/.7	.14/.7	.13/.7	.13/.7	.12/.7	.12/.7	.12/.7	.12/.9	.13/.9	.14/.9
9	.17/.8	.17/.8	.16/.8	.16/.8	.15/.8	.15/.8	.14/.8	.14/.8	.14/.8	.14/.8	.15/.8	.16/.8	.16/.8
11	.16/10	.16/10	.15/10	.15/10	.14/10	.14/10	.12/10	.11/9	.10/10	.10/10	.11/11	.12/11	.15/11
13	.15/10	.14/10	.14/10	.14/10	.14/10	.14/10	.12/10	.11/10	.09/11	.10/12	.11/12	.14/12	.14/12
15	.13/12	.13/12	.12/12	.12/12	.11/12	.11/12	.09/12	.08/12	.07/12	.08/13	.09/13	.10/13	.12/13
17	.11/13	.11/13	.10/13	.09/13	.08/13	.07/13	.06/13	.06/13	.06/13	.07/14	.09/14	.10/14	.11/14
19	.10/14	.10/14	.09/14	.08/14	.07/14	.06/14	.06/14	.06/14	.06/14	.06/15	.08/15	.09/16	.09/16
21	.09/16	.08/16	.07/16	.06/16	.05/16	.05/16	.05/16	.05/16	.05/16	.06/16	.07/16	.08/16	.08/16
10	7	.15/.7	.14/.7	.14/.7	.13/.7	.13/.7	.13/.8	.12/.8	.12/.8	.12/.8	.12/.9	.13/.9	.14/.9
9	.17/.8	.17/.8	.16/.8	.16/.8	.15/.8	.14/.8	.13/.8	.12/.8	.12/.8	.12/.8	.13/.9	.14/.9	.14/.9
11	.16/10	.16/10	.15/10	.15/10	.14/10	.14/10	.13/10	.12/10	.11/13	.12/13	.14/13	.15/13	.16/13
13	.15/10	.14/10	.14/10	.14/10	.14/10	.14/10	.12/10	.11/10	.10/13	.11/13	.12/13	.14/13	.14/13
15	.13/12	.13/12	.12/12	.12/12	.11/12	.11/12	.10/12	.09/13	.09/14	.10/14	.11/14	.12/15	.13/15
17	.11/13	.11/13	.10/13	.09/13	.08/13	.07/14	.07/14	.07/14	.07/15	.08/15	.09/15	.10/15	.11/15
19	.10/14	.10/14	.09/14	.08/14	.07/14	.06/14	.06/14	.06/14	.06/15	.06/16	.08/16	.09/16	.10/16
21	.09/16	.08/16	.07/16	.06/16	.05/16	.05/16	.05/16	.05/16	.05/16	.06/17	.07/17	.09/17	.09/17
15	7	.14/.8	.14/.8	.13/.8	.13/.7	.13/.7	.13/.7	.12/.7	.12/.7	.12/.7	.12/.9	.12/.9	.12/.9
9	.17/.8	.16/.8	.16/.8	.15/.8	.15/.8	.14/.8	.13/.8	.13/.8	.12/.8	.12/.8	.13/.9	.14/.9	.14/.9
11	.16/10	.16/10	.15/10	.15/10	.14/10	.14/10	.13/10	.11/10	.11/14	.11/14	.12/17	.13/17	.15/17
13	.15/10	.14/10	.14/10	.14/10	.14/10	.14/10	.12/10	.10/14	.09/17	.10/17	.11/17	.12/20	.15/20
15	.13/12	.13/12	.12/12	.12/12	.11/12	.11/12	.10/12	.09/14	.08/17	.08/17	.09/20	.10/20	.12/20
17	.11/13	.11/13	.10/13	.09/13	.08/14	.07/14	.07/14	.07/17	.07/17	.08/20	.09/20	.10/20	.11/20
19	.10/14	.10/14	.09/14	.08/14	.07/14	.06/14	.06/14	.06/17	.06/17	.07/20	.08/20	.09/20	.10/20
21	.09/16	.08/16	.07/16	.06/16	.05/17	.05/17	.05/17	.06/20	.06/20	.06/20	.06/20	.08/20	.08/20
20	7	.13/.8	.13/.8	.13/.8	.13/.8	.12/.8	.12/.8	.11/.13	.11/.13	.10/13	.09/13	.08/13	.07/13
9	.16/.9	.16/.9	.15/.9	.15/.9	.14/.9	.14/.9	.13/.8	.12/.8	.11/.13	.11/.13	.10/19	.10/19	.10/19
11	.16/10	.16/10	.15/10	.15/10	.14/10	.14/10	.12/10	.11/10	.10/19	.10/19	.10/23	.11/23	.11/23
13	.15/10	.14/10	.14/10	.14/10	.13/10	.13/10	.11/10	.10/19	.09/19	.09/19	.10/23	.11/23	.11/23
15	.13/12	.13/12	.12/12	.12/12	.11/12	.11/12	.10/12	.08/19	.08/19	.08/23	.09/23	.10/23	.10/26
17	.11/13	.11/13	.10/13	.09/13	.08/14	.07/14	.07/14	.07/19	.07/19	.07/23	.08/23	.09/26	.09/26
19	.10/14	.10/14	.09/14	.08/14	.07/14	.06/14	.06/14	.06/19	.06/19	.06/23	.07/23	.08/26	.08/26
21	.09/16	.08/16	.07/16	.06/19	.05/23	.05/23	.05/23	.06/23	.06/23	.06/23	.07/26	.07/26	.08/26
25	7	.13/.7	.13/.7	.12/.7	.12/.7	.12/.7	.12/.7	.11/.17	.11/.17	.10/17	.09/17	.08/17	.07/17
9	.16/.9	.16/.9	.15/.9	.15/.9	.14/.9	.14/.9	.13/.8	.12/.8	.11/.17	.11/.17	.10/17	.09/17	.08/17
11	.16/10	.16/10	.15/10	.15/10	.14/10	.14/10	.12/10	.11/10	.10/17	.10/17	.09/17	.08/17	.08/17
13	.14/10	.14/10	.13/10	.13/10	.12/10	.12/10	.11/10	.10/17	.09/17	.09/17	.08/17	.08/33	.08/33
15	.13/.12	.13/.12	.12/12	.12/12	.11/12	.11/12	.10/12	.09/17	.08/17	.08/17	.07/17	.08/33	.08/33
17	.11/13	.11/13	.10/13	.09/13	.08/14	.07/14	.07/14	.07/17	.07/17	.06/17	.07/33	.07/33	.08/33
19	.10/14	.10/14	.09/14	.08/14	.07/14	.06/14	.06/14	.06/17	.06/17	.06/17	.06/33	.07/33	.07/33
21	.09/16	.08/16	.07/16	.06/16	.05/17	.05/17	.05/17	.06/20	.06/20	.06/20	.06/20	.08/20	.08/20

ASR  
SHORTCRESTED  
RMS LAT DISP IN FEET/ENCOUNTERED MODAL PERIOD, T<sub>0</sub>, IN SECONDS

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										150	165	180
		0	15	30	45	60	75	90	105	120	135			
0	7	.04/.8	.05/.8	.07/.8	.08/.8	.10/.8	.11/.8	.10/.8	.10/.8	.10/.8	.10/.8	.08/.8	.06/.8	.04/.8
9	.07/.10	.10/.10	.11/.10	.13/.10	.14/.10	.15/.10	.14/.10	.14/.10	.13/.10	.12/.10	.10/.10	.08/.10	.07/.10	
11	.09/.12	.12/.12	.14/.12	.16/.12	.17/.12	.18/.12	.17/.12	.17/.12	.16/.12	.14/.12	.10/.12	.09/.12	.09/.12	
13	.11/.13	.13/.13	.16/.13	.18/.13	.19/.13	.20/.13	.19/.13	.19/.13	.18/.13	.16/.13	.12/.13	.11/.13	.12/.13	
15	.11/.14	.12/.14	.14/.14	.17/.14	.20/.14	.20/.14	.20/.14	.20/.14	.19/.14	.17/.14	.14/.14	.12/.14	.12/.14	
17	.12/.16	.15/.16	.17/.16	.19/.16	.20/.16	.21/.16	.20/.16	.20/.16	.19/.16	.17/.16	.14/.16	.12/.16	.12/.16	
19	.12/.18	.13/.18	.15/.18	.17/.18	.19/.18	.20/.18	.21/.18	.20/.18	.19/.18	.17/.18	.15/.18	.13/.18	.12/.18	
21	.12/.21	.13/.21	.15/.21	.17/.21	.19/.21	.21/.21	.21/.21	.21/.21	.19/.21	.17/.21	.15/.21	.13/.21	.12/.21	
8	.04/.8	.05/.8	.06/.8	.08/.8	.09/.8	.10/.8	.11/.8	.11/.8	.10/.8	.09/.8	.09/.8	.08/.8	.07/.9	.05/.9
9	.06/.10	.07/.10	.09/.10	.11/.10	.13/.10	.14/.10	.15/.10	.15/.10	.15/.10	.14/.10	.13/.10	.11/.10	.09/.11	.08/.11
11	.08/.13	.10/.13	.12/.13	.13/.13	.14/.13	.15/.13	.16/.13	.17/.13	.18/.12	.18/.12	.17/.12	.15/.12	.13/.12	.11/.12
13	.10/.14	.12/.14	.13/.14	.15/.14	.17/.14	.19/.14	.19/.14	.19/.14	.20/.13	.20/.13	.19/.13	.17/.13	.15/.13	.13/.14
15	.10/.16	.11/.16	.13/.16	.15/.16	.17/.16	.18/.16	.19/.16	.20/.16	.20/.15	.20/.15	.19/.15	.17/.15	.15/.15	.13/.15
17	.11/.16	.12/.16	.14/.16	.16/.16	.18/.16	.20/.16	.21/.16	.21/.16	.21/.17	.19/.17	.18/.17	.15/.17	.13/.16	.13/.16
19	.11/.18	.12/.18	.14/.18	.16/.18	.18/.18	.20/.18	.21/.18	.21/.18	.20/.19	.19/.19	.18/.19	.15/.19	.13/.20	.13/.20
21	.11/.21	.12/.21	.14/.21	.17/.21	.19/.21	.20/.21	.21/.21	.21/.21	.20/.21	.19/.21	.18/.22	.15/.22	.14/.22	.13/.22
10	7	.03/.8	.04/.8	.06/.8	.08/.8	.09/.8	.11/.8	.11/.8	.11/.8	.11/.8	.11/.8	.10/.11	.09/.12	.07/.12
9	.06/.10	.06/.10	.08/.10	.11/.10	.13/.10	.15/.10	.16/.10	.16/.10	.16/.10	.15/.10	.14/.10	.12/.12	.11/.13	.10/.13
11	.07/.13	.08/.13	.10/.13	.13/.13	.15/.13	.17/.13	.17/.13	.17/.13	.18/.13	.19/.13	.18/.13	.16/.13	.15/.13	.13/.14
13	.09/.14	.10/.14	.12/.14	.14/.14	.16/.14	.17/.14	.19/.14	.20/.14	.20/.14	.19/.14	.18/.14	.16/.15	.14/.15	.13/.15
15	.10/.16	.11/.16	.13/.16	.15/.16	.17/.16	.18/.16	.20/.16	.21/.16	.21/.16	.20/.16	.18/.16	.16/.17	.14/.17	.13/.17
17	.10/.16	.11/.16	.13/.16	.15/.16	.17/.16	.18/.16	.20/.17	.21/.17	.21/.17	.21/.17	.18/.18	.16/.19	.14/.19	
19	.10/.18	.11/.18	.13/.18	.15/.18	.17/.18	.18/.18	.20/.19	.21/.19	.21/.20	.20/.20	.18/.20	.16/.20	.15/.21	.14/.21
21	.11/.21	.12/.21	.14/.21	.16/.21	.19/.21	.20/.21	.21/.21	.21/.21	.20/.22	.19/.22	.16/.22	.15/.23	.14/.23	
15	7	.03/.8	.04/.8	.06/.8	.08/.8	.10/.8	.12/.11	.13/.11	.13/.11	.13/.11	.13/.11	.14/.14	.14/.14	.13/.14
9	.05/.10	.06/.10	.08/.10	.10/.10	.13/.11	.15/.11	.17/.11	.17/.11	.18/.11	.18/.11	.18/.11	.17/.11	.15/.11	
11	.07/.13	.08/.12	.10/.12	.13/.12	.15/.12	.17/.12	.19/.12	.19/.12	.20/.12	.20/.12	.19/.12	.19/.12	.16/.17	
13	.09/.14	.11/.14	.14/.14	.17/.14	.19/.14	.21/.14	.21/.14	.21/.14	.21/.14	.21/.14	.20/.17	.18/.17	.16/.17	
15	.09/.16	.10/.16	.12/.16	.15/.16	.18/.16	.20/.16	.21/.16	.22/.17	.22/.17	.21/.17	.20/.17	.18/.20	.17/.20	
17	.09/.18	.10/.18	.13/.18	.15/.17	.18/.17	.20/.18	.22/.18	.22/.18	.22/.18	.20/.20	.20/.20	.18/.20	.17/.20	
19	.10/.18	.11/.18	.13/.18	.15/.18	.18/.19	.20/.20	.22/.21	.22/.21	.21/.21	.21/.21	.20/.21	.18/.22	.17/.22	
21	.10/.21	.11/.21	.13/.21	.16/.21	.18/.21	.20/.21	.22/.22	.22/.22	.22/.22	.22/.22	.20/.23	.18/.23	.17/.24	
20	7	.03/.8	.04/.8	.05/.8	.08/.8	.11/.13	.15/.13	.18/.13	.20/.13	.21/.13	.22/.13	.21/.13	.21/.13	.21/.19
9	.05/.10	.06/.10	.08/.10	.10/.10	.14/.13	.17/.13	.21/.13	.23/.13	.24/.13	.24/.13	.24/.13	.23/.19	.23/.19	
11	.06/.13	.07/.12	.09/.12	.12/.13	.16/.13	.19/.13	.22/.13	.24/.13	.25/.13	.25/.13	.25/.13	.24/.19	.23/.23	
13	.07/.14	.08/.14	.11/.14	.14/.14	.17/.13	.20/.19	.23/.19	.25/.19	.25/.19	.25/.19	.25/.19	.24/.19	.23/.23	
15	.08/.16	.09/.16	.11/.16	.14/.16	.18/.16	.21/.19	.23/.19	.25/.19	.25/.19	.25/.19	.24/.23	.22/.23	.22/.23	
17	.09/.18	.10/.18	.12/.18	.15/.18	.18/.18	.21/.19	.23/.19	.24/.23	.25/.23	.25/.23	.24/.23	.23/.23	.22/.23	
19	.09/.18	.10/.18	.12/.18	.15/.18	.18/.18	.21/.19	.23/.19	.24/.23	.24/.23	.24/.23	.23/.23	.22/.23	.21/.23	
21	.09/.21	.10/.21	.12/.21	.15/.21	.18/.21	.21/.23	.23/.23	.24/.23	.24/.23	.24/.23	.23/.23	.22/.23	.21/.23	
25	7	.03/.8	.03/.8	.05/.9	.09/.17	.14/.17	.18/.17	.22/.17	.24/.17	.24/.17	.25/.17	.25/.17	.22/.17	.21/.17
9	.04/.10	.05/.10	.07/.12	.09/.12	.13/.12	.17/.12	.21/.17	.25/.17	.27/.17	.27/.17	.26/.17	.26/.17	.25/.17	
11	.06/.13	.07/.13	.08/.14	.10/.14	.14/.17	.18/.17	.22/.17	.25/.17	.27/.17	.27/.17	.28/.17	.28/.17	.27/.17	
13	.07/.14	.08/.14	.09/.16	.11/.16	.14/.17	.18/.17	.22/.17	.25/.17	.27/.17	.27/.17	.28/.17	.28/.17	.27/.17	
15	.08/.16	.09/.18	.11/.18	.15/.17	.18/.17	.22/.17	.25/.17	.27/.17	.27/.17	.27/.17	.26/.17	.26/.17	.25/.17	
17	.09/.18	.10/.18	.12/.18	.15/.20	.18/.17	.22/.17	.25/.17	.27/.24	.27/.24	.27/.24	.26/.24	.26/.24	.25/.24	
19	.08/.18	.09/.18	.11/.18	.15/.20	.18/.17	.22/.17	.24/.24	.26/.24	.26/.24	.26/.24	.26/.24	.25/.30	.24/.30	
21	.08/.21	.09/.21	.12/.21	.15/.21	.18/.24	.22/.24	.24/.24	.26/.24	.26/.24	.26/.24	.26/.24	.25/.30	.24/.30	



## ASR

RMS LAT ACC IN G/S/ENCOUNTERED MODAL PERIOD, T<sub>DE</sub>' IN SECONDS  
(ACC. X 100)

V	TO	SHIP HEADING ANGLE IN DEGREES										150	165	180
		0	15	30	45	60	75	90	105	120	135			
6	7	.10/.7	.13/.7	.18/.7	.23/.7	.28/.7	.30/.7	.31/.7	.30/.7	.27/.7	.23/.7	.18/.7	.12/.7	.10/.7
9	9	.11/.8	.13/.8	.17/.8	.22/.8	.26/.8	.28/.8	.29/.8	.28/.8	.25/.8	.22/.8	.17/.8	.13/.8	.11/.8
11	11	.11/11	.13/11	.16/11	.20/9	.23/9	.25/9	.25/9	.25/10	.23/10	.20/10	.16/10	.13/10	.11/10
13	13	.10/12	.12/12	.14/11	.17/11	.20/11	.21/11	.22/11	.21/11	.20/11	.17/11	.14/11	.12/11	.11/11
15	15	.09/12	.10/12	.12/12	.15/12	.18/12	.19/12	.18/12	.18/12	.17/12	.15/12	.10/12	.09/12	.09/12
17	17	.08/13	.09/13	.11/13	.13/13	.15/13	.16/13	.16/12	.16/12	.15/12	.13/12	.11/12	.09/13	.08/13
19	19	.07/14	.08/13	.09/13	.11/13	.13/13	.14/13	.14/13	.14/13	.13/13	.11/13	.09/13	.08/13	.07/13
21	21	.06/14	.07/14	.08/14	.10/14	.11/14	.12/14	.12/14	.12/14	.11/14	.10/14	.08/14	.07/14	.06/14
8	7	.12/.7	.14/.7	.19/.7	.24/.7	.28/.7	.31/.7	.31/.7	.30/.7	.27/.7	.22/.7	.17/.7	.11/.8	.09/.8
9	9	.13/.8	.15/.8	.19/.8	.23/.8	.26/.8	.29/.8	.29/.8	.28/.8	.25/.8	.21/.9	.16/.9	.12/.9	.10/.9
11	11	.12/10	.14/10	.17/10	.21/10	.23/10	.25/11	.26/11	.24/11	.22/11	.19/11	.15/11	.12/11	.10/11
13	13	.11/13	.12/13	.15/12	.18/12	.20/11	.22/11	.22/11	.21/11	.19/11	.17/11	.14/11	.11/11	.10/11
15	15	.10/13	.11/13	.13/13	.16/13	.18/13	.19/12	.19/12	.18/12	.17/12	.14/12	.12/12	.10/12	.09/12
17	17	.09/13	.10/13	.11/13	.13/13	.15/13	.16/13	.16/13	.16/13	.14/13	.12/13	.10/13	.08/13	.08/13
19	19	.08/13	.09/13	.10/13	.12/13	.13/13	.14/13	.14/13	.14/13	.12/13	.11/14	.09/14	.07/14	.07/14
21	21	.07/14	.07/14	.09/14	.10/14	.11/14	.12/14	.12/14	.12/14	.11/14	.09/14	.08/14	.06/15	.06/15
10	7	.13/.7	.15/.7	.21/.7	.25/.7	.29/.7	.31/.7	.31/.7	.30/.7	.27/.7	.22/.7	.16/.7	.11/.7	.08/.7
9	9	.14/.8	.16/.8	.20/.8	.24/.8	.27/.8	.29/.8	.29/.8	.28/.9	.25/.9	.21/.11	.16/.11	.12/.12	.10/.12
11	11	.13/10	.15/10	.18/10	.22/10	.24/10	.26/10	.26/10	.24/11	.22/11	.18/11	.14/11	.11/12	.10/12
13	13	.12/11	.13/11	.16/11	.19/11	.21/11	.21/11	.21/11	.21/11	.19/12	.16/12	.13/13	.10/13	.09/13
15	15	.11/13	.12/13	.14/13	.16/13	.18/13	.19/13	.19/13	.18/13	.16/13	.14/13	.11/13	.09/14	.08/14
17	17	.10/14	.10/14	.12/14	.14/13	.16/13	.16/13	.16/13	.16/13	.14/13	.12/14	.10/14	.08/15	.07/15
19	19	.09/14	.09/14	.11/14	.12/14	.13/14	.14/14	.14/14	.13/14	.12/14	.10/14	.08/15	.07/15	.06/16
21	21	.07/14	.08/14	.09/14	.11/14	.12/14	.12/14	.12/14	.11/15	.09/15	.07/15	.06/16	.05/16	.05/16
15	7	.14/.7	.17/.7	.22/.7	.27/.7	.30/.7	.32/.7	.32/.7	.30/.7	.26/.7	.21/.7	.15/.10	.10/.14	.07/.14
9	9	.15/.8	.17/.8	.21/.8	.25/.8	.28/.8	.30/.8	.30/.8	.28/.8	.25/.10	.20/.11	.15/.14	.11/.14	.09/.14
11	11	.15/10	.16/10	.19/10	.22/10	.25/10	.26/10	.26/10	.24/11	.22/11	.18/11	.14/14	.10/14	.09/14
13	13	.13/11	.14/11	.17/11	.20/11	.22/11	.23/11	.23/11	.21/12	.19/12	.16/14	.12/14	.08/17	.08/17
15	15	.12/13	.13/13	.15/13	.17/13	.19/13	.19/13	.19/13	.18/13	.16/14	.13/14	.11/14	.08/17	.07/17
17	17	.10/14	.11/14	.13/14	.15/14	.16/13	.17/13	.17/13	.16/14	.14/14	.12/14	.09/17	.06/17	.06/17
19	19	.09/14	.10/14	.11/14	.13/14	.14/14	.14/14	.14/14	.13/14	.12/14	.10/17	.08/17	.06/17	.06/17
21	21	.08/16	.08/16	.10/14	.11/14	.12/14	.13/14	.12/14	.10/14	.09/17	.07/17	.06/20	.05/20	.05/20
20	7	.15/.7	.18/.7	.23/.7	.28/.7	.31/.7	.33/.7	.33/.7	.31/.13	.27/.13	.21/.13	.15/.13	.10/.13	.07/.13
9	9	.16/.8	.18/.8	.22/.8	.26/.8	.29/.8	.31/.8	.30/.8	.28/.8	.25/.13	.20/.13	.15/.13	.10/.13	.08/.13
11	11	.16/10	.17/10	.20/10	.23/10	.26/10	.27/10	.26/10	.25/13	.22/13	.18/13	.13/13	.10/19	.08/19
13	13	.14/11	.15/11	.18/11	.20/11	.22/11	.23/11	.23/11	.21/13	.19/13	.15/13	.12/19	.09/19	.07/19
15	15	.12/13	.13/13	.15/13	.17/13	.19/13	.20/13	.19/13	.18/13	.16/13	.13/19	.10/19	.08/19	.07/19
17	17	.11/14	.13/14	.15/14	.16/14	.17/14	.17/14	.17/14	.16/13	.14/13	.11/19	.09/19	.06/23	.05/23
19	19	.09/16	.10/16	.11/16	.13/16	.14/16	.15/16	.14/16	.13/13	.12/13	.10/19	.09/19	.07/23	.05/23
21	21	.08/16	.09/16	.10/16	.11/16	.12/15	.13/14	.12/13	.12/13	.10/19	.09/19	.07/17	.05/23	.05/23
25	7	.16/.7	.18/.7	.24/.7	.29/.7	.32/.7	.34/.7	.34/.7	.33/.17	.27/.17	.21/.17	.15/.17	.09/.17	.06/.17
9	9	.17/.8	.19/.8	.23/.8	.27/.8	.30/.9	.31/.17	.31/.17	.29/.17	.25/.17	.20/.17	.14/.17	.09/.17	.07/.17
11	11	.16/10	.18/10	.21/10	.24/10	.26/10	.27/17	.27/17	.25/17	.21/17	.17/17	.13/17	.09/17	.07/17
13	13	.15/10	.16/10	.18/10	.21/11	.23/11	.24/17	.23/17	.21/17	.18/17	.15/17	.11/17	.08/17	.06/17
15	15	.13/13	.14/13	.16/13	.18/13	.19/13	.20/17	.20/17	.18/17	.16/17	.13/17	.10/17	.07/17	.06/17
17	17	.11/14	.12/14	.14/14	.15/14	.16/14	.17/17	.17/17	.16/17	.14/17	.11/17	.08/17	.05/17	.05/17
19	19	.10/14	.12/14	.13/14	.14/14	.15/14	.16/17	.16/17	.15/17	.13/17	.10/17	.07/17	.06/17	.05/17
21	21	.09/16	.10/16	.11/17	.12/17	.13/17	.13/17	.12/17	.12/17	.10/17	.09/17	.07/17	.05/17	.04/17

## ASR

RMS VER DISP IN FEET/ENCOUNTERED MODAL PERIOD, T, IN SECONDS  
SHORTEST CRESTED

V	T0	0	15	30	45	60	75	90	105	120	135	150	165	180
0	7	.11/. 8	.12/. 8	.14/. 8	.16/. 7	.18/. 7	.19/. 7	.19/. 7	.19/. 7	.19/. 7	.18/. 7	.16/. 8	.14/. 8	.12/. 8
0	9	.17/.10	.17/.10	.18/.10	.20/.10	.21/. 9	.22/. 9	.22/. 9	.22/. 9	.22/. 9	.21/. 9	.20/.10	.18/.10	.17/.10
11	20/11	.20/11	.21/11	.22/11	.23/11	.24/11	.24/11	.24/11	.23/11	.23/11	.22/11	.20/11	.20/11	.20/11
13	.22/13	.23/13	.23/13	.24/13	.24/13	.24/13	.24/13	.24/13	.24/13	.24/13	.23/13	.22/13	.22/13	.22/13
15	.23/16	.23/16	.24/16	.24/16	.24/16	.24/16	.25/16	.25/16	.25/16	.24/16	.23/16	.23/16	.23/16	.23/16
17	.24/18	.24/18	.24/18	.24/18	.24/18	.24/18	.25/18	.25/18	.25/18	.25/18	.24/18	.24/18	.24/18	.24/18
19	.24/18	.24/18	.24/18	.24/18	.24/18	.24/18	.25/18	.25/18	.25/18	.25/18	.24/18	.24/18	.24/18	.24/18
21	.24/21	.24/21	.25/21	.25/21	.25/21	.25/21	.25/21	.25/21	.25/21	.25/21	.24/21	.24/21	.24/21	.24/21
5	7	.14/. 7	.15/. 7	.17/. 7	.18/. 7	.20/. 7	.20/. 7	.20/. 7	.19/. 8	.17/. 8	.15/. 9	.13/.10	.11/.10	.10/.10
6	9	.19/.10	.19/.10	.20/.10	.21/.10	.22/.10	.23/.10	.23/.10	.22/.10	.21/.10	.19/.10	.17/.11	.16/.11	.16/.11
11	.22/11	.22/11	.23/11	.23/11	.24/11	.24/11	.24/11	.23/12	.23/12	.23/12	.21/13	.20/13	.19/13	.19/13
13	.23/13	.23/13	.24/13	.24/13	.24/13	.25/13	.25/13	.24/14	.23/14	.23/14	.22/14	.21/14	.21/14	.21/14
15	.24/16	.24/16	.24/16	.24/16	.25/16	.25/16	.25/16	.24/16	.24/16	.24/16	.23/16	.23/16	.23/16	.23/16
17	.24/18	.24/18	.24/18	.24/18	.25/18	.25/18	.25/18	.25/18	.25/18	.25/18	.24/18	.24/18	.24/18	.24/18
19	.24/18	.24/18	.25/18	.25/18	.25/18	.25/18	.25/18	.25/19	.25/19	.25/19	.24/20	.24/20	.24/20	.24/20
21	.25/21	.25/21	.25/21	.25/21	.25/21	.25/21	.25/21	.25/21	.25/21	.25/21	.24/22	.24/22	.24/22	.24/22
10	7	.19/. 7	.19/. 7	.20/. 7	.21/. 7	.22/. 7	.22/. 7	.21/. 7	.20/. 7	.20/. 7	.18/. 8	.15/.13	.12/.13	.11/.13
11	.24/11	.25/11	.25/11	.25/11	.25/11	.25/12	.25/12	.24/10	.22/10	.21/.12	.19/.14	.17/.14	.16/.14	.15/.14
13	.25/13	.25/13	.25/13	.25/13	.25/13	.25/14	.25/14	.24/14	.23/15	.22/16	.21/15	.20/15	.19/15	.18/15
15	.25/16	.25/16	.25/16	.25/16	.26/16	.26/16	.26/16	.24/16	.24/17	.23/17	.22/17	.21/17	.21/17	.21/17
17	.25/18	.25/18	.25/18	.25/18	.25/18	.25/18	.25/18	.25/18	.25/18	.24/18	.23/20	.23/20	.23/20	.23/20
19	.25/18	.25/18	.25/18	.25/18	.25/18	.25/19	.25/19	.25/20	.25/20	.24/21	.24/22	.23/22	.23/22	.23/22
21	.25/21	.25/21	.25/21	.25/21	.25/21	.25/21	.25/21	.25/21	.25/21	.25/22	.24/23	.24/24	.24/24	.24/24
15	7	.22/. 8	.22/. 8	.23/. 8	.23/. 8	.23/. 7	.24/. 7	.24/. 7	.23/. 7	.23/. 7	.20/. 7	.15/.14	.12/.14	.10/.14
9	.28/. 8	.28/. 8	.28/. 8	.28/. 8	.28/. 8	.28/. 8	.27/. 8	.27/. 8	.26/. 9	.25/.10	.21/.17	.18/.17	.15/.17	.14/.17
11	.28/11	.28/11	.28/11	.28/11	.28/11	.27/11	.26/12	.25/12	.24/14	.22/17	.20/20	.19/20	.18/20	.18/20
13	.28/13	.28/13	.27/13	.27/13	.27/14	.26/14	.26/14	.25/14	.24/17	.23/20	.22/20	.20/20	.20/20	.20/20
15	.27/16	.27/16	.27/16	.27/16	.26/16	.26/16	.26/16	.26/16	.25/17	.24/20	.23/20	.22/20	.22/20	.22/20
17	.27/16	.27/16	.26/18	.26/18	.26/18	.26/18	.26/18	.26/18	.25/19	.25/20	.24/20	.23/22	.22/22	.22/22
19	.26/18	.26/18	.26/18	.26/18	.26/18	.26/19	.26/19	.25/20	.25/21	.24/22	.24/22	.23/23	.23/24	.23/24
21	.26/21	.26/21	.26/21	.26/21	.26/21	.26/21	.26/21	.25/21	.25/21	.24/24	.24/24	.24/25	.24/25	.24/25
20	7	.23/. 8	.23/. 8	.24/. 8	.24/. 8	.25/. 8	.25/. 8	.24/. 7	.23/13	.21/.13	.18/.13	.15/.13	.12/.13	.10/.13
9	.31/. 8	.31/. 8	.31/. 8	.31/. 8	.30/. 8	.29/. 8	.28/. 8	.26/.13	.24/.19	.21/.19	.18/.19	.16/.19	.15/.23	.14/.23
11	.32/. 8	.32/. 8	.32/. 8	.32/. 8	.30/.13	.29/.13	.28/.13	.27/.13	.26/.13	.24/.23	.20/.23	.19/.23	.18/.23	.18/.23
13	.30/13	.30/13	.29/16	.29/16	.29/16	.28/16	.28/16	.27/16	.26/16	.24/.23	.20/.23	.21/.23	.20/26	.20/26
15	.31/16	.31/16	.31/16	.31/16	.30/16	.30/16	.30/16	.29/16	.28/16	.26/19	.24/.23	.23/26	.21/26	.21/26
17	.30/18	.30/18	.29/18	.29/18	.28/18	.28/18	.28/18	.27/18	.26/18	.25/23	.24/.23	.23/26	.22/26	.22/26
19	.28/18	.28/18	.28/18	.28/18	.28/18	.28/18	.28/18	.27/18	.26/21	.25/21	.24/26	.24/27	.23/27	.23/27
21	.28/21	.28/21	.27/21	.27/21	.26/21	.26/21	.26/21	.26/21	.25/23	.25/23	.24/27	.24/27	.24/27	.23/27
25	7	.23/. 9	.23/. 9	.24/. 9	.24/. 9	.25/. 8	.25/. 8	.25/. 8	.24/. 7	.21/.17	.18/.17	.15/.17	.12/.17	.10/.17
9	.34/. 9	.34/. 9	.34/. 9	.34/. 9	.33/. 9	.33/. 9	.33/. 9	.32/. 8	.30/.13	.29/.13	.28/.17	.26/.17	.24/.17	.19/.17
11	.35/. 9	.35/. 9	.35/. 9	.35/. 9	.34/. 9	.34/. 9	.34/. 9	.33/. 9	.31/.13	.29/.13	.28/.17	.26/.17	.25/.17	.21/.17
13	.33/. 9	.33/. 9	.33/. 9	.33/. 9	.32/. 9	.32/. 9	.32/. 9	.31/. 9	.30/.13	.29/.13	.28/.17	.26/.17	.25/.17	.20/.33
15	.31/16	.31/16	.31/16	.31/16	.31/16	.31/16	.31/16	.30/16	.29/17	.27/17	.26/17	.25/17	.23/17	.20/33
17	.30/18	.30/18	.30/18	.30/18	.29/18	.29/18	.29/18	.28/18	.28/18	.27/17	.26/17	.25/17	.23/33	.21/33
19	.28/18	.28/18	.28/18	.28/18	.28/18	.28/18	.28/18	.28/18	.28/18	.27/20	.26/20	.25/24	.24/33	.22/33
21	.28/21	.28/21	.27/21	.27/21	.27/21	.27/21	.27/21	.27/21	.27/21	.26/21	.25/24	.25/24	.24/33	.23/33

ASR RMS VER VEL IN FPS/ENCOUNTERED MODAL PERIOD, T IN SECONDS

TO	SHIP HEADING ANGLE IN DEGREES										150	155	160
	0	15	30	45	60	75	90	105	120	135			
0	.10/.8	.11/.7	.13/.7	.16/.7	.18/.7	.19/.7	.19/.7	.19/.7	.17/.7	.15/.7	.12/.7	.10/.7	.09/.7
5	.12/.9	.13/.9	.14/.9	.15/.9	.16/.9	.17/.8	.18/.8	.18/.8	.17/.8	.15/.8	.14/.9	.12/.9	.11/.9
10	.13/.10	.13/.10	.14/.10	.15/.10	.16/.10	.16/.10	.16/.10	.16/.10	.16/.10	.15/.10	.14/.10	.13/.10	.12/.10
15	.12/.12	.13/.12	.14/.12	.14/.12	.14/.12	.15/.11	.15/.11	.15/.11	.14/.12	.14/.12	.13/.12	.12/.12	.12/.12
20	.09/.18	.10/.18	.10/.18	.10/.18	.10/.18	.10/.18	.10/.18	.10/.18	.10/.18	.10/.18	.10/.18	.09/.18	.09/.18
7	.15/.7	.16/.7	.17/.7	.19/.7	.20/.6	.21/.6	.20/.6	.19/.6	.17/.6	.14/.7	.11/.9	.08/.9	.07/.0
9	.17/.9	.17/.9	.18/.8	.19/.8	.20/.8	.20/.8	.19/.9	.18/.9	.16/.9	.14/.9	.12/.10	.10/.11	.10/.11
11	.16/.10	.16/.10	.16/.10	.16/.10	.16/.10	.16/.10	.16/.10	.16/.10	.16/.10	.15/.10	.14/.10	.13/.10	.12/.10
13	.15/.12	.15/.12	.15/.12	.15/.12	.15/.12	.15/.12	.15/.12	.15/.12	.15/.12	.14/.12	.13/.12	.12/.12	.12/.12
15	.14/.13	.14/.13	.14/.13	.14/.13	.14/.13	.14/.13	.14/.13	.14/.13	.14/.13	.13/.14	.12/.14	.11/.14	.11/.14
17	.13/.16	.13/.16	.13/.16	.12/.16	.12/.16	.12/.16	.12/.16	.12/.16	.12/.16	.11/.16	.11/.16	.11/.16	.11/.16
19	.10/.16	.10/.16	.10/.16	.11/.16	.11/.16	.11/.16	.11/.16	.11/.16	.11/.16	.10/.16	.10/.16	.10/.16	.10/.16
21	.11/.18	.10/.18	.10/.18	.10/.18	.10/.18	.10/.18	.10/.18	.10/.18	.10/.18	.10/.18	.10/.18	.09/.18	.09/.18
7	.23/.7	.23/.7	.24/.7	.24/.7	.24/.7	.24/.7	.24/.7	.24/.7	.24/.7	.20/.6	.17/.6	.13/.6	.07/.13
9	.24/.7	.24/.7	.24/.7	.24/.7	.24/.7	.24/.7	.24/.7	.24/.7	.24/.7	.19/.8	.16/.9	.13/.10	.08/.14
13	.20/.12	.22/.12	.22/.12	.22/.12	.21/.10	.21/.10	.21/.10	.21/.10	.21/.10	.18/.10	.14/.12	.12/.14	.09/.14
15	.17/.13	.17/.13	.17/.13	.17/.13	.19/.11	.19/.12	.19/.12	.19/.12	.19/.12	.16/.13	.15/.13	.13/.14	.10/.14
17	.15/.14	.15/.14	.15/.14	.15/.14	.15/.14	.15/.14	.15/.14	.15/.14	.15/.14	.13/.14	.12/.15	.10/.16	.09/.17
19	.14/.16	.14/.16	.14/.16	.14/.16	.13/.16	.13/.16	.13/.16	.13/.16	.13/.16	.12/.16	.11/.17	.09/.18	.08/.18
21	.12/.18	.12/.18	.12/.18	.12/.18	.12/.18	.12/.18	.12/.18	.12/.18	.12/.18	.10/.18	.10/.20	.08/.21	.07/.22
7	.28/.7	.28/.7	.28/.7	.28/.7	.29/.7	.29/.7	.29/.7	.29/.7	.29/.7	.24/.7	.21/.7	.13/.6	.04/.14
9	.32/.8	.32/.8	.31/.8	.30/.8	.29/.8	.29/.8	.29/.8	.29/.8	.29/.8	.23/.7	.20/.7	.16/.7	.06/.17
11	.29/.8	.29/.8	.28/.8	.28/.8	.27/.8	.27/.8	.27/.8	.27/.8	.27/.8	.23/.8	.20/.8	.16/.8	.06/.17
13	.25/.8	.25/.8	.24/.8	.24/.8	.23/.8	.23/.8	.23/.8	.23/.8	.23/.8	.20/.12	.16/.12	.13/.14	.07/.20
15	.21/.8	.21/.8	.21/.8	.21/.8	.20/.13	.20/.13	.20/.13	.20/.13	.20/.13	.17/.14	.15/.14	.13/.14	.07/.20
17	.19/.14	.19/.14	.18/.14	.17/.14	.16/.15	.16/.15	.15/.16	.14/.16	.14/.16	.14/.16	.12/.17	.10/.20	.08/.20
19	.16/.16	.16/.16	.16/.16	.15/.16	.15/.16	.14/.16	.13/.17	.13/.17	.12/.18	.11/.18	.09/.20	.08/.20	.07/.20
21	.15/.18	.14/.18	.14/.18	.14/.18	.13/.18	.13/.18	.12/.18	.12/.18	.11/.20	.10/.21	.09/.21	.08/.22	.07/.22
7	.31/.8	.31/.8	.31/.8	.31/.8	.32/.8	.32/.8	.32/.8	.32/.8	.32/.8	.29/.7	.26/.7	.22/.7	.13/.13
9	.39/.8	.39/.8	.39/.8	.38/.8	.36/.8	.36/.8	.36/.8	.36/.8	.36/.8	.30/.8	.26/.8	.21/.7	.05/.19
11	.36/.8	.35/.8	.35/.8	.34/.8	.32/.8	.32/.8	.32/.8	.32/.8	.32/.8	.26/.8	.23/.8	.19/.8	.06/.23
13	.31/.8	.30/.8	.30/.8	.29/.8	.25/.8	.25/.8	.25/.8	.25/.8	.25/.8	.22/.8	.19/.8	.13/.13	.06/.23
15	.26/.8	.26/.8	.26/.8	.25/.8	.24/.8	.24/.8	.24/.8	.24/.8	.24/.8	.21/.13	.17/.13	.11/.13	.06/.23
17	.22/.8	.22/.8	.21/.8	.20/.8	.19/.8	.19/.8	.19/.8	.19/.8	.19/.8	.16/.16	.12/.19	.08/.23	.06/.26
19	.19/.16	.19/.16	.19/.16	.18/.16	.16/.16	.15/.17	.13/.19	.13/.19	.11/.19	.10/.19	.09/.23	.07/.26	.06/.27
21	.17/.18	.17/.18	.16/.18	.15/.18	.14/.18	.13/.19	.11/.19	.10/.23	.09/.23	.07/.26	.06/.27	.06/.27	.06/.27
7	.32/.8	.33/.8	.33/.8	.34/.8	.33/.8	.34/.8	.34/.8	.34/.8	.34/.8	.31/.8	.29/.8	.23/.8	.03/.17
9	.45/.8	.45/.8	.43/.8	.41/.8	.38/.8	.38/.8	.38/.8	.38/.8	.38/.8	.34/.8	.30/.8	.25/.8	.04/.17
11	.43/.8	.42/.8	.41/.8	.39/.8	.36/.8	.35/.8	.34/.8	.33/.8	.32/.8	.29/.8	.25/.8	.21/.8	.05/.17
13	.37/.9	.37/.9	.37/.9	.36/.9	.36/.9	.35/.9	.35/.9	.35/.9	.35/.9	.32/.9	.29/.9	.25/.9	.05/.33
15	.31/.9	.31/.9	.31/.9	.30/.9	.30/.9	.30/.9	.30/.9	.30/.9	.30/.9	.26/.9	.22/.9	.18/.9	.05/.33
17	.26/.9	.26/.9	.26/.9	.25/.9	.25/.9	.25/.9	.25/.9	.25/.9	.25/.9	.21/.8	.16/.17	.11/.17	.05/.33
19	.20/.9	.20/.9	.20/.9	.19/.9	.19/.9	.19/.9	.19/.9	.19/.9	.19/.9	.18/.17	.13/.17	.10/.17	.05/.33
21	.19/.9	.19/.9	.19/.9	.19/.9	.19/.9	.19/.9	.19/.9	.19/.9	.19/.9	.18/.17	.14/.17	.11/.17	.05/.33

RMS VER ACC IN G'S/ENCOUNTERED MODAL PERIOD, T' IN SECONDS  
 SHORTCRESTED DE  
 (ACC. X 100)

V	T'	0	15	30	45	60	SHIP HEADING ANGLE IN DEGREES						150	165	160
							75	90	105	120	135	147/ 6			
0	7	.30/ 7	.34/ 7	.42/ 5	.51/ 5	.58/ 5	.62/ 6	.63/ 6	.61/ 6	.55/ 6	.47/ 6	.38/ 7	.31/ 7	.27/ 7	.27/ 7
9	.30/ 8	.33/ 8	.38/ 8	.43/ 8	.48/ 7	.51/ 7	.52/ 7	.51/ 7	.47/ 7	.42/ 7	.36/ 8	.31/ 8	.29/ 8	.29/ 8	.29/ 8
11	.28/ 10	.29/ 10	.32/ 9	.36/ 9	.41/ 8	.42/ 8	.41/ 8	.41/ 8	.39/ 8	.39/ 9	.35/ 9	.31/ 9	.28/ 9	.27/ 9	.27/ 9
13	.24/ 10	.25/ 10	.27/ 10	.30/ 10	.32/ 10	.34/ 10	.34/ 10	.34/ 10	.33/ 10	.32/ 10	.29/ 10	.27/ 10	.25/ 10	.24/ 10	.24/ 10
15	.21/ 11	.22/ 11	.23/ 11	.25/ 10	.27/ 10	.28/ 10	.28/ 10	.28/ 10	.28/ 10	.26/ 10	.25/ 10	.23/ 11	.21/ 11	.21/ 11	.21/ 11
17	.18/ 13	.19/ 13	.20/ 13	.22/ 12	.22/ 12	.23/ 11	.23/ 11	.23/ 11	.22/ 12	.19/ 12	.19/ 13	.18/ 13	.17/ 13	.17/ 13	.18/ 13
19	.16/ 13	.16/ 13	.17/ 13	.18/ 13	.19/ 13	.20/ 13	.20/ 13	.20/ 13	.19/ 13	.19/ 13	.18/ 13	.16/ 13	.16/ 13	.16/ 13	.16/ 13
21	.14/ 14	.14/ 14	.15/ 14	.15/ 14	.16/ 14	.17/ 14	.17/ 14	.17/ 14	.17/ 14	.16/ 14	.15/ 14	.14/ 14	.14/ 14	.14/ 14	.14/ 14
8	7	.52/ 7	.55/ 7	.61/ 6	.66/ 6	.70/ 6	.71/ 6	.69/ 6	.63/ 6	.54/ 6	.43/ 6	.31/ 6	.22/ 9	.18/ 9	.18/ 9
9	.50/ 7	.52/ 7	.55/ 7	.58/ 7	.60/ 6	.60/ 6	.57/ 6	.52/ 6	.45/ 6	.36/ 6	.28/ 10	.22/ 10	.19/ 10	.19/ 10	.19/ 10
11	.43/ 9	.44/ 9	.46/ 9	.48/ 8	.48/ 8	.48/ 8	.48/ 8	.48/ 8	.46/ 9	.36/ 10	.33/ 10	.30/ 10	.24/ 11	.19/ 11	.19/ 11
13	.36/ 10	.37/ 10	.38/ 10	.39/ 10	.39/ 10	.38/ 10	.38/ 10	.38/ 10	.37/ 10	.37/ 10	.37/ 10	.37/ 10	.28/ 11	.20/ 11	.20/ 11
15	.30/ 10	.31/ 10	.31/ 10	.32/ 10	.32/ 10	.32/ 10	.31/ 10	.31/ 10	.30/ 10	.30/ 10	.29/ 10	.29/ 10	.23/ 13	.17/ 14	.17/ 14
17	.26/ 12	.26/ 12	.26/ 12	.27/ 11	.27/ 11	.26/ 11	.26/ 11	.26/ 11	.25/ 12	.24/ 12	.21/ 13	.18/ 13	.16/ 13	.15/ 13	.15/ 13
19	.22/ 13	.22/ 13	.22/ 13	.23/ 13	.23/ 13	.22/ 13	.22/ 13	.22/ 13	.21/ 13	.21/ 13	.19/ 13	.17/ 14	.15/ 14	.14/ 14	.13/ 14
21	.19/ 14	.19/ 14	.19/ 14	.19/ 14	.19/ 14	.19/ 14	.19/ 14	.19/ 14	.18/ 14	.18/ 14	.15/ 15	.13/ 16	.12/ 16	.11/ 17	.10/ 17
10	7	.85/ 7	.86/ 7	.89/ 7	.91/ 7	.91/ 7	.87/ 6	.80/ 6	.75/ 7	.67/ 7	.57/ 6	.56/ 6	.42/ 6	.38/ 6	.17/ 8
9	.84/ 7	.84/ 7	.84/ 7	.84/ 7	.83/ 7	.83/ 7	.80/ 7	.76/ 7	.65/ 7	.60/ 7	.53/ 7	.53/ 7	.46/ 6	.46/ 6	.17/ 8
11	.70/ 7	.70/ 7	.70/ 7	.70/ 7	.68/ 7	.68/ 7	.60/ 7	.57/ 7	.52/ 7	.50/ 7	.45/ 7	.45/ 7	.37/ 6	.35/ 6	.13/ 13
13	.57/ 7	.57/ 7	.56/ 7	.56/ 7	.55/ 7	.55/ 7	.48/ 7	.48/ 7	.42/ 7	.42/ 7	.36/ 7	.36/ 7	.29/ 10	.28/ 10	.13/ 14
15	.47/ 7	.46/ 7	.46/ 7	.46/ 7	.44/ 7	.44/ 7	.39/ 7	.39/ 7	.34/ 7	.34/ 7	.29/ 11	.29/ 11	.24/ 13	.17/ 14	.17/ 15
17	.38/ 7	.38/ 7	.38/ 7	.38/ 7	.36/ 7	.36/ 7	.32/ 7	.32/ 7	.28/ 12	.28/ 12	.24/ 13	.24/ 13	.20/ 14	.19/ 14	.11/ 16
19	.32/ 7	.32/ 7	.32/ 7	.31/ 7	.30/ 7	.30/ 7	.29/ 7	.29/ 7	.26/ 7	.26/ 7	.24/ 13	.24/ 13	.20/ 14	.17/ 15	.10/ 17
21	.27/ 7	.27/ 7	.27/ 7	.27/ 7	.26/ 7	.26/ 7	.24/ 7	.24/ 7	.22/ 13	.22/ 13	.20/ 14	.17/ 16	.14/ 16	.10/ 18	.08/ 19
15	7	1.13/ 7	1.14/ 7	1.14/ 7	1.14/ 7	1.14/ 7	1.11/ 7	1.11/ 7	1.03/ 7	1.03/ 7	.92/ 7	.92/ 7	.60/ 6	.43/ 6	.14/ 14
9	1.21/ 8	1.20/ 8	1.18/ 8	1.18/ 8	1.13/ 8	1.13/ 8	1.05/ 7	1.05/ 7	.94/ 7	.94/ 7	.66/ 7	.66/ 7	.42/ 6	.42/ 6	.14/ 14
11	1.03/ 8	1.02/ 8	1.02/ 8	1.02/ 8	.99/ 8	.99/ 8	.86/ 7	.86/ 7	.76/ 7	.76/ 7	.52/ 7	.52/ 7	.35/ 6	.35/ 6	.09/ 14
13	.83/ 8	.82/ 8	.82/ 8	.82/ 8	.79/ 8	.79/ 8	.75/ 8	.75/ 8	.68/ 8	.68/ 8	.60/ 7	.60/ 7	.41/ 7	.41/ 7	.09/ 17
15	.67/ 8	.66/ 8	.66/ 8	.66/ 8	.64/ 8	.64/ 8	.55/ 8	.55/ 8	.48/ 8	.48/ 8	.41/ 7	.41/ 7	.33/ 7	.33/ 7	.08/ 20
17	.55/ 8	.54/ 8	.54/ 8	.52/ 8	.52/ 8	.49/ 8	.45/ 8	.45/ 8	.45/ 8	.45/ 8	.39/ 7	.39/ 7	.27/ 7	.27/ 7	.07/ 20
19	.45/ 8	.45/ 8	.43/ 8	.43/ 8	.43/ 8	.41/ 8	.37/ 8	.37/ 8	.33/ 7	.33/ 7	.28/ 7	.28/ 7	.18/ 14	.18/ 14	.07/ 20
21	.38/ 8	.38/ 8	.38/ 8	.36/ 8	.36/ 8	.34/ 8	.31/ 8	.31/ 8	.27/ 7	.27/ 7	.19/ 7	.19/ 7	.15/ 17	.15/ 17	.06/ 20
20	7	1.32/ 8	1.33/ 8	1.33/ 8	1.32/ 8	1.32/ 8	1.27/ 7	1.18/ 7	1.04/ 7	1.04/ 7	.76/ 7	.76/ 7	.66/ 7	.66/ 7	.12/ 13
9	1.57/ 8	1.55/ 8	1.50/ 8	1.42/ 8	1.30/ 8	1.30/ 8	1.21/ 8	1.21/ 8	1.09/ 8	1.09/ 8	.78/ 8	.78/ 8	.61/ 7	.61/ 7	.10/ 13
11	1.37/ 8	1.35/ 8	1.30/ 8	1.30/ 8	1.05/ 8	1.05/ 8	.97/ 8	.97/ 8	.87/ 8	.87/ 8	.61/ 8	.61/ 8	.48/ 7	.48/ 7	.09/ 19
13	1.11/ 8	1.10/ 8	1.09/ 8	1.09/ 8	.89/ 8	.85/ 8	.78/ 8	.78/ 8	.70/ 8	.70/ 8	.60/ 8	.60/ 8	.38/ 7	.35/ 7	.08/ 23
15	.90/ 8	.89/ 8	.87/ 8	.87/ 8	.79/ 8	.79/ 8	.64/ 8	.64/ 8	.57/ 8	.57/ 8	.49/ 8	.49/ 8	.31/ 7	.28/ 7	.07/ 23
17	.73/ 8	.72/ 8	.72/ 8	.72/ 8	.69/ 8	.69/ 8	.64/ 8	.64/ 8	.64/ 8	.64/ 8	.57/ 8	.57/ 8	.31/ 7	.28/ 7	.06/ 23
19	.60/ 8	.60/ 8	.60/ 8	.60/ 8	.57/ 8	.57/ 8	.52/ 8	.52/ 8	.47/ 8	.47/ 8	.40/ 8	.40/ 8	.33/ 8	.26/ 7	.06/ 26
21	.51/ 8	.50/ 8	.50/ 8	.50/ 8	.48/ 8	.48/ 8	.44/ 8	.44/ 8	.39/ 8	.39/ 8	.34/ 8	.34/ 8	.28/ 8	.22/ 7	.05/ 26
25	7	1.45/ 8	1.46/ 8	1.47/ 8	1.46/ 8	1.41/ 8	1.41/ 8	1.31/ 8	1.31/ 8	1.15/ 7	1.15/ 7	.95/ 7	.72/ 6	.49/ 6	.12/ 17
9	1.90/ 8	1.88/ 8	1.82/ 8	1.71/ 8	1.55/ 8	1.55/ 8	1.33/ 8	1.33/ 8	1.12/ 8	1.12/ 8	.88/ 8	.88/ 8	.71/ 8	.50/ 7	.09/ 17
11	1.72/ 8	1.70/ 8	1.62/ 8	1.52/ 8	1.33/ 8	1.33/ 8	1.08/ 8	1.08/ 8	.91/ 8	.91/ 8	.74/ 8	.74/ 8	.56/ 8	.39/ 7	.08/ 17
13	1.42/ 8	1.39/ 8	1.33/ 8	1.22/ 8	1.08/ 8	1.08/ 8	.98/ 8	.98/ 8	.87/ 8	.87/ 8	.73/ 8	.73/ 8	.44/ 8	.31/ 7	.04/ 17
15	1.15/ 8	1.13/ 8	1.07/ 8	1.07/ 8	.92/ 8	.92/ 8	.80/ 8	.80/ 8	.70/ 8	.70/ 8	.59/ 8	.59/ 8	.48/ 8	.36/ 8	.04/ 13
17	.93/ 8	.92/ 8	.87/ 8	.87/ 8	.76/ 8	.76/ 8	.66/ 8	.66/ 8	.58/ 8	.58/ 8	.49/ 8	.49/ 8	.30/ 8	.25/ 7	.04/ 13
19	.77/ 8	.76/ 8	.72/ 8	.72/ 8	.66/ 8	.66/ 8	.56/ 8	.56/ 8	.49/ 8	.49/ 8	.39/ 8	.39/ 8	.21/ 8	.18/ 7	.04/ 13
21	.64/ 8	.63/ 8	.60/ 8	.60/ 8	.55/ 8	.55/ 8	.48/ 8	.48/ 8	.41/ 8	.41/ 8	.33/ 8	.33/ 8	.25/ 8	.18/ 7	.04/ 13

## ASR

RMS ROLL IN DEGREES/ENCOUNTERED MODAL PERIOD, T<sub>Q</sub>, IN SECONDS  
SHORTCRESTED

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										150	165	180
		0	15	30	45	60	75	90	105	120	135			
0	7	.16/10	.16/10	.17/10	.18/10	.20/10	.20/10	.20/10	.19/10	.18/10	.16/10	.15/10	.15/10	.15/10
1	9	.32/10	.33/10	.35/10	.38/10	.41/10	.42/10	.43/10	.42/10	.40/10	.38/10	.35/10	.33/10	.32/10
11	11	.38/10	.39/10	.42/10	.45/10	.48/10	.50/10	.51/10	.50/10	.48/10	.45/10	.41/10	.39/10	.38/10
13	13	.35/10	.36/10	.38/10	.42/10	.45/10	.47/10	.47/10	.47/10	.45/10	.41/10	.38/10	.36/10	.35/10
15	15	.30/10	.31/10	.33/10	.36/10	.38/10	.40/10	.41/10	.40/10	.38/10	.35/10	.33/10	.30/10	.29/10
17	17	.25/10	.27/10	.30/10	.32/10	.33/10	.34/10	.34/10	.33/10	.32/10	.30/10	.27/10	.25/10	.25/10
19	19	.21/10	.21/10	.23/10	.25/10	.27/10	.28/10	.28/10	.28/10	.27/10	.25/10	.23/10	.21/10	.20/10
21	21	.17/10	.18/10	.19/10	.21/10	.23/10	.24/10	.24/10	.24/10	.22/10	.21/10	.19/10	.18/10	.17/10
8	8	.09/.8	.10/.8	.11/.9	.14/.10	.18/.10	.23/.10	.28/.10	.33/.10	.36/.10	.38/.10	.40/.10	.41/.10	.41/.10
9	9	.22/.11	.23/.11	.27/.11	.32/.10	.38/.10	.48/.11	.53/.10	.57/.10	.59/.10	.58/.10	.59/.10	.58/.10	.58/.10
11	11	.32/.11	.33/.11	.37/.11	.42/.11	.48/.11	.49/.11	.52/.10	.53/.10	.52/.10	.50/.10	.55/.10	.55/.10	.54/.10
13	13	.33/.12	.34/.12	.37/.12	.41/.11	.46/.11	.49/.11	.52/.10	.53/.10	.52/.10	.48/.10	.46/.10	.45/.10	.45/.10
15	15	.29/.12	.30/.12	.33/.11	.36/.11	.40/.11	.43/.11	.44/.10	.44/.10	.43/.10	.41/.10	.39/.10	.37/.10	.36/.10
17	17	.25/.12	.26/.12	.28/.11	.31/.11	.34/.11	.36/.11	.37/.11	.37/.10	.36/.10	.34/.10	.32/.10	.30/.10	.29/.10
19	19	.21/.12	.22/.12	.24/.11	.26/.11	.28/.11	.30/.11	.31/.11	.31/.10	.30/.10	.28/.10	.26/.10	.25/.10	.24/.10
21	21	.18/.12	.18/.12	.20/.11	.22/.11	.24/.11	.25/.11	.25/.11	.26/.10	.25/.10	.23/.10	.22/.10	.20/.10	.20/.10
10	7	.06/.8	.07/.8	.09/.9	.13/.10	.23/.10	.35/.10	.47/.10	.56/.10	.61/.10	.64/.10	.64/.12	.64/.12	.64/.12
9	9	.12/.11	.13/.11	.17/.10	.22/.10	.31/.10	.41/.10	.51/.10	.58/.10	.61/.10	.62/.10	.61/.10	.59/.12	.58/.12
11	11	.18/.13	.20/.13	.23/.13	.29/.13	.35/.13	.42/.13	.48/.10	.52/.10	.52/.10	.50/.10	.47/.12	.46/.12	.46/.12
13	13	.21/.13	.22/.13	.25/.13	.29/.13	.34/.13	.38/.13	.42/.10	.44/.10	.44/.10	.42/.10	.39/.10	.37/.12	.36/.12
15	15	.19/.13	.20/.13	.23/.13	.26/.13	.30/.11	.33/.11	.35/.10	.36/.10	.36/.10	.34/.10	.31/.10	.29/.12	.28/.12
17	17	.17/.13	.18/.13	.20/.13	.23/.13	.28/.13	.28/.11	.29/.11	.29/.10	.28/.10	.25/.10	.23/.12	.23/.12	.23/.12
19	19	.15/.13	.16/.13	.17/.13	.19/.13	.22/.13	.23/.11	.25/.11	.25/.10	.24/.10	.23/.10	.21/.10	.19/.12	.18/.12
21	21	.13/.13	.13/.13	.15/.13	.15/.13	.17/.13	.18/.13	.20/.11	.21/.11	.21/.10	.20/.10	.19/.10	.17/.10	.15/.12
15	7	.04/.8	.05/.8	.07/.9	.15/.10	.26/.10	.36/.10	.44/.10	.49/.10	.50/.10	.49/.10	.44/.10	.40/.10	.38/.10
9	9	.07/.11	.08/.10	.11/.10	.18/.10	.27/.10	.35/.10	.41/.10	.44/.10	.45/.10	.43/.10	.39/.10	.35/.10	.33/.10
11	11	.12/.13	.13/.13	.16/.12	.21/.10	.32/.10	.36/.10	.38/.10	.36/.10	.32/.10	.29/.10	.26/.10	.26/.14	.26/.14
13	13	.15/.14	.15/.14	.18/.13	.21/.12	.25/.11	.29/.10	.31/.10	.32/.10	.32/.10	.29/.10	.26/.10	.22/.10	.20/.14
15	15	.15/.14	.16/.14	.17/.14	.20/.13	.23/.11	.25/.11	.27/.10	.27/.10	.26/.10	.24/.10	.21/.10	.18/.14	.16/.14
17	17	.14/.14	.14/.14	.16/.14	.18/.14	.20/.13	.20/.13	.21/.11	.22/.10	.21/.10	.19/.10	.14/.10	.14/.14	.13/.14
19	19	.12/.14	.13/.14	.14/.14	.15/.14	.15/.13	.16/.13	.16/.11	.16/.10	.15/.10	.14/.10	.12/.10	.12/.14	.11/.14
21	21	.11/.14	.11/.14	.12/.14	.12/.14	.13/.13	.14/.13	.14/.13	.14/.13	.13/.13	.13/.13	.12/.10	.10/.14	.09/.14
20	7	.03/.8	.04/.8	.07/.10	.13/.13	.21/.13	.27/.13	.32/.13	.36/.13	.37/.13	.36/.13	.34/.13	.31/.13	.29/.13
9	9	.06/.11	.07/.10	.10/.10	.16/.13	.23/.13	.28/.13	.32/.13	.34/.13	.35/.13	.33/.13	.30/.13	.26/.13	.24/.13
11	11	.09/.14	.10/.13	.13/.11	.18/.11	.23/.13	.27/.13	.30/.13	.31/.13	.30/.13	.28/.13	.25/.13	.21/.13	.19/.13
13	13	.12/.14	.13/.14	.15/.14	.18/.13	.22/.13	.25/.13	.26/.13	.27/.13	.26/.13	.23/.13	.20/.13	.17/.13	.15/.13
15	15	.13/.14	.13/.14	.17/.13	.20/.13	.22/.13	.23/.13	.23/.13	.23/.13	.21/.13	.19/.13	.16/.13	.14/.13	.12/.13
17	17	.12/.14	.12/.14	.14/.14	.16/.14	.17/.13	.18/.11	.19/.11	.19/.11	.18/.10	.16/.10	.14/.10	.12/.14	.11/.14
19	19	.11/.14	.11/.14	.12/.14	.12/.14	.13/.13	.14/.13	.14/.13	.14/.13	.13/.13	.13/.13	.11/.13	.09/.13	.08/.13
21	21	.10/.14	.10/.14	.11/.14	.12/.14	.12/.14	.13/.13	.14/.13	.14/.13	.13/.13	.11/.13	.10/.13	.08/.13	.07/.13
25	7	.03/.8	.03/.8	.08/.9	.15/.9	.22/.9	.28/.9	.31/.17	.33/.17	.33/.17	.31/.17	.27/.17	.22/.17	.19/.17
9	9	.04/.11	.05/.10	.10/.10	.16/.10	.22/.17	.27/.17	.30/.17	.32/.17	.32/.17	.29/.17	.25/.17	.21/.17	.18/.17
11	11	.07/.13	.08/.13	.11/.11	.16/.11	.21/.17	.25/.17	.27/.17	.28/.17	.27/.17	.25/.17	.21/.17	.17/.17	.15/.17
13	13	.09/.14	.10/.14	.13/.13	.16/.11	.20/.17	.23/.17	.24/.17	.24/.17	.23/.17	.21/.17	.17/.17	.14/.17	.12/.17
15	15	.10/.16	.11/.16	.13/.14	.16/.14	.18/.17	.20/.17	.21/.17	.21/.17	.21/.17	.19/.17	.14/.17	.11/.17	.10/.17
17	17	.10/.16	.11/.16	.12/.16	.14/.14	.16/.17	.17/.17	.18/.17	.17/.17	.16/.17	.14/.17	.12/.17	.09/.17	.08/.17
19	19	.09/.16	.10/.16	.11/.16	.13/.16	.14/.17	.15/.17	.15/.17	.14/.17	.12/.17	.10/.17	.08/.17	.07/.17	.06/.17

## ASR

RMS ROLL VEL IN DPS/ENCOUNTERED MODAL PERIOD, T<sub>m</sub> IN SECONDS  
SHORTCRESTED

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										180
		0	15	30	45	60	75	90	105	120	135	
0	7	.13/.8	.13/.8	.14/.8	.15/.8	.16/.8	.17/.8	.17/.8	.17/.8	.16/.8	.15/.8	.12/.8
0	9	.21/10	.22/10	.23/10	.25/10	.26/10	.28/10	.28/10	.28/10	.27/10	.25/10	.21/10
1	11	.24/10	.24/10	.24/10	.25/10	.26/10	.30/10	.31/10	.31/10	.30/10	.28/10	.23/10
13	13	.21/10	.22/10	.22/10	.24/10	.25/10	.27/13	.28/10	.28/10	.27/10	.25/10	.21/10
15	15	.18/10	.18/10	.18/10	.21/10	.21/10	.23/13	.24/10	.24/10	.23/10	.21/10	.18/10
17	17	.15/10	.15/10	.16/10	.18/10	.19/10	.20/10	.20/10	.20/10	.19/10	.18/10	.15/10
19	19	.12/10	.13/10	.14/10	.15/10	.16/10	.17/10	.17/10	.17/10	.16/10	.15/10	.12/10
21	21	.10/10	.11/10	.11/10	.12/10	.13/10	.14/10	.14/10	.14/10	.13/10	.12/10	.10/10
5	7	.09/.7	.10/.7	.11/.7	.13/.8	.15/.10	.18/.10	.21/.10	.24/.10	.25/.10	.26/.10	.27/.10
9	9	.15/.11	.16/.11	.18/.11	.21/.10	.25/.10	.29/.10	.33/.10	.35/.10	.37/.10	.37/.10	.36/.10
11	11	.20/.11	.21/.11	.23/.11	.26/.11	.30/.10	.33/.10	.35/.10	.36/.10	.37/.10	.35/.10	.33/.10
13	13	.20/.11	.21/.11	.23/.11	.25/.11	.28/.11	.30/.10	.31/.10	.32/.10	.31/.10	.30/.10	.28/.10
15	15	.18/.12	.18/.11	.20/.11	.22/.11	.24/.11	.26/.11	.27/.10	.27/.10	.26/.10	.25/.10	.23/.10
17	17	.15/.12	.16/.12	.17/.12	.17/.11	.19/.11	.20/.11	.22/.11	.22/.10	.21/.10	.20/.10	.19/.10
19	19	.13/.12	.13/.12	.14/.11	.16/.11	.17/.11	.18/.11	.18/.10	.18/.10	.17/.10	.17/.10	.17/.10
21	21	.11/.12	.11/.12	.12/.11	.12/.11	.13/.11	.14/.11	.15/.11	.15/.10	.15/.10	.14/.10	.13/.10
10	7	.07/.7	.08/.7	.09/.7	.12/.10	.17/.10	.24/.10	.30/.10	.35/.10	.38/.10	.39/.10	.38/.10
9	11	.10/.11	.10/.11	.12/.10	.16/.10	.21/.10	.27/.10	.32/.10	.36/.10	.37/.10	.36/.10	.34/.10
13	13	.13/.13	.13/.13	.14/.13	.16/.13	.18/.12	.21/.11	.23/.11	.25/.10	.26/.10	.25/.10	.22/.10
15	15	.12/.13	.13/.13	.14/.13	.14/.13	.16/.13	.18/.11	.20/.10	.21/.10	.21/.10	.20/.10	.18/.10
17	17	.11/.13	.11/.13	.12/.13	.14/.13	.15/.11	.16/.11	.17/.10	.18/.10	.16/.10	.14/.10	.13/.10
19	19	.09/.13	.09/.13	.10/.13	.11/.13	.11/.13	.13/.11	.14/.11	.14/.10	.13/.10	.12/.10	.10/.10
21	21	.08/.13	.08/.13	.09/.13	.10/.13	.11/.13	.12/.11	.12/.10	.12/.10	.11/.10	.10/.10	.09/.10
15	7	.06/.7	.06/.7	.06/.7	.08/.8	.12/.10	.18/.10	.23/.10	.27/.10	.30/.10	.29/.10	.23/.10
9	9	.07/.10	.08/.10	.09/.10	.13/.10	.18/.10	.22/.10	.25/.10	.27/.10	.27/.10	.25/.10	.19/.10
11	11	.09/.13	.09/.13	.11/.11	.14/.10	.17/.10	.20/.10	.22/.10	.23/.10	.22/.10	.20/.10	.14/.10
13	13	.10/.14	.10/.14	.11/.13	.13/.11	.16/.10	.17/.10	.18/.10	.19/.10	.18/.10	.16/.10	.12/.10
15	15	.09/.14	.10/.14	.11/.14	.12/.14	.12/.13	.14/.11	.15/.10	.15/.10	.13/.10	.11/.10	.09/.10
17	17	.09/.14	.09/.14	.09/.14	.11/.13	.12/.11	.12/.10	.13/.10	.12/.10	.11/.10	.09/.10	.07/.10
19	19	.07/.14	.08/.14	.08/.14	.09/.14	.10/.14	.10/.13	.10/.10	.10/.10	.10/.10	.09/.10	.06/.10
21	21	.06/.14	.07/.14	.07/.14	.08/.14	.08/.13	.09/.10	.09/.10	.09/.10	.08/.10	.07/.10	.05/.10
20	7	.05/.7	.05/.7	.05/.7	.07/.8	.10/.13	.14/.13	.17/.13	.19/.13	.20/.13	.19/.13	.15/.13
9	9	.06/10	.06/10	.08/10	.11/10	.15/13	.17/13	.19/13	.20/13	.19/13	.18/13	.12/13
11	11	.07/13	.08/13	.09/11	.11/11	.12/10	.14/10	.16/13	.17/13	.17/13	.15/13	.10/13
13	13	.08/14	.09/14	.10/14	.10/14	.12/13	.13/13	.15/13	.15/13	.14/13	.12/13	.08/13
15	15	.08/14	.08/14	.09/14	.11/13	.12/13	.13/13	.13/13	.12/13	.11/13	.10/13	.08/13
17	17	.07/14	.08/14	.08/14	.09/14	.10/13	.11/13	.11/13	.10/13	.09/13	.08/13	.07/13
19	19	.07/14	.07/14	.08/14	.08/14	.09/13	.09/13	.09/13	.08/13	.07/13	.07/13	.05/13
21	21	.06/14	.06/14	.06/14	.07/14	.08/14	.08/13	.08/13	.07/13	.06/13	.05/13	.04/13
25	7	.04/.7	.04/.7	.04/.7	.07/.9	.11/.9	.15/.9	.18/.9	.19/.9	.20/.9	.17/.9	.09/.17
9	9	.05/9	.05/9	.05/9	.08/10	.11/10	.14/10	.17/10	.18/10	.19/10	.16/10	.08/17
11	11	.06/13	.06/13	.08/11	.11/10	.13/10	.15/10	.16/10	.16/10	.15/17	.11/17	.06/17
13	13	.07/14	.07/14	.08/13	.10/11	.12/11	.13/11	.14/11	.14/10	.12/17	.09/17	.05/17
15	15	.07/16	.07/16	.08/14	.10/13	.10/13	.11/11	.12/11	.11/11	.10/17	.07/17	.04/17
17	17	.06/16	.07/16	.07/16	.08/14	.08/14	.09/11	.10/11	.10/11	.09/17	.06/17	.03/17
19	19	.06/16	.06/16	.06/16	.06/16	.06/16	.07/14	.08/11	.08/11	.07/17	.05/17	.03/17
21	21	.05/16	.05/16	.05/16	.06/16	.06/16	.07/14	.07/11	.07/11	.06/17	.05/17	.03/17

RMS ROLL ACC IN DS2/ENCOUNTERED MODAL PERIOD, T, IN SECONDS

SHORTESTEST  
ASR

V	T0	SHIP HEADING ANGLE IN DEGREES										DE	
		0	15	30	45	60	75	90	105	120	135	150	
0	7	.12/.7	.12/.7	.13/.7	.14/.7	.15/.7	.16/.7	.16/.7	.15/.7	.14/.7	.13/.7	.12/.7	.11/.7
9	.15/.10	.16/.10	.17/.10	.18/.10	.19/.10	.20/.10	.20/.10	.19/.10	.17/.10	.16/.10	.15/.10	.15/.10	.14/.10
11	.16/.10	.16/.10	.17/.10	.18/.10	.19/.10	.20/.10	.21/.10	.19/.10	.18/.10	.16/.10	.15/.10	.16/.10	.15/.10
13	.14/.10	.14/.10	.15/.10	.16/.10	.17/.10	.18/.10	.18/.10	.18/.10	.17/.10	.16/.10	.15/.10	.14/.10	.13/.10
15	.11/.10	.12/.10	.12/.10	.13/.10	.14/.10	.15/.10	.15/.10	.15/.10	.14/.10	.13/.10	.12/.10	.11/.10	.11/.10
17	.09/.10	.10/.10	.10/.10	.11/.10	.12/.10	.12/.10	.12/.10	.12/.10	.11/.10	.11/.10	.10/.10	.09/.10	.09/.10
19	.08/.10	.08/.10	.08/.10	.09/.10	.09/.10	.10/.10	.10/.10	.10/.10	.10/.10	.09/.10	.08/.10	.08/.10	.08/.10
21	.06/.10	.07/.10	.07/.10	.08/.10	.08/.10	.08/.10	.08/.10	.08/.10	.08/.10	.08/.10	.07/.10	.06/.10	.06/.10
5	7	.10/.6	.11/.6	.12/.6	.12/.6	.13/.6	.15/.7	.16/.10	.16/.10	.16/.10	.16/.10	.16/.10	.16/.10
9	.12/.11	.13/.11	.14/.10	.16/.10	.18/.10	.20/.10	.22/.10	.24/.10	.24/.10	.24/.10	.24/.10	.23/.10	.23/.10
11	.14/.11	.14/.11	.16/.11	.18/.11	.21/.10	.22/.10	.23/.10	.23/.10	.22/.10	.21/.10	.21/.10	.21/.10	.21/.10
13	.13/.11	.14/.11	.15/.11	.16/.11	.18/.10	.20/.10	.20/.10	.20/.10	.19/.10	.18/.10	.17/.10	.17/.10	.17/.10
15	.11/.11	.12/.11	.13/.11	.14/.11	.15/.11	.16/.10	.16/.10	.16/.10	.15/.10	.14/.10	.14/.10	.13/.10	.13/.10
17	.10/.11	.10/.11	.11/.11	.12/.11	.12/.11	.13/.10	.13/.10	.13/.10	.13/.10	.12/.10	.11/.10	.11/.10	.11/.10
19	.08/.11	.08/.11	.09/.11	.10/.11	.10/.11	.11/.11	.11/.10	.11/.10	.10/.10	.09/.10	.09/.10	.09/.10	.09/.10
21	.07/.12	.07/.11	.07/.11	.08/.11	.08/.11	.09/.11	.09/.10	.09/.10	.08/.10	.08/.10	.07/.10	.07/.10	.07/.10
10	7	.09/.7	.10/.7	.11/.7	.12/.7	.12/.7	.15/.10	.19/.10	.22/.10	.24/.10	.24/.10	.24/.10	.23/.10
9	.09/.7	.10/.10	.11/.10	.13/.10	.16/.10	.19/.10	.21/.10	.23/.10	.23/.10	.23/.10	.22/.10	.21/.10	.20/.10
11	.10/.13	.10/.13	.11/.11	.13/.10	.15/.10	.17/.10	.19/.10	.20/.10	.20/.10	.19/.10	.18/.10	.16/.10	.16/.10
13	.09/.13	.09/.13	.10/.13	.11/.13	.12/.11	.14/.10	.15/.10	.16/.10	.16/.10	.15/.10	.14/.10	.12/.10	.12/.10
15	.08/.13	.08/.13	.09/.13	.09/.13	.10/.13	.12/.11	.12/.10	.13/.10	.13/.10	.12/.10	.11/.10	.10/.10	.09/.10
17	.07/.13	.07/.13	.08/.13	.09/.13	.09/.13	.10/.11	.10/.10	.11/.10	.10/.10	.10/.10	.09/.10	.08/.10	.07/.10
19	.06/.13	.06/.13	.06/.13	.06/.13	.07/.13	.07/.13	.08/.11	.09/.10	.09/.10	.08/.10	.07/.10	.06/.10	.06/.10
21	.05/.13	.05/.13	.05/.13	.06/.13	.06/.13	.06/.13	.07/.11	.07/.10	.07/.10	.06/.10	.06/.10	.05/.10	.05/.10
15	7	.09/.7	.09/.7	.10/.7	.10/.7	.12/.10	.15/.10	.17/.10	.19/.10	.19/.10	.20/.10	.20/.10	.19/.10
9	.08/.7	.08/.8	.09/.8	.09/.10	.11/.10	.14/.10	.16/.10	.17/.10	.17/.10	.17/.10	.15/.10	.13/.10	.12/.10
11	.08/.13	.08/.12	.09/.12	.09/.10	.10/.10	.12/.10	.13/.10	.14/.10	.14/.10	.14/.10	.12/.10	.10/.10	.09/.10
13	.07/.13	.07/.13	.08/.13	.08/.13	.09/.10	.11/.10	.11/.10	.12/.10	.12/.10	.11/.10	.10/.10	.08/.10	.06/.10
15	.07/.14	.07/.14	.07/.14	.07/.13	.08/.11	.09/.10	.10/.10	.10/.10	.09/.10	.09/.10	.08/.10	.06/.10	.05/.10
17	.06/.14	.06/.14	.06/.14	.06/.14	.06/.14	.07/.13	.08/.10	.08/.10	.08/.10	.07/.10	.06/.10	.05/.10	.04/.10
19	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.06/.13	.06/.13	.06/.13	.06/.10	.06/.10	.05/.10	.04/.10	.03/.10
21	.04/.14	.04/.14	.04/.14	.04/.14	.04/.14	.05/.14	.05/.14	.06/.13	.06/.13	.06/.10	.05/.10	.04/.10	.03/.10
20	7	.08/.7	.08/.7	.09/.7	.11/.7	.13/.13	.14/.13	.14/.13	.13/.13	.13/.13	.12/.13	.12/.13	.11/.13
9	.08/.8	.08/.8	.09/.10	.10/.10	.12/.10	.13/.13	.13/.13	.12/.10	.11/.10	.11/.10	.10/.10	.09/.13	.08/.13
11	.07/.12	.07/.11	.08/.10	.09/.10	.11/.10	.11/.10	.12/.10	.11/.13	.10/.13	.09/.13	.07/.13	.06/.13	.05/.13
13	.07/.14	.07/.14	.08/.13	.09/.13	.09/.10	.10/.10	.10/.10	.09/.13	.08/.13	.07/.13	.06/.13	.04/.13	.03/.13
15	.06/.14	.06/.14	.06/.14	.06/.14	.07/.14	.07/.13	.08/.11	.08/.13	.08/.13	.07/.13	.06/.13	.05/.13	.03/.13
17	.05/.14	.05/.14	.05/.14	.05/.14	.06/.14	.06/.13	.07/.13	.07/.13	.06/.13	.06/.13	.05/.13	.04/.13	.02/.13
19	.04/.14	.04/.14	.04/.14	.04/.14	.04/.14	.05/.14	.05/.14	.06/.13	.06/.13	.05/.13	.04/.13	.03/.13	.02/.13
21	.03/.14	.03/.14	.03/.14	.03/.14	.03/.14	.04/.14	.04/.14	.05/.13	.05/.13	.04/.13	.03/.13	.02/.13	.01/.13
25	7	.08/.7	.08/.7	.09/.9	.11/.9	.13/.9	.14/.9	.14/.9	.13/.9	.13/.9	.12/.9	.12/.9	.09/.9
9	.07/.8	.07/.8	.08/.8	.08/.8	.08/.10	.09/.10	.10/.10	.11/.10	.11/.10	.11/.10	.10/.10	.09/.10	.08/.10
11	.06/.12	.07/.11	.08/.10	.09/.10	.09/.10	.09/.10	.09/.10	.09/.10	.09/.10	.09/.10	.08/.10	.07/.10	.06/.10
13	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.06/.14	.06/.14	.06/.14	.06/.11	.06/.10	.05/.10	.04/.10	.03/.10
15	.05/.16	.05/.16	.05/.16	.05/.16	.05/.16	.05/.16	.05/.16	.05/.16	.05/.11	.05/.10	.04/.10	.03/.10	.02/.10
17	.04/.16	.04/.16	.04/.16	.04/.16	.04/.16	.04/.16	.04/.16	.04/.16	.04/.11	.04/.10	.03/.10	.02/.10	.01/.10
19	.03/.16	.03/.16	.03/.16	.03/.16	.03/.16	.04/.16	.04/.16	.04/.16	.04/.11	.04/.10	.03/.10	.02/.10	.01/.10
21	.02/.16	.02/.16	.02/.16	.02/.16	.02/.16	.03/.16	.03/.16	.03/.16	.03/.11	.03/.10	.02/.10	.01/.10	.01/.10

RMS PITCH IN DEGREES/ENCOUNTERED MODAL PERIOD, T . IN SECONDS  
SHORTCRESTED  
DE

V TO	0	SHIP HEADING ANGLE IN DEGREES										165	180
		15	30	45	60	75	90	105	120	135	150		
0	7	.19/. 7	.18/. 7	.18/. 7	.18/. 7	.17/. 6	.16/. 6	.16/. 6	.16/. 7	.16/. 7	.16/. 7	.17/. 7	.17/. 7
1	9	.19/. 8	.18/. 8	.18/. 8	.17/. 7	.16/. 7	.15/. 7	.14/. 7	.15/. 8	.16/. 8	.17/. 8	.17/. 8	.18/. 8
11	.17/. 9	.16/. 9	.16/. 9	.14/. 9	.13/. 8	.12/. 8	.12/. 8	.12/. 8	.13/. 9	.14/. 9	.15/. 9	.16/. 9	.16/. 9
13	.14/. 10	.14/. 10	.13/. 10	.12/. 10	.11/. 10	.10/. 9	.10/. 9	.10/. 9	.10/. 10	.10/. 10	.10/. 10	.11/. 10	.11/. 10
15	.12/. 10	.12/. 10	.11/. 10	.10/. 10	.09/. 10	.08/. 10	.08/. 10	.08/. 10	.09/. 10	.09/. 10	.09/. 10	.10/. 10	.10/. 10
17	.10/. 12	.10/. 11	.09/. 11	.09/. 11	.08/. 11	.07/. 11	.07/. 11	.07/. 11	.08/. 11	.08/. 12	.08/. 12	.09/. 12	.10/. 12
19	.09/. 13	.09/. 13	.08/. 13	.08/. 13	.07/. 13	.06/. 13	.06/. 13	.06/. 13	.06/. 13	.06/. 13	.06/. 13	.08/. 13	.09/. 13
21	.08/. 14	.07/. 14	.06/. 14	.06/. 14	.05/. 14	.05/. 14	.05/. 14	.05/. 14	.06/. 14	.06/. 14	.06/. 14	.07/. 14	.07/. 14
5	7	.21/. 7	.21/. 7	.20/. 7	.20/. 7	.19/. 7	.19/. 7	.18/. 7	.17/. 7	.16/. 7	.15/. 7	.14/. 9	.14/. 9
9	.22/. 9	.21/. 9	.20/. 9	.20/. 9	.19/. 9	.19/. 9	.18/. 9	.17/. 9	.16/. 9	.15/. 9	.14/. 9	.14/. 9	.14/. 9
11	.19/. 8	.19/. 8	.18/. 8	.18/. 8	.17/. 8	.16/. 8	.15/. 8	.14/. 8	.13/. 9	.12/. 9	.11/. 9	.11/. 9	.11/. 9
13	.16/. 10	.16/. 10	.15/. 10	.15/. 10	.14/. 10	.13/. 10	.12/. 10	.11/. 10	.10/. 10	.10/. 10	.10/. 10	.11/. 10	.11/. 10
15	.13/. 10	.13/. 10	.12/. 10	.12/. 10	.11/. 10	.10/. 10	.10/. 10	.09/. 10	.09/. 10	.09/. 10	.09/. 10	.10/. 10	.10/. 10
17	.11/. 11	.11/. 11	.10/. 11	.10/. 11	.09/. 10	.08/. 10	.08/. 10	.07/. 10	.07/. 10	.07/. 10	.07/. 10	.08/. 10	.09/. 10
19	.10/. 12	.09/. 12	.08/. 12	.08/. 12	.07/. 12	.06/. 12	.06/. 12	.06/. 12	.06/. 13	.06/. 13	.06/. 13	.08/. 14	.09/. 14
21	.08/. 14	.08/. 14	.07/. 13	.07/. 13	.06/. 13	.05/. 14	.05/. 14	.05/. 14	.05/. 14	.05/. 15	.05/. 15	.06/. 15	.07/. 15
10	7	.21/. 7	.21/. 7	.20/. 7	.20/. 7	.19/. 7	.18/. 7	.17/. 7	.16/. 7	.15/. 7	.14/. 9	.14/. 9	.14/. 9
11	.23/. 8	.23/. 8	.22/. 8	.20/. 8	.19/. 8	.17/. 8	.15/. 8	.13/. 8	.12/. 8	.11/. 8	.10/. 9	.10/. 9	.10/. 9
13	.17/. 8	.17/. 8	.16/. 8	.16/. 8	.14/. 8	.13/. 8	.11/. 8	.10/. 8	.09/. 10	.09/. 10	.09/. 10	.10/. 10	.10/. 10
15	.14/. 8	.14/. 8	.13/. 8	.13/. 8	.12/. 8	.10/. 8	.09/. 10	.08/. 10	.07/. 10	.06/. 12	.05/. 12	.05/. 12	.05/. 12
17	.12/. 9	.12/. 9	.11/. 9	.10/. 9	.09/. 10	.09/. 10	.08/. 10	.07/. 10	.06/. 12	.05/. 12	.04/. 12	.04/. 12	.04/. 12
19	.10/. 11	.10/. 11	.09/. 11	.09/. 11	.08/. 10	.07/. 11	.06/. 12	.05/. 12	.04/. 13	.03/. 13	.02/. 13	.02/. 13	.02/. 13
21	.09/. 12	.08/. 12	.08/. 12	.07/. 12	.06/. 12	.05/. 13	.05/. 13	.05/. 14	.05/. 14	.05/. 15	.05/. 15	.06/. 15	.06/. 15
15	7	.20/. 8	.20/. 7	.19/. 7	.18/. 7	.17/. 7	.17/. 7	.16/. 7	.15/. 7	.14/. 9	.14/. 9	.14/. 9	.14/. 9
9	.23/. 8	.23/. 8	.23/. 8	.22/. 8	.20/. 8	.18/. 8	.16/. 8	.14/. 8	.12/. 8	.10/. 8	.08/. 9	.07/. 9	.06/. 9
11	.21/. 8	.21/. 8	.20/. 8	.19/. 8	.17/. 8	.15/. 8	.13/. 8	.11/. 8	.09/. 10	.07/. 10	.05/. 10	.03/. 10	.01/. 10
13	.18/. 8	.18/. 8	.18/. 8	.17/. 8	.15/. 8	.13/. 8	.11/. 8	.09/. 9	.07/. 10	.05/. 10	.03/. 10	.01/. 10	.00/. 10
15	.15/. 8	.15/. 8	.15/. 8	.14/. 8	.12/. 8	.10/. 8	.09/. 8	.07/. 9	.05/. 10	.03/. 10	.01/. 10	.00/. 10	.00/. 10
17	.12/. 8	.12/. 8	.12/. 8	.11/. 8	.10/. 8	.09/. 8	.08/. 8	.07/. 9	.05/. 10	.03/. 10	.01/. 10	.00/. 10	.00/. 10
19	.11/. 8	.10/. 8	.10/. 8	.09/. 8	.08/. 8	.07/. 9	.06/. 9	.05/. 10	.03/. 10	.01/. 10	.00/. 10	.00/. 10	.00/. 10
21	.09/. 9	.08/. 9	.07/. 8	.06/. 10	.05/. 14	.05/. 17	.05/. 20	.05/. 20	.05/. 20	.05/. 20	.05/. 20	.06/. 20	.06/. 20
20	7	.19/. 8	.19/. 8	.18/. 8	.18/. 8	.17/. 8	.17/. 8	.16/. 8	.15/. 8	.13/. 9	.12/. 13	.11/. 13	.10/. 13
9	.24/. 8	.23/. 8	.22/. 8	.20/. 8	.19/. 8	.17/. 8	.16/. 8	.14/. 8	.12/. 8	.10/. 9	.10/. 13	.11/. 13	.12/. 13
11	.22/. 8	.22/. 8	.20/. 8	.19/. 8	.17/. 8	.15/. 8	.13/. 8	.11/. 8	.10/. 9	.09/. 10	.09/. 13	.10/. 13	.11/. 13
13	.19/. 8	.18/. 8	.17/. 8	.16/. 8	.14/. 8	.12/. 8	.10/. 8	.09/. 9	.08/. 10	.07/. 10	.06/. 13	.05/. 13	.04/. 13
15	.16/. 8	.15/. 8	.14/. 8	.13/. 8	.12/. 8	.11/. 8	.09/. 8	.08/. 9	.07/. 10	.06/. 11	.05/. 13	.04/. 13	.03/. 13
17	.13/. 8	.13/. 8	.12/. 8	.11/. 8	.10/. 8	.09/. 8	.08/. 8	.07/. 9	.06/. 10	.05/. 11	.04/. 13	.03/. 13	.02/. 13
19	.11/. 8	.11/. 8	.11/. 8	.10/. 8	.09/. 8	.08/. 8	.07/. 8	.06/. 9	.05/. 10	.04/. 11	.03/. 13	.02/. 13	.01/. 13
21	.09/. 8	.09/. 8	.09/. 8	.08/. 8	.07/. 8	.06/. 8	.05/. 8	.04/. 9	.03/. 10	.02/. 11	.01/. 13	.00/. 13	.00/. 13
25	7	.17/. 8	.17/. 8	.17/. 8	.17/. 8	.17/. 8	.17/. 8	.16/. 9	.15/. 10	.14/. 11	.13/. 12	.12/. 12	.11/. 12
9	.24/. 8	.23/. 8	.23/. 8	.22/. 9	.20/. 9	.19/. 9	.19/. 9	.18/. 9	.17/. 10	.16/. 11	.15/. 12	.14/. 12	.13/. 12
11	.22/. 8	.22/. 8	.20/. 8	.19/. 8	.17/. 8	.15/. 8	.14/. 8	.12/. 9	.11/. 10	.10/. 11	.09/. 12	.08/. 12	.07/. 12
13	.19/. 8	.18/. 8	.17/. 8	.16/. 8	.14/. 8	.12/. 8	.10/. 8	.09/. 9	.08/. 10	.07/. 11	.06/. 12	.05/. 12	.04/. 12
15	.16/. 8	.15/. 8	.14/. 8	.13/. 8	.12/. 8	.11/. 8	.09/. 8	.08/. 9	.07/. 10	.06/. 11	.05/. 12	.04/. 12	.03/. 12
17	.14/. 9	.14/. 9	.13/. 9	.13/. 9	.12/. 9	.12/. 9	.10/. 9	.09/. 9	.08/. 10	.07/. 11	.06/. 12	.05/. 12	.04/. 12
19	.12/. 9	.11/. 9	.11/. 9	.11/. 9	.10/. 9	.10/. 9	.08/. 9	.07/. 9	.06/. 10	.05/. 11	.04/. 12	.03/. 12	.02/. 12
21	.10/. 9	.09/. 9	.09/. 9	.09/. 9	.08/. 9	.07/. 9	.06/. 9	.05/. 10	.04/. 11	.03/. 12	.02/. 12	.01/. 12	.00/. 12

ASR  
RMS PITCH VEL IN DPS/ENCOUNTERED MODAL PERIOD, T, IN SECONDS  
SHORICRESTED  
DE

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										150	155	160	
		15	30	45	60	75	90	105	120	135					
0	7	.18/ 6	.18/ 6	.18/ 6	.18/ 6	.18/ 6	.17/ 6	.17/ 6	.17/ 6	.17/ 6	.17/ 6	.17/ 6	.16/ 7	.16/ 7	.16/ 7
1	9	.16/ 7	.16/ 7	.16/ 7	.15/ 7	.15/ 7	.14/ 6	.14/ 6	.14/ 6	.14/ 6	.14/ 6	.14/ 6	.15/ 7	.15/ 7	.15/ 7
2	11	.13/ 7	.13/ 7	.13/ 7	.12/ 7	.12/ 7	.11/ 7	.11/ 7	.11/ 7	.11/ 7	.11/ 7	.11/ 7	.12/ 8	.12/ 8	.13/ 8
3	13	.11/ 8	.10/ 8	.10/ 8	.10/ 8	.10/ 8	.09/ 7	.08/ 7	.08/ 7	.08/ 7	.09/ 7	.09/ 7	.10/ 8	.10/ 8	.10/ 8
4	15	.09/ 8	.08/ 8	.08/ 8	.08/ 8	.08/ 8	.07/ 8	.07/ 8	.07/ 8	.06/ 7	.07/ 8	.07/ 8	.08/ 8	.08/ 8	.08/ 8
5	17	.07/ 8	.07/ 8	.07/ 8	.06/ 8	.06/ 8	.05/ 8	.05/ 8	.05/ 8	.05/ 7	.05/ 7	.05/ 7	.06/ 9	.07/ 9	.07/ 9
6	19	.06/ 9	.06/ 9	.06/ 9	.05/ 9	.05/ 9	.05/ 9	.05/ 9	.05/ 9	.05/ 9	.05/ 9	.05/ 9	.05/ 9	.06/ 9	.06/ 9
7	21	.05/ 9	.05/ 9	.05/ 9	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 9	.05/ 9	.05/ 9
8	7	.24/ 7	.24/ 7	.23/ 7	.22/ 7	.22/ 7	.20/ 6	.19/ 6	.17/ 6	.15/ 6	.14/ 6	.12/ 6	.12/ 9	.11/ 9	.11/ 9
9	9	.22/ 7	.22/ 7	.21/ 7	.20/ 7	.20/ 7	.18/ 7	.16/ 7	.14/ 7	.12/ 6	.11/ 6	.11/ 9	.10/ 9	.10/ 10	.10/ 10
10	11	.18/ 7	.18/ 7	.17/ 7	.16/ 7	.16/ 7	.14/ 7	.12/ 7	.10/ 7	.09/ 7	.09/ 10	.09/ 10	.09/ 10	.09/ 10	.09/ 10
11	13	.14/ 7	.14/ 7	.13/ 7	.12/ 7	.12/ 7	.11/ 7	.10/ 7	.08/ 7	.07/ 7	.07/ 10	.07/ 10	.07/ 10	.07/ 10	.07/ 10
12	15	.11/ 7	.11/ 7	.11/ 7	.10/ 7	.10/ 7	.09/ 7	.08/ 7	.07/ 7	.06/ 10	.06/ 10	.06/ 11	.06/ 11	.06/ 11	.06/ 11
13	17	.09/ 7	.09/ 7	.09/ 7	.08/ 7	.08/ 7	.06/ 7	.05/ 7	.05/ 7	.05/ 10	.05/ 11	.05/ 11	.05/ 11	.05/ 11	.05/ 11
14	19	.08/ 7	.07/ 7	.07/ 7	.06/ 7	.06/ 7	.05/ 7	.04/ 7	.04/ 7	.04/ 10	.04/ 11	.04/ 11	.04/ 11	.04/ 11	.04/ 11
15	21	.06/ 7	.06/ 7	.05/ 7	.05/ 7	.05/ 7	.04/ 7	.04/ 7	.03/ 10	.03/ 11	.03/ 11	.03/ 11	.03/ 11	.03/ 11	.03/ 11
16	7	.26/ 7	.26/ 7	.25/ 7	.23/ 7	.23/ 7	.22/ 7	.19/ 7	.17/ 7	.14/ 6	.11/ 6	.10/ 13	.08/ 13	.07/ 13	.07/ 13
17	9	.22/ 7	.21/ 7	.20/ 7	.18/ 7	.18/ 7	.16/ 7	.14/ 7	.12/ 7	.10/ 7	.09/ 13	.08/ 13	.07/ 13	.06/ 13	.06/ 13
18	11	.17/ 7	.17/ 7	.16/ 7	.15/ 7	.15/ 7	.13/ 7	.11/ 7	.09/ 7	.07/ 7	.06/ 13	.05/ 13	.05/ 13	.05/ 13	.05/ 13
19	13	.14/ 8	.14/ 8	.13/ 8	.13/ 8	.13/ 8	.12/ 7	.10/ 7	.08/ 7	.06/ 13	.05/ 13	.04/ 13	.04/ 13	.04/ 13	.04/ 13
20	15	.11/ 8	.11/ 8	.10/ 8	.10/ 8	.10/ 8	.09/ 7	.08/ 7	.07/ 7	.06/ 7	.05/ 13	.04/ 13	.04/ 13	.04/ 13	.04/ 13
21	17	.09/ 8	.09/ 8	.09/ 8	.08/ 8	.08/ 8	.07/ 7	.06/ 7	.05/ 7	.04/ 13	.03/ 13	.03/ 13	.03/ 13	.03/ 13	.03/ 13
22	19	.08/ 8	.07/ 8	.07/ 8	.06/ 7	.06/ 7	.05/ 7	.05/ 7	.04/ 7	.03/ 13	.03/ 13	.03/ 13	.03/ 13	.03/ 13	.03/ 13
23	21	.06/ 8	.06/ 8	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.04/ 7	.03/ 13	.03/ 13	.03/ 13	.03/ 13	.03/ 13	.03/ 13
24	7	.26/ 7	.26/ 7	.25/ 7	.24/ 7	.24/ 7	.22/ 7	.20/ 7	.17/ 7	.13/ 7	.10/ 10	.08/ 10	.07/ 13	.07/ 13	.07/ 13
25	9	.22/ 7	.21/ 7	.20/ 7	.19/ 7	.19/ 7	.17/ 7	.15/ 7	.12/ 7	.10/ 7	.09/ 14	.07/ 14	.05/ 14	.05/ 14	.05/ 14
26	11	.19/ 8	.19/ 8	.18/ 8	.18/ 8	.18/ 8	.16/ 8	.14/ 8	.12/ 8	.09/ 7	.07/ 7	.05/ 14	.04/ 17	.04/ 17	.04/ 17
27	13	.16/ 8	.15/ 8	.15/ 8	.15/ 8	.15/ 8	.13/ 8	.11/ 8	.09/ 8	.07/ 7	.06/ 7	.04/ 17	.04/ 20	.04/ 20	.04/ 20
28	15	.13/ 8	.13/ 8	.12/ 8	.12/ 8	.12/ 8	.11/ 8	.09/ 8	.08/ 8	.06/ 7	.05/ 7	.04/ 17	.03/ 20	.03/ 20	.03/ 20
29	17	.10/ 8	.10/ 8	.10/ 8	.10/ 8	.10/ 8	.10/ 8	.10/ 8	.08/ 8	.06/ 7	.05/ 7	.04/ 17	.03/ 20	.03/ 20	.03/ 20
30	19	.09/ 8	.09/ 8	.08/ 8	.07/ 8	.07/ 8	.06/ 8	.06/ 8	.06/ 8	.05/ 7	.04/ 7	.03/ 17	.02/ 20	.02/ 20	.02/ 20
31	21	.06/ 8	.06/ 8	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.04/ 7	.03/ 7	.02/ 20	.02/ 20	.02/ 20	.02/ 20
32	7	.26/ 8	.26/ 8	.25/ 8	.24/ 8	.24/ 8	.22/ 7	.20/ 7	.17/ 7	.14/ 7	.10/ 13	.07/ 13	.05/ 13	.05/ 13	.05/ 13
33	9	.22/ 8	.21/ 8	.20/ 8	.19/ 8	.19/ 8	.17/ 8	.15/ 8	.13/ 8	.10/ 7	.07/ 13	.05/ 13	.04/ 13	.04/ 13	.04/ 13
34	11	.19/ 8	.19/ 8	.18/ 8	.18/ 8	.18/ 8	.16/ 8	.14/ 8	.12/ 8	.09/ 8	.07/ 7	.05/ 13	.03/ 23	.03/ 23	.03/ 23
35	13	.16/ 8	.16/ 8	.15/ 8	.15/ 8	.15/ 8	.13/ 8	.11/ 8	.09/ 8	.08/ 8	.06/ 7	.04/ 13	.03/ 23	.03/ 23	.03/ 23
36	15	.13/ 8	.13/ 8	.12/ 8	.12/ 8	.12/ 8	.10/ 8	.08/ 8	.07/ 8	.06/ 7	.05/ 7	.03/ 23	.02/ 23	.02/ 23	.02/ 23
37	17	.10/ 8	.10/ 8	.10/ 8	.10/ 8	.10/ 8	.08/ 8	.07/ 8	.06/ 8	.05/ 7	.04/ 7	.02/ 23	.02/ 26	.02/ 26	.02/ 26
38	19	.09/ 8	.09/ 8	.08/ 8	.07/ 8	.07/ 8	.06/ 8	.06/ 8	.06/ 8	.05/ 7	.04/ 7	.02/ 23	.02/ 26	.02/ 26	.02/ 26
39	21	.06/ 8	.06/ 8	.05/ 8	.05/ 8	.05/ 8	.04/ 8	.04/ 8	.04/ 8	.03/ 7	.02/ 23	.02/ 23	.02/ 26	.02/ 26	.02/ 26
40	7	.25/ 8	.25/ 8	.25/ 8	.24/ 8	.24/ 8	.23/ 8	.20/ 7	.18/ 7	.14/ 7	.10/ 9	.07/ 9	.05/ 17	.03/ 17	.03/ 17
41	9	.22/ 8	.21/ 8	.20/ 8	.19/ 8	.19/ 8	.17/ 8	.15/ 8	.13/ 8	.10/ 7	.07/ 13	.05/ 13	.04/ 13	.04/ 13	.04/ 13
42	11	.19/ 8	.19/ 8	.18/ 8	.18/ 8	.18/ 8	.16/ 8	.14/ 8	.12/ 8	.09/ 8	.07/ 7	.05/ 17	.03/ 17	.03/ 17	.03/ 17
43	13	.16/ 8	.16/ 8	.15/ 8	.15/ 8	.15/ 8	.13/ 8	.11/ 8	.09/ 8	.08/ 8	.06/ 7	.04/ 13	.03/ 23	.03/ 23	.03/ 23
44	15	.13/ 8	.13/ 8	.12/ 8	.12/ 8	.12/ 8	.10/ 8	.08/ 8	.07/ 8	.06/ 7	.05/ 7	.03/ 23	.02/ 23	.02/ 23	.02/ 23
45	17	.10/ 8	.10/ 8	.10/ 8	.10/ 8	.10/ 8	.08/ 8	.07/ 8	.06/ 8	.05/ 7	.04/ 7	.02/ 23	.02/ 26	.02/ 26	.02/ 26
46	19	.09/ 8	.09/ 8	.08/ 8	.07/ 8	.07/ 8	.06/ 8	.06/ 8	.06/ 8	.05/ 7	.04/ 7	.02/ 23	.02/ 26	.02/ 26	.02/ 26
47	21	.06/ 8	.06/ 8	.05/ 8	.05/ 8	.05/ 8	.04/ 8	.04/ 8	.04/ 8	.03/ 7	.02/ 23	.02/ 23	.02/ 26	.02/ 26	.02/ 26

RMS PITCH ACC IN DS2/ENCOUNTERED MODAL PERIOD,  $T_e$ , IN SECONDS

V	T <sub>e</sub>	SHIP HEADING ANGLE IN DEGREES										180
		0	15	30	45	60	75	90	105	120	135	
0	7	.18/ 6	.18/ 6	.18/ 6	.19/ 6	.19/ 6	.19/ 6	.19/ 5	.18/ 6	.18/ 6	.17/ 6	.17/ 6
1	9	.15/ 7	.15/ 7	.15/ 6	.15/ 6	.15/ 6	.14/ 6	.14/ 6	.14/ 6	.14/ 6	.14/ 7	.14/ 7
11	11	.12/ 7	.11/ 7	.11/ 6	.11/ 6	.11/ 6	.10/ 6	.10/ 6	.10/ 6	.10/ 6	.11/ 7	.11/ 7
13	13	.09/ 7	.09/ 7	.09/ 7	.08/ 6	.08/ 6	.08/ 6	.08/ 6	.08/ 6	.08/ 6	.08/ 7	.08/ 7
15	15	.07/ 7	.07/ 7	.07/ 7	.07/ 7	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 7	.07/ 7
17	17	.06/ 7	.06/ 7	.05/ 7	.05/ 7	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 7	.05/ 7
19	19	.05/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 6	.04/ 6	.04/ 6	.04/ 6	.04/ 6	.04/ 7	.04/ 7
21	21	.04/ 7	.04/ 7	.03/ 7	.03/ 6	.03/ 6	.03/ 6	.03/ 6	.03/ 6	.03/ 6	.03/ 7	.04/ 7
5	7	.28/ 7	.27/ 7	.27/ 6	.28/ 6	.24/ 6	.22/ 6	.19/ 6	.17/ 6	.14/ 6	.12/ 6	.10/ 6
9	9	.24/ 7	.24/ 7	.23/ 7	.23/ 7	.20/ 6	.17/ 6	.15/ 6	.13/ 6	.11/ 6	.09/ 6	.09/ 6
11	11	.19/ 7	.18/ 7	.18/ 7	.16/ 7	.15/ 6	.13/ 6	.11/ 6	.09/ 6	.08/ 6	.07/ 9	.06/ 9
13	13	.14/ 7	.14/ 7	.13/ 7	.13/ 7	.11/ 7	.10/ 6	.08/ 6	.07/ 6	.06/ 6	.05/ 9	.05/ 10
15	15	.11/ 7	.10/ 7	.10/ 7	.09/ 7	.09/ 7	.08/ 7	.06/ 7	.05/ 6	.05/ 6	.04/ 10	.04/ 10
17	17	.09/ 7	.09/ 7	.08/ 7	.08/ 7	.06/ 7	.06/ 7	.05/ 6	.04/ 6	.04/ 6	.03/ 10	.03/ 10
19	19	.07/ 7	.07/ 7	.06/ 7	.06/ 7	.05/ 7	.05/ 7	.04/ 6	.03/ 6	.03/ 6	.03/ 10	.03/ 10
21	21	.06/ 7	.06/ 7	.05/ 7	.05/ 7	.04/ 7	.03/ 6	.03/ 6	.03/ 6	.02/ 6	.02/ 10	.02/ 10
10	7	.33/ 7	.33/ 7	.32/ 7	.30/ 7	.27/ 7	.24/ 7	.20/ 6	.16/ 6	.12/ 6	.09/ 6	.07/ 13
9	9	.31/ 7	.31/ 7	.29/ 7	.29/ 7	.27/ 7	.24/ 7	.20/ 7	.17/ 7	.13/ 6	.10/ 6	.05/ 13
11	11	.25/ 7	.24/ 7	.23/ 7	.23/ 7	.21/ 7	.19/ 7	.16/ 7	.12/ 7	.10/ 7	.07/ 6	.05/ 13
13	13	.19/ 7	.19/ 7	.18/ 7	.18/ 7	.16/ 7	.14/ 7	.12/ 7	.10/ 7	.07/ 7	.05/ 6	.04/ 13
15	15	.15/ 7	.15/ 7	.15/ 7	.14/ 7	.13/ 7	.11/ 7	.09/ 7	.07/ 7	.06/ 7	.04/ 13	.03/ 13
17	17	.12/ 7	.12/ 7	.11/ 7	.11/ 7	.10/ 7	.09/ 7	.07/ 7	.06/ 7	.04/ 7	.03/ 13	.02/ 13
19	19	.10/ 7	.10/ 7	.09/ 7	.08/ 7	.07/ 7	.07/ 7	.06/ 7	.05/ 7	.04/ 7	.03/ 13	.02/ 13
21	21	.08/ 7	.08/ 7	.07/ 7	.07/ 7	.06/ 7	.05/ 7	.04/ 7	.03/ 7	.02/ 6	.02/ 13	.01/ 13
15	7	.36/ 7	.36/ 7	.35/ 7	.33/ 7	.30/ 7	.26/ 7	.22/ 7	.17/ 6	.12/ 6	.08/ 6	.05/ 10
9	9	.37/ 7	.36/ 7	.34/ 7	.32/ 7	.28/ 7	.23/ 7	.19/ 7	.14/ 7	.10/ 6	.06/ 6	.03/ 14
11	11	.30/ 8	.30/ 8	.28/ 8	.25/ 8	.22/ 8	.20/ 8	.18/ 7	.14/ 7	.11/ 7	.07/ 7	.04/ 6
13	13	.24/ 8	.24/ 8	.22/ 8	.22/ 8	.19/ 8	.17/ 7	.14/ 7	.11/ 7	.08/ 7	.05/ 7	.03/ 6
15	15	.19/ 8	.18/ 8	.17/ 8	.16/ 8	.16/ 8	.13/ 8	.11/ 7	.09/ 7	.06/ 7	.04/ 7	.02/ 17
17	17	.15/ 8	.15/ 8	.14/ 8	.14/ 8	.12/ 8	.11/ 7	.09/ 7	.07/ 7	.05/ 7	.03/ 6	.02/ 20
19	19	.12/ 8	.12/ 8	.11/ 8	.10/ 8	.09/ 8	.09/ 8	.07/ 7	.06/ 7	.04/ 7	.03/ 6	.01/ 20
21	21	.10/ 8	.10/ 8	.09/ 8	.08/ 8	.07/ 7	.06/ 7	.05/ 7	.03/ 7	.02/ 7	.01/ 20	.01/ 20
20	7	.38/ 8	.37/ 8	.36/ 8	.34/ 8	.32/ 7	.28/ 7	.23/ 7	.18/ 7	.13/ 7	.08/ 7	.02/ 13
9	9	.42/ 8	.41/ 8	.39/ 8	.36/ 8	.32/ 8	.27/ 8	.21/ 7	.16/ 7	.11/ 7	.06/ 7	.03/ 13
11	11	.36/ 8	.35/ 8	.33/ 8	.30/ 8	.26/ 8	.21/ 8	.17/ 7	.12/ 7	.08/ 7	.05/ 7	.02/ 13
13	13	.28/ 8	.28/ 8	.26/ 8	.24/ 8	.20/ 8	.17/ 8	.13/ 8	.09/ 7	.06/ 7	.03/ 7	.01/ 13
15	15	.22/ 8	.22/ 8	.21/ 8	.19/ 8	.16/ 8	.13/ 8	.10/ 8	.07/ 7	.03/ 7	.01/ 13	.01/ 13
17	17	.18/ 8	.18/ 8	.14/ 8	.13/ 8	.12/ 8	.10/ 8	.08/ 8	.06/ 7	.04/ 7	.02/ 7	.01/ 23
19	19	.15/ 8	.15/ 8	.14/ 8	.14/ 8	.12/ 8	.10/ 8	.08/ 8	.06/ 7	.04/ 7	.02/ 7	.01/ 23
21	21	.12/ 8	.12/ 8	.11/ 8	.10/ 8	.09/ 8	.07/ 8	.05/ 8	.04/ 7	.02/ 7	.01/ 7	.00/ 23
25	7	.38/ 8	.38/ 8	.37/ 8	.36/ 8	.33/ 8	.30/ 7	.25/ 7	.19/ 7	.14/ 7	.09/ 6	.04/ 9
9	9	.47/ 8	.46/ 8	.44/ 8	.41/ 8	.36/ 8	.30/ 8	.24/ 8	.18/ 7	.12/ 7	.07/ 6	.02/ 9
11	11	.41/ 8	.41/ 8	.38/ 8	.35/ 8	.30/ 8	.25/ 8	.19/ 8	.14/ 8	.10/ 8	.05/ 7	.02/ 17
13	13	.33/ 8	.33/ 8	.31/ 8	.28/ 8	.24/ 8	.20/ 8	.15/ 8	.11/ 8	.07/ 7	.04/ 7	.02/ 17
15	15	.27/ 8	.27/ 8	.26/ 8	.24/ 8	.22/ 8	.19/ 8	.15/ 8	.12/ 8	.08/ 8	.05/ 7	.01/ 17
17	17	.21/ 8	.21/ 8	.20/ 8	.18/ 8	.16/ 8	.13/ 8	.10/ 8	.09/ 8	.07/ 8	.04/ 7	.01/ 17
19	19	.17/ 8	.17/ 8	.16/ 8	.16/ 8	.14/ 8	.12/ 8	.10/ 8	.08/ 8	.05/ 8	.02/ 7	.01/ 17
21	21	.14/ 8	.14/ 8	.13/ 8	.12/ 8	.12/ 8	.10/ 8	.08/ 8	.06/ 8	.04/ 8	.02/ 7	.00/ 17

## ASR

RMS YAW IN DEGREES/ENCOUNTERED MODAL PERIOD, T' IN SECONDS  
SHORCRESTED

V	T0	0	15	30	45	60	75	90	105	120	135	150	165	180
			SHIP HEADING ANGLE IN DEGREES											
0	7	.04/ 7	.04/ 7	.04/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.04/ 7	.04/ 7	.04/ 7
9	.05/ 9	.05/ 9	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.04/ 8	.04/ 8	.04/ 8
11	.05/10	.05/10	.05/10	.05/10	.05/10	.05/10	.05/10	.05/10	.05/10	.05/10	.05/10	.04/ 9	.04/ 9	.04/ 9
13	.04/10	.04/10	.04/10	.04/10	.04/10	.04/10	.04/10	.04/10	.04/10	.04/10	.04/10	.04/12	.04/12	.04/12
15	.04/10	.04/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.04/13	.04/13	.03/13
17	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/13	.03/13	.03/13
19	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/14	.03/14	.03/14
21	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/14	.02/14	.02/14
8	7	.03/ 7	.03/ 7	.04/ 7	.04/ 7	.04/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 9	.05/ 9	.05/ 9
9	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.05/ 8	.06/ 9	.06/ 9	.06/ 9
11	.04/11	.04/11	.04/11	.04/11	.04/11	.04/11	.05/11	.05/11	.05/11	.05/11	.05/11	.05/12	.05/12	.05/12
13	.04/12	.04/12	.04/12	.04/12	.04/12	.04/12	.04/12	.04/12	.04/12	.04/12	.04/12	.05/12	.05/12	.05/12
15	.03/12	.03/12	.03/12	.03/12	.03/12	.03/12	.03/12	.03/12	.03/12	.03/12	.03/12	.04/12	.04/12	.04/12
17	.03/12	.03/12	.03/12	.03/12	.03/12	.03/12	.03/12	.03/12	.03/12	.03/12	.03/12	.04/13	.04/13	.04/13
19	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.03/12	.03/12	.03/12	.03/12	.03/12	.03/13	.03/13	.03/13
21	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.03/14	.03/14	.03/14
10	7	.03/ 7	.03/ 7	.03/ 7	.04/ 7	.04/ 7	.05/ 8	.05/ 8	.05/ 8	.06/12	.07/12	.07/12	.07/12	.07/12
9	.03/ 8	.03/ 8	.03/ 8	.04/ 8	.04/ 8	.04/ 8	.05/ 9	.05/ 9	.05/ 9	.06/12	.07/12	.07/12	.07/12	.07/12
11	.03/10	.03/10	.03/10	.03/10	.04/10	.04/10	.04/11	.04/11	.04/11	.05/12	.06/13	.06/13	.06/13	.06/13
13	.03/13	.03/13	.03/13	.03/13	.03/13	.03/13	.03/13	.03/13	.03/13	.05/13	.05/13	.05/13	.05/13	.05/13
15	.03/13	.03/13	.03/13	.03/13	.03/13	.03/13	.03/13	.03/13	.03/13	.04/13	.05/13	.05/13	.05/13	.05/13
17	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.03/13	.04/13	.04/13	.04/13	.04/13
19	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.03/13	.03/13	.03/13	.03/13	.03/13
21	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.03/13	.03/13	.03/13	.03/13	.03/13
15	7	.02/ 7	.03/ 7	.03/ 7	.04/ 7	.04/ 7	.05/ 8	.05/ 8	.05/ 8	.06/12	.07/12	.07/12	.07/12	.07/12
9	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.04/ 9	.04/ 9	.04/ 9	.05/12	.06/13	.06/13	.06/13	.06/13
11	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.04/10	.04/10	.04/10	.05/14	.06/15	.06/15	.06/15	.06/15
13	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.03/12	.03/12	.03/12	.04/14	.05/14	.05/14	.05/14	.05/14
15	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.03/13	.03/13	.03/13	.04/14	.05/14	.05/14	.05/14	.05/14
17	.02/14	.02/14	.02/14	.02/14	.02/14	.02/14	.02/14	.02/14	.02/14	.03/14	.03/14	.04/14	.04/14	.04/14
19	.02/14	.02/14	.02/14	.02/14	.02/14	.02/14	.02/14	.02/14	.02/14	.02/14	.03/14	.03/14	.03/14	.03/14
21	.01/14	.01/14	.01/14	.01/14	.01/14	.01/14	.01/14	.01/14	.01/14	.02/14	.02/14	.02/14	.02/14	.02/14
20	7	.02/ 7	.02/ 7	.03/ 7	.03/ 7	.03/ 7	.03/13	.03/13	.03/13	.06/13	.07/13	.09/13	.10/13	.10/13
9	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.03/13	.03/13	.03/13	.06/13	.07/13	.08/13	.08/13	.08/13
11	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.03/13	.03/13	.03/13	.05/13	.06/13	.06/13	.06/13	.06/13
13	.02/11	.02/11	.02/11	.02/11	.02/11	.02/11	.02/13	.02/13	.02/13	.04/13	.05/13	.05/13	.05/13	.05/13
15	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.03/13	.04/13	.04/13	.04/13	.04/13
17	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.02/13	.03/13	.03/13	.03/13	.03/13
19	.01/14	.01/14	.01/14	.01/14	.01/14	.01/14	.01/14	.01/14	.01/14	.02/13	.02/13	.02/13	.02/13	.02/13
21	.01/14	.01/14	.01/14	.01/14	.01/14	.01/14	.01/14	.01/14	.01/14	.02/13	.02/13	.02/13	.02/13	.02/13
25	7	.02/ 7	.02/ 7	.02/ 7	.02/ 9	.03/ 9	.04/ 9	.04/ 9	.05/ 9	.06/39	.07/45	.09/52	.11/52	.11/52
9	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 9	.03/ 9	.03/17	.03/17	.03/17	.04/39	.05/45	.08/45	.08/45	.08/45
11	.02/10	.02/10	.02/10	.02/10	.02/ 9	.02/ 9	.02/17	.02/17	.02/17	.03/39	.04/42	.05/45	.07/45	.07/45
13	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/17	.02/17	.02/17	.02/39	.03/42	.04/45	.06/45	.06/45
15	.01/12	.01/12	.01/12	.01/12	.01/12	.01/12	.01/13	.01/13	.01/13	.01/17	.01/17	.02/39	.02/42	.02/42
17	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/17	.01/17	.02/39	.02/42	.02/42
19	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/17	.01/17	.02/42	.03/45	.03/45
21	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/17	.01/17	.02/42	.03/45	.03/45

ASR

RMS YAW VEL IN DPS/ENCOUNTERED MODAL PERIOD, T<sub>e</sub> IN SECONDS

SHORTCRESTED

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										DE	
		0	15	30	45	60	75	90	105	120	135	150	
0	7	.04/ 7	.04/ 7	.04/ 7	.05/ 7	.05/ 6	.06/ 6	.06/ 6	.06/ 6	.05/ 7	.05/ 7	.04/ 7	.04/ 7
9	.04/ 8	.04/ 8	.04/ 8	.04/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.04/ 7	.04/ 7	.04/ 8	.04/ 8
11	.03/10	.03/10	.04/10	.04/10	.04/10	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.03/ 8	.03/ 8
13	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/ 9	.03/ 9	.03/ 9	.03/ 9
15	.02/10	.02/10	.02/10	.02/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/ 9	.03/ 9	.02/ 9	.02/ 9
17	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/11	.02/12	.02/12	.02/12
19	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/11	.02/12	.02/12	.02/12
21	.01/10	.01/10	.01/10	.01/10	.01/10	.01/10	.01/10	.01/10	.01/10	.01/10	.01/12	.01/13	.01/13
6	7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.05/ 7	.05/ 7	.06/ 7	.06/ 7	.06/ 7	.05/ 8	.04/ 8	.04/ 8
9	.04/ 8	.04/ 8	.04/ 8	.04/ 7	.04/ 7	.05/ 7	.05/ 8	.05/ 8	.05/ 8	.05/ 9	.04/ 9	.04/ 9	.04/ 9
11	.03/ 9	.03/ 9	.03/ 9	.03/ 9	.04/ 9	.04/ 9	.04/ 9	.04/ 9	.04/ 9	.04/ 9	.04/ 9	.03/ 9	.03/ 9
13	.03/11	.03/11	.03/11	.03/11	.03/11	.03/11	.03/11	.03/11	.03/11	.03/12	.03/12	.03/12	.03/12
15	.02/11	.02/11	.02/11	.02/11	.02/11	.02/11	.02/11	.02/11	.02/11	.03/12	.02/12	.02/12	.02/12
17	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12
19	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12	.02/12
21	.01/12	.01/12	.01/12	.01/12	.01/12	.01/12	.01/12	.01/12	.01/12	.01/12	.01/12	.01/12	.01/12
10	7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.05/ 7	.05/ 7	.05/ 8	.05/ 8	.05/ 8	.05/10	.05/12	.05/12
9	.03/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.04/ 8	.05/12	.04/12	.04/12	.04/12
11	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.04/12	.04/12	.04/12	.04/12
13	.02/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/10	.03/12	.03/13	.03/13	.03/13
15	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.03/12	.03/13	.03/13	.03/13
17	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13	.02/13
19	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.02/13	.02/13	.02/13	.02/13
21	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13
15	7	.03/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.05/10	.05/10	.05/10	.05/14	.05/14	.04/14
9	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.03/10	.03/10	.04/14	.04/14	.04/14	.03/14
11	.03/ 8	.02/ 9	.02/ 9	.02/ 9	.03/10	.03/10	.03/10	.03/10	.03/10	.03/14	.03/14	.03/14	.03/14
13	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/10	.02/14	.02/14	.02/14	.02/14
15	.02/11	.02/11	.02/11	.02/11	.02/11	.02/11	.02/11	.02/11	.02/11	.02/14	.02/14	.02/14	.02/14
17	.02/11	.02/11	.02/11	.02/11	.02/11	.02/11	.02/11	.02/11	.02/11	.02/14	.02/14	.02/14	.02/14
19	.01/12	.01/12	.01/12	.01/12	.01/12	.01/12	.01/12	.01/12	.01/12	.01/14	.01/14	.01/14	.01/14
21	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13	.01/14	.01/14	.01/14	.01/14
20	7	.03/ 7	.03/ 7	.04/ 7	.04/ 7	.05/13	.05/13	.05/13	.05/13	.04/13	.04/13	.03/13	.02/13
9	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.04/ 7	.04/ 7	.04/ 7	.04/13	.04/13	.04/13	.03/13	.02/13	.02/13
11	.03/ 8	.02/ 9	.02/ 9	.02/ 9	.03/ 8	.03/ 8	.03/ 8	.03/13	.03/13	.03/13	.02/13	.02/13	.02/13
13	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/13	.02/13	.02/13	.02/13	.01/13	.01/13
15	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/13	.02/13	.02/13	.02/13	.01/13	.01/13
17	.01/10	.01/10	.01/10	.01/10	.01/10	.01/10	.01/10	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13
19	.01/10	.01/10	.01/10	.01/10	.01/10	.01/10	.01/10	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13
21	.01/10	.01/10	.01/10	.01/10	.01/10	.01/10	.01/10	.01/13	.01/13	.01/13	.01/13	.01/13	.01/13
25	7	.03/ 7	.03/ 7	.03/ 7	.04/ 9	.04/ 9	.04/ 9	.04/ 9	.04/ 9	.03/ 9	.03/ 9	.02/ 9	.02/ 9
9	.03/ 8	.03/ 8	.03/ 8	.03/ 8	.03/ 9	.03/ 9	.03/ 9	.03/ 9	.03/ 9	.03/ 9	.02/17	.02/17	.02/13
11	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/17	.02/17	.02/17	.02/12
13	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.01/17	.01/17	.01/17	.01/12
15	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.02/ 9	.01/17	.01/17	.01/17	.01/12
17	.01/ 9	.01/ 9	.01/ 9	.01/ 9	.01/ 9	.01/ 9	.01/ 9	.01/ 9	.01/ 9	.01/17	.01/17	.01/17	.01/12
19	.01/ 9	.01/ 9	.01/ 9	.01/ 9	.01/ 9	.01/ 9	.01/ 9	.01/ 9	.01/ 9	.01/17	.01/17	.01/17	.01/12
21	.01/ 9	.01/ 9	.01/ 9	.01/ 9	.01/ 9	.01/ 9	.01/ 9	.01/ 9	.01/ 9	.01/17	.01/17	.01/17	.01/12

## ASR

 RMS YAW ACC IN DS2/ENCOUNTERED MODAL PERIOD, T' IN SECONDS  
 SHORTCRESTED

V	T0	SHIP HEADING ANGLE IN DEGREES										QE'
		15	30	45	60	75	90	105	120	135	150	
0	0	.04/ 6	.04/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.04/ 6
0	7	.03/ 7	.03/ 7	.04/ 7	.04/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.04/ 7
11	9	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.03/ 7	.03/ 7
11	11	.02/ 10	.02/ 10	.02/ 10	.03/ 10	.03/ 10	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7
13	13	.02/ 10	.02/ 10	.02/ 10	.02/ 10	.02/ 10	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7
15	15	.02/ 10	.02/ 10	.02/ 10	.02/ 10	.02/ 10	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7
17	17	.01/ 10	.01/ 10	.01/ 10	.01/ 10	.01/ 10	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7
19	19	.01/ 10	.01/ 10	.01/ 10	.01/ 10	.01/ 10	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7
21	21	.01/ 10	.01/ 10	.01/ 10	.01/ 10	.01/ 10	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7
8	7	.04/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6
11	9	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7
13	13	.02/ 8	.02/ 8	.02/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7
15	15	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7
17	17	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7
19	19	.01/ 11	.01/ 11	.01/ 11	.01/ 11	.01/ 11	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7
21	21	.01/ 11	.01/ 11	.01/ 11	.01/ 11	.01/ 11	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7
10	7	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6	.05/ 6
11	9	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7
13	13	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7
15	15	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7
17	17	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7
19	19	.01/ 8	.01/ 8	.01/ 8	.01/ 8	.01/ 8	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7
21	21	.01/ 8	.01/ 8	.01/ 8	.01/ 8	.01/ 8	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7
15	7	.05/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6
11	9	.04/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7
13	13	.03/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7
15	15	.03/ 8	.03/ 8	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7
17	17	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7
19	19	.01/ 8	.01/ 8	.01/ 8	.01/ 8	.01/ 8	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7
21	21	.01/ 8	.01/ 8	.01/ 8	.01/ 8	.01/ 8	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7
15	7	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6
11	9	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7
13	13	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7	.03/ 7
15	15	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7
17	17	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7
19	19	.01/ 8	.01/ 8	.01/ 8	.01/ 8	.01/ 8	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7
21	21	.01/ 8	.01/ 8	.01/ 8	.01/ 8	.01/ 8	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7
25	7	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6	.06/ 6
11	9	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7	.05/ 7
13	13	.03/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7	.04/ 7
15	15	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7
17	17	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 8	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7	.02/ 7
19	19	.01/ 8	.01/ 8	.01/ 8	.01/ 8	.01/ 8	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7
21	21	.01/ 8	.01/ 8	.01/ 8	.01/ 8	.01/ 8	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7	.01/ 7

ASR

RMS LAT DISP IN FEET/ENCOUNTERED MODAL PERIOD, T<sub>m</sub> IN SECONDS  
 QE  
 ROLLER CHOCK - 8.0 FT AFT OF AP. ON CL. AND 26.07 FT ABOVE KEEL

V	TO	0	15	30	45	60	75	90	SHIP HEADING ANGLE IN DEGREES						
									105	120	135	150	165	180	
0	7	.11/.7	.12/.7	.13/.7	.15/.7	.16/.7	.17/.7	.18/.7	.18/.7	.17/.7	.15/.7	.14/.7	.12/.7	.11/.7	
1	9	.13/.0	.14/.0	.16/.0	.17/.0	.19/.0	.21/.0	.21/.0	.21/.0	.20/.0	.19/.0	.19/.0	.17/.0	.16/.0	.15/.0
11		.14/.0	.16/.0	.18/.0	.20/.0	.21/.0	.22/.0	.22/.0	.22/.0	.21/.0	.20/.0	.19/.0	.18/.0	.16/.0	.15/.0
13		.13/.0	.14/.0	.15/.0	.17/.0	.19/.0	.20/.0	.20/.0	.21/.0	.21/.0	.20/.0	.19/.0	.17/.0	.15/.0	.15/.0
15		.13/.4	.13/.4	.15/.6	.17/.6	.19/.6	.20/.6	.21/.6	.21/.6	.20/.6	.20/.6	.19/.6	.16/.6	.15/.6	.14/.6
17		.12/.6	.13/.6	.15/.6	.17/.6	.19/.6	.20/.6	.21/.6	.20/.6	.20/.6	.19/.6	.17/.6	.14/.6	.13/.6	.13/.6
19		.12/.8	.13/.8	.15/.8	.17/.8	.19/.8	.20/.8	.20/.8	.20/.8	.20/.8	.19/.8	.17/.8	.14/.8	.13/.8	.13/.8
21		.13/.2	.13/.2	.15/.2	.17/.2	.19/.2	.20/.2	.20/.2	.20/.2	.19/.2	.19/.2	.17/.2	.13/.2	.13/.2	.13/.2
8	7	.09/.7	.10/.7	.11/.7	.13/.7	.16/.8	.18/.8	.19/.8	.19/.8	.20/.8	.20/.8	.19/.9	.18/.9	.17/.9	.17/.9
9		.12/.0	.12/.0	.14/.0	.16/.0	.19/.0	.21/.0	.21/.0	.23/.0	.23/.0	.23/.0	.23/.0	.21/.0	.20/.0	.20/.0
11		.13/.0	.13/.0	.15/.0	.17/.0	.19/.0	.21/.0	.21/.0	.23/.0	.23/.0	.23/.0	.23/.0	.19/.0	.19/.0	.19/.0
13		.13/.0	.13/.0	.14/.0	.17/.0	.19/.0	.21/.0	.22/.0	.22/.0	.22/.0	.22/.0	.21/.0	.19/.0	.18/.0	.17/.0
15		.12/.6	.13/.6	.14/.6	.16/.6	.18/.6	.20/.6	.21/.6	.21/.6	.21/.6	.21/.6	.21/.5	.19/.5	.16/.0	.16/.0
17		.12/.6	.12/.6	.14/.6	.16/.6	.18/.6	.20/.6	.20/.6	.21/.6	.21/.6	.21/.6	.21/.6	.19/.7	.15/.7	.15/.7
19		.11/.8	.12/.8	.14/.8	.16/.8	.18/.8	.20/.8	.21/.8	.21/.8	.21/.8	.21/.8	.20/.8	.19/.8	.16/.8	.14/.8
21		.11/.2	.12/.2	.14/.2	.16/.2	.18/.2	.20/.2	.21/.2	.21/.2	.21/.2	.21/.2	.20/.2	.19/.9	.16/.20	.14/.20
10	7	.08/.7	.08/.7	.10/.7	.10/.7	.12/.8	.16/.8	.19/.8	.19/.8	.22/.10	.24/.10	.25/.10	.24/.10	.23/.10	.22/.10
9		.10/.0	.10/.0	.12/.0	.13/.0	.16/.0	.18/.0	.21/.0	.21/.0	.24/.0	.25/.0	.25/.0	.24/.0	.23/.0	.22/.0
11		.11/.1	.11/.1	.13/.0	.13/.0	.16/.0	.18/.0	.21/.0	.23/.0	.23/.0	.24/.0	.24/.0	.23/.0	.22/.0	.20/.13
13		.11/.2	.11/.2	.13/.2	.13/.2	.16/.1	.18/.0	.20/.4	.22/.4	.22/.4	.23/.4	.23/.4	.22/.4	.21/.4	.20/.13
15		.11/.6	.11/.6	.13/.6	.13/.6	.16/.6	.18/.6	.20/.6	.22/.6	.22/.6	.22/.6	.22/.6	.20/.6	.19/.6	.18/.4
17		.11/.8	.11/.8	.13/.8	.13/.8	.15/.8	.18/.8	.20/.8	.21/.8	.21/.8	.22/.8	.22/.8	.20/.8	.18/.8	.17/.6
19		.10/.8	.11/.8	.13/.8	.13/.8	.15/.9	.18/.9	.20/.9	.21/.9	.21/.9	.22/.9	.22/.9	.20/.9	.18/.9	.16/.9
21		.11/.2	.11/.2	.13/.2	.13/.2	.16/.2	.18/.2	.20/.2	.21/.2	.21/.2	.21/.2	.20/.2	.19/.2	.16/.2	.15/.2
15	7	.06/.7	.07/.7	.09/.7	.09/.8	.12/.10	.16/.10	.17/.10	.17/.10	.20/.10	.24/.10	.27/.10	.29/.10	.29/.10	.28/.14
9		.08/.0	.09/.0	.11/.0	.14/.0	.17/.0	.21/.0	.24/.0	.24/.0	.26/.14	.27/.14	.27/.14	.27/.14	.26/.14	.25/.14
11		.09/.1	.10/.1	.12/.1	.15/.1	.18/.0	.21/.0	.23/.0	.23/.0	.25/.14	.25/.14	.25/.14	.24/.14	.22/.17	.22/.17
13		.10/.3	.10/.3	.12/.3	.15/.3	.18/.3	.20/.4	.20/.4	.22/.4	.22/.4	.22/.4	.22/.4	.23/.17	.20/.17	.20/.17
15		.10/.6	.10/.6	.12/.6	.15/.6	.18/.6	.20/.6	.20/.6	.22/.17	.23/.17	.23/.17	.23/.17	.22/.17	.19/.17	.19/.17
17		.10/.8	.10/.8	.12/.8	.15/.8	.18/.8	.20/.8	.20/.8	.21/.7	.22/.7	.22/.7	.22/.7	.22/.20	.19/.20	.18/.20
19		.10/.8	.10/.8	.12/.8	.15/.8	.18/.8	.20/.8	.20/.8	.21/.7	.22/.7	.22/.7	.22/.7	.21/.20	.18/.20	.18/.20
21		.10/.2	.11/.2	.13/.2	.15/.2	.18/.2	.20/.2	.21/.2	.21/.2	.22/.22	.22/.22	.22/.22	.21/.21	.17/.22	.17/.22
21		.10/.2	.11/.2	.13/.2	.15/.2	.18/.2	.20/.2	.21/.2	.21/.2	.22/.22	.22/.22	.22/.22	.20/.23	.17/.24	.16/.24
20	7	.06/.8	.06/.8	.08/.8	.08/.8	.11/.13	.15/.13	.20/.13	.25/.13	.25/.13	.28/.13	.29/.13	.31/.13	.32/.13	.32/.63
9		.07/.10	.08/.10	.10/.10	.13/.10	.17/.13	.21/.13	.25/.13	.28/.13	.28/.13	.30/.19	.30/.19	.30/.19	.30/.19	.30/.19
11		.08/.12	.09/.12	.11/.12	.14/.13	.17/.13	.21/.13	.24/.13	.27/.13	.27/.13	.28/.19	.28/.19	.28/.19	.27/.23	.27/.23
13		.09/.13	.10/.13	.12/.13	.15/.13	.18/.13	.21/.13	.24/.13	.26/.13	.26/.13	.26/.19	.26/.19	.26/.19	.25/.23	.25/.23
15		.09/.14	.10/.14	.12/.14	.15/.14	.18/.14	.21/.14	.24/.14	.27/.14	.27/.14	.25/.23	.25/.23	.25/.23	.24/.23	.23/.23
17		.09/.18	.09/.18	.10/.18	.12/.18	.15/.18	.17/.18	.20/.19	.23/.19	.24/.23	.24/.23	.24/.23	.23/.23	.22/.23	.22/.23
19		.09/.18	.10/.18	.12/.18	.15/.18	.18/.18	.20/.19	.20/.19	.22/.23	.24/.23	.24/.23	.24/.23	.23/.23	.22/.23	.22/.23
21		.09/.21	.10/.21	.12/.21	.15/.21	.18/.21	.20/.21	.20/.21	.22/.23	.23/.23	.24/.23	.24/.23	.23/.23	.22/.23	.20/.23
25	7	.05/.8	.05/.8	.08/.9	.08/.9	.12/.17	.17/.17	.23/.17	.28/.17	.33/.17	.35/.17	.35/.17	.34/.17	.34/.17	.34/.17
9		.06/.10	.07/.10	.08/.10	.09/.10	.13/.17	.18/.17	.23/.17	.28/.17	.32/.17	.35/.17	.36/.17	.36/.17	.36/.17	.36/.17
11		.07/.12	.08/.12	.10/.11	.14/.17	.18/.17	.22/.17	.23/.17	.27/.17	.31/.17	.33/.17	.34/.17	.34/.17	.33/.17	.33/.17
13		.08/.14	.09/.14	.09/.14	.11/.14	.14/.17	.18/.17	.22/.17	.26/.17	.31/.17	.31/.17	.31/.17	.31/.17	.31/.17	.30/.24
15		.08/.14	.09/.14	.11/.16	.14/.16	.18/.17	.22/.17	.25/.17	.28/.17	.31/.17	.31/.17	.31/.17	.31/.17	.31/.17	.28/.24
17		.08/.18	.09/.18	.11/.18	.14/.17	.18/.17	.21/.17	.25/.17	.29/.17	.31/.17	.31/.17	.31/.17	.31/.17	.31/.17	.29/.24
19		.08/.18	.09/.18	.11/.18	.14/.20	.18/.17	.21/.17	.25/.17	.29/.17	.31/.17	.31/.17	.31/.17	.31/.17	.31/.17	.27/.30
21		.08/.21	.09/.21	.11/.21	.14/.21	.18/.24	.21/.24	.21/.24	.24/.24	.26/.24	.26/.24	.26/.24	.26/.24	.26/.24	.25/.30
21		.08/.21	.09/.21	.11/.21	.14/.21	.18/.24	.21/.24	.21/.24	.24/.24	.26/.24	.26/.24	.26/.24	.26/.24	.26/.24	.24/.33

V	T <sub>0</sub>	0	SHIP HEADING ANGLE IN DEGREES										150	165	180	
			30	45	60	75	90	105	120	135	150	165				
0	7	.10/. 7	.11/. 7	.12/. 7	.14/. 7	.16/. 7	.17/. 7	.17/. 7	.16/. 7	.14/. 7	.13/. 7	.11/. 7	.10/. 7	.10/. 7	.10/. 7	
1	9	.11/. 9	.12/. 9	.14/. 9	.16/. 9	.17/. 9	.17/. 9	.17/. 9	.16/. 9	.15/. 9	.15/. 9	.13/. 9	.12/. 9	.11/. 9	.11/. 9	.11/. 9
11	10	.10/.10	.11/.10	.13/.10	.14/.10	.15/.10	.15/.10	.15/.10	.15/.10	.14/.10	.14/.10	.12/.10	.11/.10	.11/.10	.11/.10	.11/.10
13	13	.09/.10	.10/.10	.11/.10	.12/.10	.13/.10	.13/.10	.13/.10	.13/.10	.12/.10	.12/.10	.11/.10	.10/.10	.09/.10	.09/.10	.09/.10
15	15	.07/.10	.08/.10	.10/.10	.11/.10	.12/.10	.13/.10	.13/.10	.13/.10	.12/.10	.12/.10	.11/.10	.10/.10	.09/.10	.08/.10	.08/.10
17	17	.06/.14	.07/.14	.08/.14	.09/.16	.09/.16	.09/.16	.09/.16	.09/.16	.09/.16	.09/.16	.09/.16	.08/.10	.07/.10	.07/.10	.07/.10
19	19	.06/.16	.06/.16	.07/.16	.08/.16	.08/.16	.08/.16	.08/.16	.08/.16	.08/.16	.08/.16	.08/.16	.06/.10	.06/.10	.06/.10	.06/.10
21	21	.06/.18	.06/.18	.06/.18	.06/.18	.06/.18	.06/.18	.06/.18	.06/.18	.06/.18	.06/.18	.06/.18	.06/.10	.06/.10	.06/.10	.06/.10
8	7	.10/. 7	.10/. 7	.12/. 7	.14/. 7	.15/. 7	.17/. 7	.17/. 7	.18/. 8	.17/. 8	.16/. 8	.14/. 9	.13/. 9	.12/. 9	.12/. 9	.12/. 9
11	11	.10/.10	.11/.10	.12/.10	.13/.10	.14/.10	.15/.10	.16/.10	.16/.10	.16/.10	.16/.10	.15/.10	.14/.10	.13/.10	.12/.10	.12/.10
13	13	.08/.10	.09/.10	.10/.10	.11/.10	.12/.10	.13/.10	.13/.10	.13/.10	.12/.10	.12/.10	.11/.10	.11/.10	.10/.10	.10/.10	.10/.10
15	15	.07/.11	.08/.10	.09/.10	.10/.10	.11/.10	.12/.10	.13/.10	.13/.10	.12/.10	.12/.10	.11/.10	.10/.10	.09/.10	.08/.10	.08/.10
17	17	.06/.11	.07/.10	.08/.10	.09/.10	.10/.10	.10/.10	.11/.10	.11/.10	.11/.10	.11/.10	.10/.10	.09/.10	.08/.10	.07/.10	.07/.10
19	19	.06/.16	.07/.16	.08/.16	.09/.16	.09/.16	.09/.16	.09/.16	.09/.16	.09/.16	.09/.16	.08/.10	.07/.10	.06/.10	.06/.10	.06/.10
21	21	.05/.18	.05/.18	.06/.18	.07/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.07/.19	.06/.10	.06/.10	.06/.10	.06/.10
10	7	.09/. 7	.10/. 7	.11/. 7	.13/. 7	.15/. 8	.17/. 8	.17/. 8	.18/. 8	.17/. 8	.16/. 8	.15/.10	.14/.10	.13/.10	.13/.10	.13/.10
11	9	.10/. 8	.10/. 8	.11/. 8	.13/. 9	.15/. 10	.17/. 10	.17/. 10	.18/. 10	.17/. 10	.16/. 10	.15/.10	.14/.10	.13/.10	.12/.10	.12/.10
13	11	.09/.10	.09/.10	.11/.10	.12/.10	.14/.10	.15/.10	.15/.10	.15/.10	.14/.10	.14/.10	.12/.10	.11/.10	.11/.10	.11/.10	.11/.10
15	15	.07/.12	.07/.12	.08/.11	.09/.11	.11/.10	.12/.10	.13/.10	.13/.10	.13/.10	.13/.10	.12/.10	.11/.10	.10/.10	.09/.10	.08/.10
17	17	.06/.12	.07/.12	.08/.11	.09/.11	.11/.10	.12/.10	.12/.10	.12/.10	.12/.10	.12/.10	.11/.10	.10/.10	.09/.10	.08/.10	.08/.10
19	19	.06/.16	.07/.16	.08/.16	.09/.16	.10/.16	.10/.16	.10/.16	.10/.16	.10/.16	.10/.16	.09/.15	.08/.15	.07/.15	.07/.15	.07/.15
21	21	.05/.18	.05/.18	.06/.18	.06/.18	.07/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.07/.19	.06/.10	.06/.10	.06/.10	.06/.10
10	7	.09/. 7	.10/. 7	.11/. 7	.13/. 7	.15/. 8	.17/. 8	.17/. 8	.18/. 8	.17/. 8	.16/. 8	.15/.10	.14/.10	.13/.10	.13/.10	.13/.10
11	9	.10/. 8	.10/. 8	.11/. 8	.13/. 9	.15/. 10	.17/. 10	.17/. 10	.18/. 10	.17/. 10	.16/. 10	.15/.10	.14/.10	.13/.10	.12/.10	.12/.10
13	11	.09/.10	.09/.10	.11/.10	.12/.10	.14/.10	.15/.10	.15/.10	.15/.10	.14/.10	.14/.10	.12/.10	.11/.10	.11/.10	.11/.10	.11/.10
15	15	.07/.12	.07/.12	.08/.11	.09/.11	.11/.10	.12/.10	.13/.10	.13/.10	.13/.10	.13/.10	.12/.10	.11/.10	.10/.10	.09/.10	.08/.10
17	17	.06/.13	.07/.13	.08/.13	.09/.13	.10/.14	.11/.14	.11/.14	.11/.14	.11/.14	.11/.14	.10/.14	.09/.14	.08/.14	.08/.14	.08/.14
19	19	.05/.18	.06/.18	.06/.18	.07/.18	.08/.18	.09/.17	.09/.17	.09/.17	.09/.17	.09/.17	.08/.17	.07/.17	.07/.17	.07/.17	.07/.17
21	21	.05/.18	.05/.18	.06/.18	.06/.18	.07/.18	.08/.18	.08/.19	.08/.20	.08/.20	.08/.20	.07/.20	.06/.20	.05/.20	.05/.20	.05/.20
15	7	.09/. 7	.09/. 7	.11/. 7	.13/. 7	.15/.10	.16/.10	.16/.10	.16/.10	.16/.10	.16/.10	.15/.10	.13/.10	.12/.10	.11/.10	.11/.10
11	9	.09/. 8	.10/. 8	.11/. 8	.13/. 10	.14/.10	.15/.10	.15/.10	.15/.10	.15/.10	.15/.10	.14/.10	.12/.10	.11/.10	.10/.10	.10/.10
13	13	.08/.12	.08/.12	.09/.12	.10/.12	.11/.12	.12/.12	.12/.12	.12/.12	.12/.12	.12/.12	.11/.12	.10/.12	.09/.12	.08/.12	.08/.12
15	15	.07/.13	.07/.13	.08/.13	.09/.13	.10/.14	.11/.14	.11/.14	.11/.14	.11/.14	.11/.14	.10/.14	.09/.14	.08/.14	.08/.14	.08/.14
17	17	.06/.13	.06/.13	.07/.13	.08/.13	.09/.13	.10/.14	.10/.14	.10/.14	.10/.14	.10/.14	.09/.14	.08/.14	.07/.14	.07/.14	.07/.14
19	19	.05/.18	.06/.18	.06/.18	.07/.18	.08/.18	.09/.17	.09/.17	.09/.17	.09/.17	.09/.17	.08/.17	.07/.20	.06/.20	.06/.20	.06/.20
21	21	.05/.18	.05/.18	.06/.18	.06/.18	.07/.18	.08/.18	.08/.19	.08/.20	.08/.20	.08/.20	.07/.20	.06/.20	.05/.20	.05/.20	.05/.20
20	7	.08/. 7	.09/. 7	.10/. 7	.12/. 7	.14/.13	.15/.13	.15/.13	.15/.13	.15/.13	.15/.13	.12/.13	.10/.13	.09/.13	.08/.13	.08/.13
9	9	.09/. 8	.09/. 8	.10/. 8	.12/. 9	.13/. 9	.14/.13	.15/.13	.15/.13	.15/.13	.15/.13	.12/.13	.11/.13	.10/.13	.09/.13	.08/.13
11	10	.08/.10	.09/.10	.10/.10	.11/.10	.12/.10	.13/.10	.13/.10	.13/.10	.13/.10	.13/.10	.12/.10	.11/.10	.10/.10	.09/.10	.08/.10
13	13	.07/.13	.08/.13	.09/.12	.10/.12	.11/.12	.12/.12	.12/.12	.12/.12	.12/.12	.12/.12	.11/.12	.10/.12	.09/.12	.08/.12	.07/.12
15	14	.06/.14	.06/.14	.07/.14	.08/.14	.09/.13	.10/.13	.11/.13	.11/.13	.11/.13	.11/.13	.10/.13	.09/.13	.08/.13	.07/.13	.07/.13
17	17	.05/.14	.06/.14	.06/.14	.07/.14	.08/.14	.09/.13	.10/.13	.10/.13	.10/.13	.10/.13	.09/.13	.08/.13	.07/.13	.07/.13	.06/.13
19	19	.05/.16	.05/.16	.06/.16	.07/.17	.08/.17	.09/.17	.09/.17	.09/.17	.09/.17	.09/.17	.08/.17	.07/.17	.06/.17	.06/.17	.06/.17
21	21	.05/.18	.05/.18	.06/.18	.06/.18	.07/.18	.08/.18	.08/.19	.08/.19	.08/.19	.08/.19	.07/.19	.06/.17	.05/.17	.05/.17	.05/.17
25	7	.08/. 7	.08/. 7	.10/. 7	.11/. 9	.13/.17	.14/.17	.15/.17	.14/.17	.13/.17	.13/.17	.11/.17	.10/.17	.09/.17	.07/.17	.06/.17
9	9	.08/. 8	.08/. 8	.10/. 9	.12/. 9	.13/.17	.14/.17	.14/.17	.14/.17	.13/.17	.13/.17	.12/.17	.11/.17	.10/.17	.08/.17	.07/.17
11	10	.08/.10	.08/.10	.09/.10	.11/.10	.12/.10	.13/.17	.13/.17	.13/.17	.13/.17	.13/.17	.12/.17	.11/.17	.10/.17	.09/.17	.07/.17
13	13	.07/.13	.07/.13	.08/.13	.09/.13	.10/.13	.11/.17	.11/.17	.11/.17	.11/.17	.11/.17	.12/.17	.11/.17	.10/.17	.09/.17	.07/.17
15	14	.06/.14	.06/.14	.07/.14	.08/.14	.09/.14	.10/.17	.11/.17	.11/.17	.11/.17	.11/.17	.10/.17	.09/.17	.08/.17	.07/.17	.06/.17
17	17	.05/.14	.06/.14	.06/.14	.07/.14	.08/.14	.09/.14	.09/.14	.09/.14	.09/.14	.09/.14	.08/.14	.07/.14	.06/.14	.05/.14	.04/.14
19	19	.05/.16	.05/.16	.06/.16	.07/.17	.08/.17	.09/.17	.09/.17	.09/.17	.09/.17	.09/.17	.08/.17	.07/.17	.06/.17	.05/.17	.04/.17
21	21	.05/.18	.05/.18	.06/.18	.06/.18	.07/.18	.08/.18	.08/.17	.08/.17	.08/.17	.08/.17	.07/.17	.06/.17	.05/.17	.04/.17	.03/.17

## ASR

RMS LAT ACC IN G'S/ENCOUNTERED MODAL PERIOD, T<sub>m</sub>, IN SECONDS  
 Q<sub>E</sub>

(ACC. X 100)

ROLLER CHOCK - 8.0 FT AFT OF AP. ON CL. AND 26.07 FT ABOVE KEEL

V	T <sub>0</sub>	SWIM HEADING ANGLE IN DEGREES										180	
		0	15	30	45	60	75	90	105	120	135		
0	7	.30/.7	.32/.7	.38/.6	.44/.6	.50/.6	.55/.6	.56/.6	.55/.6	.52/.6	.46/.6	.39/.7	.33/.7
1	9	.28/.6	.30/.6	.34/.6	.39/.7	.43/.7	.47/.7	.48/.7	.47/.7	.45/.7	.41/.7	.36/.7	.31/.8
1	9	.23/.9	.24/.9	.28/.9	.31/.9	.35/.9	.38/.9	.39/.9	.39/.9	.37/.9	.33/.9	.30/.10	.27/.10
1	10	.19/.10	.20/.10	.22/.10	.28/.10	.25/.10	.30/.10	.31/.10	.30/.10	.25/.10	.24/.10	.22/.10	.25/.10
1	13	.15/.10	.16/.10	.18/.10	.21/.10	.23/.10	.28/.10	.25/.10	.25/.10	.25/.10	.24/.10	.22/.10	.21/.10
1	15	.13/.10	.13/.10	.15/.10	.17/.10	.19/.10	.20/.10	.21/.10	.21/.10	.21/.10	.20/.10	.19/.10	.17/.10
1	17	.11/.10	.11/.10	.13/.10	.14/.10	.16/.10	.17/.10	.18/.10	.18/.10	.17/.10	.16/.10	.15/.10	.14/.10
1	19	.09/.10	.09/.10	.11/.10	.12/.10	.13/.10	.14/.10	.15/.10	.15/.10	.15/.10	.14/.10	.14/.10	.12/.10
2	21	.09/.10	.09/.10	.11/.10	.12/.10	.12/.10	.13/.10	.13/.10	.13/.10	.13/.10	.13/.10	.10/.10	.10/.10
5	7	.34/.7	.36/.7	.41/.6	.48/.6	.53/.6	.56/.6	.56/.6	.55/.7	.55/.7	.51/.7	.45/.8	.38/.8
5	9	.31/.7	.32/.7	.36/.7	.41/.7	.45/.7	.48/.7	.49/.8	.47/.9	.44/.9	.40/.10	.35/.10	.30/.10
11	9	.26/.9	.27/.9	.30/.10	.34/.10	.37/.10	.39/.10	.39/.10	.38/.10	.36/.10	.32/.10	.29/.10	.26/.10
13	9	.21/.9	.22/.9	.24/.10	.27/.10	.30/.10	.31/.10	.32/.10	.31/.10	.29/.10	.26/.10	.23/.10	.20/.10
15	10	.17/.10	.18/.10	.20/.10	.22/.10	.24/.10	.24/.10	.25/.10	.25/.10	.25/.10	.21/.10	.19/.10	.16/.10
17	10	.14/.10	.15/.10	.16/.10	.16/.10	.16/.10	.21/.10	.21/.10	.19/.10	.17/.10	.15/.10	.14/.10	.13/.10
19	10	.12/.10	.12/.10	.12/.10	.14/.10	.15/.10	.17/.10	.18/.10	.17/.10	.16/.10	.15/.10	.13/.10	.11/.10
21	10	.10/.10	.11/.10	.12/.10	.13/.10	.14/.10	.15/.10	.15/.10	.15/.10	.14/.10	.12/.10	.10/.10	.09/.10
10	7	.37/.7	.39/.7	.44/.6	.50/.6	.55/.6	.57/.6	.57/.7	.57/.7	.54/.10	.42/.10	.35/.10	.29/.10
11	9	.33/.7	.35/.7	.39/.7	.43/.7	.47/.8	.48/.8	.48/.8	.48/.8	.46/.10	.41/.10	.36/.10	.26/.10
13	9	.28/.8	.29/.8	.32/.8	.35/.9	.38/.9	.39/.9	.39/.9	.38/.9	.37/.10	.33/.10	.29/.10	.24/.10
15	10	.23/.10	.23/.10	.26/.10	.28/.10	.30/.10	.31/.10	.31/.10	.31/.10	.29/.10	.23/.10	.20/.10	.17/.10
17	10	.18/.11	.19/.10	.21/.10	.23/.10	.25/.10	.26/.10	.26/.10	.25/.10	.24/.10	.19/.10	.16/.10	.13/.10
19	11	.15/.11	.16/.11	.17/.10	.19/.10	.20/.10	.21/.10	.21/.10	.20/.10	.18/.10	.16/.10	.13/.10	.10/.10
21	11	.13/.11	.13/.11	.14/.11	.16/.10	.17/.10	.18/.10	.17/.10	.17/.10	.17/.10	.13/.10	.09/.10	.06/.10
15	7	.39/.7	.41/.7	.46/.6	.52/.6	.56/.7	.57/.7	.57/.7	.55/.10	.49/.10	.42/.10	.35/.10	.29/.10
9	9	.35/.7	.37/.7	.40/.7	.44/.7	.47/.7	.48/.10	.48/.10	.46/.10	.42/.10	.36/.10	.26/.10	.21/.10
11	9	.29/.8	.30/.8	.33/.8	.36/.8	.38/.8	.38/.10	.38/.10	.37/.10	.34/.10	.29/.10	.19/.10	.15/.10
13	8	.24/.8	.24/.8	.27/.10	.29/.10	.31/.10	.31/.10	.30/.10	.30/.10	.27/.10	.24/.10	.20/.10	.17/.10
15	11	.20/.11	.22/.10	.24/.10	.24/.10	.25/.10	.25/.10	.24/.10	.24/.10	.22/.10	.16/.10	.12/.10	.11/.10
17	12	.16/.12	.16/.12	.18/.11	.20/.10	.21/.10	.21/.10	.21/.10	.20/.10	.19/.10	.16/.10	.12/.10	.09/.10
19	13	.14/.12	.14/.12	.15/.12	.16/.10	.17/.10	.18/.10	.17/.10	.17/.10	.16/.10	.14/.10	.11/.10	.07/.17
21	13	.11/.13	.12/.13	.13/.12	.14/.11	.15/.10	.14/.10	.13/.10	.12/.10	.10/.10	.08/.17	.06/.17	.05/.17
20	7	.41/.7	.43/.7	.43/.7	.48/.6	.53/.6	.56/.7	.56/.7	.53/.7	.47/.7	.39/.13	.30/.13	.21/.13
9	9	.37/.7	.38/.7	.42/.7	.45/.7	.47/.7	.44/.8	.44/.8	.43/.8	.39/.8	.33/.13	.25/.13	.13/.13
11	8	.30/.8	.31/.8	.34/.8	.37/.8	.38/.8	.36/.9	.36/.9	.36/.9	.32/.13	.21/.13	.15/.13	.09/.19
13	8	.25/.8	.25/.8	.28/.9	.30/.10	.31/.10	.31/.10	.31/.10	.29/.10	.26/.13	.22/.13	.17/.13	.09/.19
15	11	.20/.11	.21/.11	.23/.10	.24/.10	.25/.10	.25/.10	.24/.10	.24/.10	.21/.13	.18/.13	.14/.13	.08/.19
17	13	.17/.13	.17/.13	.19/.12	.20/.11	.21/.13	.21/.13	.20/.13	.18/.13	.18/.13	.15/.13	.12/.13	.09/.19
19	13	.14/.13	.14/.13	.16/.13	.17/.13	.18/.13	.17/.13	.17/.13	.17/.13	.13/.13	.10/.13	.08/.19	.06/.23
21	14	.12/.14	.12/.13	.13/.13	.14/.13	.15/.13	.14/.13	.14/.13	.13/.13	.11/.13	.09/.19	.07/.23	.05/.23
25	7	.41/.7	.43/.7	.48/.6	.53/.6	.56/.6	.56/.6	.56/.6	.52/.9	.46/.9	.38/.9	.28/.9	.12/.17
9	9	.37/.7	.39/.7	.42/.7	.46/.7	.47/.9	.44/.9	.44/.9	.43/.9	.38/.17	.24/.17	.16/.17	.08/.17
11	8	.31/.8	.32/.8	.35/.9	.37/.9	.39/.9	.38/.9	.38/.9	.36/.17	.31/.17	.26/.17	.14/.17	.09/.17
13	8	.25/.9	.26/.9	.28/.9	.30/.9	.31/.9	.31/.9	.31/.9	.29/.17	.26/.17	.16/.17	.12/.17	.07/.17
15	9	.21/.9	.21/.9	.23/.9	.25/.10	.26/.10	.25/.10	.25/.10	.24/.17	.21/.17	.18/.17	.14/.17	.07/.17
17	13	.17/.13	.18/.13	.19/.13	.20/.13	.21/.13	.21/.13	.21/.13	.20/.17	.18/.17	.15/.17	.12/.17	.06/.17
19	13	.14/.14	.14/.14	.15/.13	.16/.13	.17/.13	.17/.13	.17/.13	.16/.17	.15/.17	.12/.17	.09/.17	.05/.17
19	14	.14/.14	.15/.13	.16/.13	.17/.13	.18/.13	.18/.13	.18/.13	.17/.17	.16/.17	.13/.17	.08/.17	.06/.17

## ASR

RMS VER DISP IN FEET/ENCOUNTERED MODAL PERIOD, T<sub>DE</sub> IN SECONDS  
ROLLER CHOCK - 8.0 FT AFT OF AP. ON CL. AND 26.07 FT ABOVE MEEL

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										150	165	180
		30	45	60	75	90	105	120	135	150	165			
0	7	.39/ 7	.38/ 7	.38/ 7	.38/ 7	.38/ 7	.38/ 7	.38/ 7	.38/ 7	.39/ 7	.39/ 7	.39/ 7	.39/ 7	.39/ 7
1	9	.42/ 8	.41/ 8	.40/ 8	.39/ 8	.38/ 8	.37/ 8	.36/ 8	.37/ 8	.38/ 8	.39/ 8	.40/ 8	.41/ 8	.41/ 8
2	10	.40/10	.39/10	.38/10	.37/10	.36/10	.34/10	.34/10	.34/10	.35/10	.37/10	.38/10	.39/10	.39/10
3	12	.37/12	.36/12	.35/12	.34/12	.33/12	.32/12	.32/12	.33/12	.34/12	.35/12	.36/12	.36/12	.36/12
4	14	.34/14	.33/14	.32/14	.32/14	.31/14	.30/14	.30/14	.30/14	.31/14	.32/14	.33/14	.34/14	.34/14
5	15	.32/16	.31/16	.31/16	.31/16	.30/16	.29/15	.28/16	.28/16	.29/16	.30/16	.31/16	.32/16	.32/16
6	17	.30/18	.30/18	.29/18	.29/18	.28/18	.27/18	.27/18	.27/18	.28/18	.29/18	.30/18	.30/18	.30/18
7	19	.28/21	.28/21	.28/21	.28/21	.27/21	.27/21	.27/21	.27/21	.28/21	.28/21	.29/21	.29/21	.29/21
8	21	.29/21	.29/21	.28/21	.28/21	.27/21	.27/21	.27/21	.27/21	.27/22	.28/22	.28/22	.28/22	.28/22
9	7	.41/ 7	.40/ 7	.40/ 7	.39/ 7	.39/ 7	.37/ 7	.36/ 7	.36/ 7	.35/ 8	.34/ 8	.32/ 9	.32/ 9	.32/ 9
10	9	.45/ 8	.44/ 8	.43/ 8	.43/ 8	.41/ 8	.39/ 8	.39/ 8	.37/ 8	.34/10	.34/10	.35/10	.36/10	.36/10
11	11	.42/10	.42/10	.42/10	.42/10	.40/10	.38/10	.36/10	.36/10	.34/10	.34/10	.34/10	.35/12	.35/12
12	13	.38/12	.38/12	.37/12	.37/12	.35/12	.33/13	.32/13	.31/13	.31/13	.31/13	.32/13	.33/13	.33/13
13	15	.35/14	.35/14	.34/14	.34/14	.33/14	.31/14	.30/14	.29/15	.29/15	.30/15	.31/15	.31/15	.31/15
14	17	.33/16	.33/16	.32/16	.32/16	.31/16	.29/16	.29/16	.28/17	.28/17	.28/17	.29/17	.30/17	.30/17
15	19	.31/18	.31/18	.30/18	.30/18	.29/18	.28/18	.28/18	.27/19	.27/19	.28/20	.29/20	.29/20	.29/20
16	21	.29/21	.29/21	.28/21	.28/21	.27/21	.27/21	.27/21	.27/22	.27/22	.28/22	.28/22	.28/22	.28/22
17	7	.40/ 7	.40/ 7	.39/ 7	.39/ 7	.37/ 7	.36/ 7	.36/ 7	.34/ 7	.32/10	.31/13	.28/13	.27/13	.27/13
18	9	.45/ 8	.44/ 8	.42/ 8	.42/ 8	.40/ 8	.37/ 8	.35/ 8	.35/ 10	.33/10	.32/12	.32/13	.31/13	.31/13
19	11	.43/ 9	.43/ 9	.42/10	.42/10	.40/10	.37/10	.35/10	.35/12	.33/12	.32/13	.32/13	.32/13	.32/13
20	13	.39/12	.39/12	.38/12	.38/12	.36/13	.34/13	.32/13	.31/13	.30/14	.30/14	.30/15	.31/15	.31/15
21	15	.36/14	.36/14	.35/14	.35/14	.33/14	.31/14	.30/15	.29/16	.29/16	.29/17	.29/17	.30/17	.30/17
22	17	.33/16	.33/16	.32/16	.32/16	.31/16	.30/17	.29/18	.28/18	.28/18	.28/18	.28/19	.29/20	.29/20
23	19	.31/18	.31/18	.31/18	.31/18	.30/18	.29/18	.28/18	.27/20	.27/20	.27/21	.27/21	.28/22	.28/22
24	21	.30/21	.30/21	.29/21	.29/21	.28/21	.27/21	.27/21	.26/22	.26/22	.27/22	.27/23	.27/23	.27/24
25	7	.40/ 7	.40/ 7	.40/ 7	.39/ 7	.39/ 7	.38/ 7	.36/ 7	.34/ 10	.32/14	.29/14	.27/14	.27/14	.27/14
26	9	.45/ 8	.45/ 8	.43/ 8	.43/ 8	.41/ 8	.39/ 8	.36/ 8	.35/ 10	.33/14	.31/14	.29/17	.28/17	.28/17
27	11	.42/10	.41/13	.40/13	.38/13	.35/13	.33/14	.31/14	.30/17	.29/20	.29/20	.29/20	.29/20	.29/20
28	13	.38/14	.37/14	.36/14	.35/14	.33/14	.31/14	.30/17	.28/17	.28/20	.28/20	.28/20	.28/20	.28/20
29	15	.35/16	.34/16	.33/16	.32/16	.31/17	.29/17	.28/17	.27/20	.27/20	.27/20	.28/20	.28/20	.28/20
30	17	.32/18	.32/18	.31/18	.30/18	.29/18	.28/20	.27/21	.27/21	.27/22	.27/22	.27/20	.27/20	.27/20
31	19	.31/21	.31/21	.30/21	.29/21	.28/21	.27/21	.27/21	.26/22	.26/23	.26/24	.26/25	.27/25	.27/25
32	21	.32/21	.31/21	.30/21	.29/21	.28/21	.27/21	.27/21	.26/23	.26/23	.26/26	.26/27	.26/27	.26/27
33	23	.31/21	.31/21	.30/21	.29/21	.28/21	.27/21	.27/21	.26/23	.26/23	.26/26	.26/27	.26/27	.26/27
34	25	.40/ 8	.40/ 8	.40/ 8	.40/ 8	.40/ 8	.38/ 8	.36/ 8	.34/ 17	.32/17	.29/17	.27/17	.27/17	.27/17
35	9	.51/ 8	.49/ 8	.49/ 8	.47/ 8	.44/ 8	.44/ 8	.40/ 8	.36/ 8	.33/13	.30/13	.28/13	.27/27	.27/27
36	11	.49/ 8	.49/ 8	.47/ 8	.44/ 8	.41/ 8	.38/ 8	.34/ 8	.32/ 13	.30/13	.29/13	.28/23	.28/23	.28/23
37	13	.44/ 8	.44/ 8	.42/ 8	.40/13	.37/14	.35/13	.32/13	.29/13	.28/23	.28/23	.28/26	.28/26	.28/26
38	15	.40/14	.39/14	.38/14	.37/14	.34/14	.32/14	.30/13	.29/13	.28/23	.28/23	.27/26	.27/26	.27/26
39	17	.37/16	.36/16	.35/16	.34/16	.32/16	.30/17	.29/19	.28/23	.27/23	.27/23	.27/26	.27/26	.27/26
40	19	.34/18	.34/18	.33/18	.32/18	.30/19	.29/19	.28/23	.27/23	.26/23	.26/23	.26/25	.27/25	.27/25
41	21	.32/21	.31/21	.30/21	.29/21	.28/21	.27/21	.27/21	.26/23	.26/23	.26/26	.26/27	.26/27	.26/27

RMS VERT VEL IN FPS/ENCOUNTERED MODAL PERIOD, T<sub>0</sub>, IN SECONDS  
 ROLLER CHOCK - 8.0 FT AFT OF AP, ON CL, AND 26.07 FT ABOVE KEEL

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										150	165	180
		0	15	30	45	60	75	90	105	120	135			
0	0	.37/ 7	.37/ 7	.37/ 6	.38/ 6	.39/ 6	.39/ 6	.39/ 6	.39/ 6	.39/ 6	.39/ 6	.38/ 7	.38/ 7	.37/ 7
0	3	.35/ 7	.35/ 7	.34/ 7	.34/ 7	.33/ 7	.33/ 7	.33/ 7	.33/ 7	.33/ 7	.33/ 7	.35/ 7	.35/ 7	.35/ 7
1	0	.30/ 8	.30/ 8	.29/ 8	.29/ 8	.28/ 8	.27/ 8	.27/ 8	.27/ 8	.27/ 8	.27/ 8	.29/ 8	.29/ 8	.30/ 8
1	11	.25/ 9	.25/ 9	.24/ 9	.24/ 9	.23/ 9	.23/ 9	.23/ 9	.22/ 10	.22/ 10	.22/ 10	.24/ 9	.24/ 9	.25/ 9
1	13	.21/ 10	.21/ 10	.20/ 10	.20/ 10	.19/ 11	.19/ 11	.19/ 11	.19/ 12	.19/ 12	.19/ 12	.20/ 10	.20/ 10	.21/ 10
1	15	.18/ 13	.17/ 13	.17/ 14	.16/ 14	.16/ 14	.16/ 14	.16/ 14	.16/ 14	.16/ 14	.16/ 14	.17/ 13	.18/ 13	.18/ 13
1	17	.15/ 16	.15/ 16	.14/ 16	.14/ 16	.14/ 16	.14/ 16	.14/ 16	.14/ 16	.14/ 16	.14/ 16	.15/ 16	.15/ 16	.15/ 16
1	19	.13/ 18	.13/ 18	.13/ 18	.13/ 18	.12/ 18	.12/ 18	.12/ 18	.12/ 18	.12/ 18	.12/ 18	.13/ 18	.13/ 18	.14/ 18
2	0													
2	7	.48/ 7	.45/ 7	.44/ 7	.43/ 7	.41/ 7	.41/ 7	.39/ 6	.37/ 6	.34/ 6	.31/ 7	.29/ 8	.27/ 9	.25/ 9
2	9	.44/ 7	.42/ 7	.40/ 7	.38/ 7	.35/ 7	.35/ 7	.32/ 7	.32/ 7	.29/ 8	.27/ 9	.26/ 9	.25/ 9	.24/ 9
2	11	.37/ 7	.36/ 7	.34/ 7	.31/ 7	.29/ 7	.29/ 7	.26/ 9	.26/ 9	.24/ 10	.23/ 10	.22/ 10	.22/ 10	.21/ 10
2	13	.31/ 8	.29/ 8	.28/ 8	.26/ 10	.24/ 10	.22/ 10	.20/ 11	.20/ 11	.19/ 11	.19/ 11	.18/ 11	.18/ 11	.18/ 11
2	15	.25/ 10	.24/ 10	.23/ 10	.22/ 11	.20/ 12	.18/ 13	.17/ 13	.17/ 13	.16/ 13	.16/ 13	.16/ 13	.16/ 13	.16/ 13
2	17	.22/ 11	.21/ 13	.20/ 13	.18/ 14	.17/ 14	.16/ 14	.15/ 14	.15/ 14	.14/ 14	.14/ 14	.14/ 14	.14/ 14	.14/ 14
2	19	.18/ 14	.18/ 16	.17/ 16	.16/ 16	.15/ 16	.14/ 16	.13/ 16	.13/ 16	.13/ 17	.12/ 17	.12/ 17	.12/ 17	.12/ 17
2	21	.16/ 18	.15/ 18	.14/ 18	.13/ 18	.12/ 18	.12/ 18	.12/ 18	.12/ 18	.11/ 18	.11/ 18	.11/ 18	.11/ 18	.11/ 18
3	0													
3	7	.48/ 7	.45/ 7	.44/ 7	.43/ 7	.41/ 7	.41/ 7	.39/ 6	.37/ 6	.34/ 6	.31/ 7	.29/ 8	.27/ 9	.25/ 9
3	9	.44/ 7	.42/ 7	.40/ 7	.38/ 7	.35/ 7	.35/ 7	.32/ 7	.32/ 7	.29/ 8	.27/ 9	.26/ 9	.25/ 9	.24/ 9
3	11	.37/ 7	.36/ 7	.34/ 7	.31/ 7	.29/ 7	.29/ 7	.26/ 9	.26/ 9	.24/ 10	.23/ 10	.22/ 10	.22/ 10	.21/ 10
3	13	.31/ 8	.29/ 8	.28/ 8	.26/ 10	.24/ 10	.22/ 10	.20/ 11	.20/ 11	.19/ 11	.19/ 11	.18/ 11	.18/ 11	.18/ 11
3	15	.25/ 10	.24/ 10	.23/ 10	.22/ 11	.20/ 12	.18/ 13	.17/ 13	.17/ 13	.16/ 13	.16/ 13	.16/ 13	.16/ 13	.16/ 13
3	17	.22/ 11	.21/ 13	.20/ 13	.18/ 14	.17/ 14	.16/ 14	.15/ 14	.15/ 14	.14/ 14	.14/ 14	.14/ 14	.14/ 14	.14/ 14
3	19	.18/ 14	.18/ 16	.17/ 16	.16/ 16	.15/ 16	.14/ 16	.13/ 16	.13/ 16	.12/ 16	.12/ 16	.11/ 16	.11/ 16	.11/ 16
3	21	.16/ 18	.15/ 18	.14/ 18	.13/ 18	.12/ 18	.12/ 18	.12/ 18	.12/ 18	.11/ 19	.10/ 20	.09/ 20	.09/ 21	.09/ 21
4	0													
4	7	.46/ 7	.43/ 7	.41/ 7	.39/ 6	.37/ 6	.36/ 7	.36/ 7	.34/ 6	.31/ 7	.27/ 6	.23/ 13	.19/ 13	.16/ 13
4	9	.43/ 7	.41/ 7	.38/ 7	.35/ 7	.33/ 7	.31/ 7	.30/ 7	.27/ 7	.24/ 13	.21/ 13	.18/ 13	.17/ 13	.16/ 13
4	11	.36/ 8	.35/ 8	.34/ 8	.32/ 8	.29/ 8	.26/ 10	.24/ 10	.22/ 12	.20/ 13	.17/ 13	.16/ 13	.15/ 13	.15/ 13
4	13	.30/ 8	.29/ 8	.28/ 8	.26/ 8	.24/ 11	.21/ 12	.19/ 13	.17/ 13	.15/ 13	.14/ 14	.13/ 14	.13/ 14	.14/ 13
4	15	.25/ 8	.25/ 8	.24/ 8	.22/ 13	.20/ 14	.18/ 14	.16/ 14	.14/ 15	.12/ 17	.11/ 17	.12/ 15	.12/ 15	.12/ 15
4	17	.21/ 14	.20/ 14	.19/ 16	.17/ 16	.16/ 16	.14/ 16	.13/ 17	.12/ 17	.11/ 17	.11/ 17	.11/ 17	.11/ 17	.11/ 17
4	19	.18/ 18	.17/ 18	.16/ 18	.15/ 18	.14/ 18	.13/ 18	.12/ 18	.11/ 19	.10/ 20	.09/ 20	.09/ 20	.09/ 20	.09/ 20
4	21	.16/ 20	.15/ 20	.14/ 20	.13/ 20	.12/ 20	.11/ 20	.10/ 20	.09/ 20	.08/ 20	.08/ 20	.08/ 20	.08/ 20	.08/ 20
5	0													
5	7	.53/ 7	.53/ 7	.52/ 7	.50/ 7	.47/ 7	.47/ 7	.43/ 7	.43/ 7	.37/ 7	.31/ 7	.25/ 6	.19/ 13	.14/ 14
5	9	.58/ 8	.57/ 8	.55/ 8	.51/ 7	.47/ 7	.47/ 7	.41/ 7	.41/ 7	.35/ 7	.28/ 7	.22/ 10	.18/ 14	.14/ 17
5	11	.50/ 8	.50/ 8	.44/ 8	.44/ 8	.39/ 8	.39/ 8	.34/ 7	.34/ 7	.29/ 8	.24/ 10	.19/ 14	.15/ 17	.11/ 17
5	13	.42/ 8	.41/ 8	.39/ 8	.36/ 8	.33/ 8	.33/ 8	.28/ 7	.28/ 7	.24/ 10	.20/ 14	.16/ 14	.13/ 17	.12/ 20
5	15	.34/ 8	.34/ 8	.32/ 8	.30/ 8	.27/ 8	.27/ 8	.24/ 8	.24/ 8	.20/ 14	.17/ 14	.14/ 17	.12/ 20	.10/ 20
5	17	.29/ 8	.28/ 8	.27/ 8	.25/ 8	.23/ 8	.23/ 8	.21/ 8	.21/ 8	.19/ 16	.17/ 17	.15/ 17	.12/ 20	.10/ 20
5	19	.24/ 8	.24/ 8	.23/ 8	.21/ 8	.19/ 8	.19/ 8	.17/ 8	.17/ 8	.15/ 18	.13/ 20	.10/ 20	.09/ 20	.08/ 20
5	21	.21/ 8	.21/ 8	.20/ 8	.18/ 18	.17/ 18	.17/ 18	.15/ 18	.13/ 20	.11/ 20	.09/ 20	.08/ 20	.08/ 20	.08/ 20
6	0													
6	7	.56/ 8	.55/ 8	.53/ 8	.50/ 7	.45/ 7	.45/ 7	.40/ 7	.40/ 7	.33/ 7	.25/ 7	.19/ 13	.12/ 13	.07/ 13
6	9	.66/ 8	.65/ 8	.63/ 8	.58/ 8	.53/ 8	.46/ 8	.38/ 8	.30/ 8	.23/ 13	.16/ 13	.12/ 13	.09/ 13	.08/ 13
6	11	.59/ 8	.58/ 8	.49/ 8	.46/ 8	.42/ 8	.37/ 8	.32/ 8	.26/ 8	.21/ 13	.16/ 13	.14/ 13	.10/ 23	.08/ 23
6	13	.49/ 8	.49/ 8	.40/ 8	.38/ 8	.35/ 8	.31/ 8	.27/ 8	.22/ 8	.18/ 13	.14/ 13	.11/ 13	.09/ 23	.08/ 23
6	15	.40/ 8	.34/ 8	.33/ 8	.31/ 8	.29/ 8	.24/ 8	.22/ 8	.19/ 13	.15/ 13	.12/ 13	.10/ 23	.08/ 23	.07/ 26
6	17	.28/ 8	.28/ 8	.27/ 8	.24/ 8	.22/ 8	.22/ 8	.19/ 16	.16/ 19	.13/ 19	.11/ 23	.10/ 23	.08/ 26	.07/ 26
6	19	.24/ 8	.24/ 8	.23/ 8	.21/ 8	.19/ 8	.16/ 19	.14/ 19	.12/ 23	.10/ 23	.09/ 26	.08/ 26	.07/ 26	.07/ 26
6	21	.21/ 8	.21/ 8	.20/ 8	.18/ 18	.17/ 18	.15/ 18	.13/ 20	.10/ 23	.08/ 26	.07/ 26	.07/ 26	.07/ 27	.06/ 27
7	0													
7	7	.58/ 8	.58/ 8	.57/ 8	.56/ 8	.53/ 8	.53/ 8	.48/ 7	.48/ 7	.42/ 7	.35/ 7	.26/ 9	.18/ 17	.06/ 17
7	9	.75/ 8	.74/ 8	.66/ 8	.59/ 8	.52/ 8	.45/ 8	.45/ 8	.45/ 8	.43/ 8	.33/ 7	.24/ 17	.16/ 17	.06/ 17
7	11	.69/ 8	.68/ 8	.64/ 8	.54/ 8	.49/ 8	.43/ 8	.43/ 8	.43/ 8	.42/ 8	.36/ 8	.28/ 8	.20/ 17	.06/ 17
7	13	.57/ 8	.56/ 8	.47/ 8	.44/ 8	.40/ 8	.37/ 8	.36/ 8	.36/ 8	.36/ 8	.30/ 8	.23/ 17	.17/ 17	.06/ 17
7	15	.47/ 8	.39/ 8	.37/ 8	.34/ 8	.30/ 8	.24/ 8	.24/ 8	.24/ 8	.24/ 8	.25/ 8	.19/ 17	.14/ 17	.06/ 17
7	17	.39/ 8	.39/ 8	.37/ 8	.34/ 8	.30/ 8	.24/ 8	.22/ 8	.22/ 8	.22/ 8	.21/ 17	.16/ 17	.11/ 17	.06/ 17
7	19	.33/ 8	.32/ 8	.32/ 8	.28/ 8	.25/ 8	.25/ 8	.24/ 8	.24/ 8	.24/ 8	.21/ 17	.16/ 17	.06/ 17	.06/ 17
7	21	.28/ 8	.28/ 8	.28/ 8	.24/ 8	.21/ 8	.21/ 8	.18/ 17	.18/ 17	.18/ 17	.15/ 17	.12/ 17	.06/ 17	.06/ 17

## ASR

RMS VER ACC IN G/S/ENCOUNTERED MODAL PERIOD, T<sub>0</sub>, IN SECONDS  
(ACC. X 100)  
ROLLER CHOCK - 8.0 FT AFT OF AP. ON CL. AND 26.07 FT ABOVE KEEL

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										165	160
		0	15	30	45	60	75	90	105	120	135		
0	7	1.13/ 6	1.14/ 6	1.16/ 6	1.21/ 6	1.26/ 6	1.31/ 6	1.34/ 6	1.35/ 6	1.33/ 6	1.29/ 6	1.24/ 6	1.20/ 6
5	.97/ 7	.97/ 7	.98/ 7	.99/ 7	1.00/ 6	1.02/ 6	1.03/ 6	1.04/ 6	1.03/ 6	1.02/ 6	1.00/ 7	1.00/ 7	.99/ 7
11	.77/ 7	.77/ 7	.77/ 7	.76/ 7	.77/ 6	.77/ 6	.78/ 6	.78/ 6	.78/ 6	.79/ 6	.79/ 7	.79/ 7	.78/ 7
13	.61/ 7	.61/ 7	.60/ 7	.60/ 7	.59/ 6	.59/ 6	.60/ 6	.60/ 6	.61/ 6	.61/ 6	.62/ 7	.62/ 7	.62/ 7
15	.49/ 7	.48/ 7	.48/ 7	.47/ 7	.47/ 7	.47/ 7	.47/ 6	.47/ 6	.47/ 6	.47/ 6	.48/ 7	.48/ 7	.49/ 7
17	.39/ 7	.39/ 7	.39/ 7	.38/ 7	.38/ 7	.38/ 6	.38/ 6	.38/ 6	.38/ 6	.38/ 6	.39/ 7	.39/ 7	.40/ 7
18	.33/ 7	.32/ 7	.32/ 7	.31/ 7	.31/ 7	.31/ 6	.31/ 6	.31/ 6	.31/ 6	.32/ 7	.32/ 7	.33/ 7	.33/ 7
21	.27/ 7	.27/ 7	.27/ 7	.26/ 7	.26/ 7	.26/ 6	.26/ 6	.26/ 6	.26/ 6	.27/ 7	.27/ 7	.27/ 7	.27/ 7
8	7	1.63/ 7	1.62/ 7	1.59/ 6	1.55/ 6	1.49/ 6	1.39/ 6	1.28/ 6	1.15/ 6	1.00/ 6	.87/ 6	.75/ 6	.65/ 6
11	1.15/ 7	1.14/ 7	1.10/ 7	1.04/ 7	.96/ 7	.87/ 7	.77/ 7	.68/ 6	.60/ 6	.53/ 6	.56/ 6	.54/ 6	.54/ 6
13	.90/ 7	.89/ 7	.86/ 7	.81/ 7	.74/ 7	.67/ 7	.60/ 7	.53/ 7	.47/ 7	.42/ 10	.39/ 10	.36/ 10	.36/ 10
15	.71/ 7	.70/ 7	.68/ 7	.64/ 7	.59/ 7	.53/ 7	.47/ 7	.42/ 6	.37/ 10	.34/ 10	.31/ 10	.30/ 10	.29/ 10
17	.57/ 7	.57/ 7	.54/ 7	.51/ 7	.47/ 7	.43/ 7	.38/ 7	.34/ 7	.30/ 10	.27/ 10	.26/ 10	.24/ 10	.24/ 10
19	.47/ 7	.46/ 7	.45/ 7	.42/ 7	.39/ 7	.35/ 7	.31/ 7	.28/ 7	.25/ 10	.21/ 10	.21/ 10	.20/ 10	.20/ 10
21	.39/ 7	.39/ 7	.37/ 7	.35/ 7	.32/ 7	.29/ 7	.26/ 7	.23/ 10	.21/ 10	.19/ 10	.18/ 11	.17/ 11	.17/ 11
10	7	1.98/ 7	1.96/ 7	1.91/ 7	1.83/ 7	1.70/ 7	1.53/ 7	1.33/ 6	1.10/ 6	.87/ 6	.66/ 6	.49/ 13	.37/ 13
11	9	1.87/ 7	1.84/ 7	1.77/ 7	1.65/ 7	1.49/ 7	1.30/ 7	1.10/ 7	.89/ 6	.69/ 6	.52/ 6	.40/ 13	.32/ 13
13	1.51/ 7	1.48/ 7	1.42/ 7	1.31/ 7	1.18/ 7	1.02/ 7	.85/ 7	.68/ 6	.53/ 6	.41/ 13	.32/ 13	.27/ 13	.25/ 13
15	.94/ 7	.92/ 7	.88/ 7	.81/ 7	.72/ 7	.79/ 7	.66/ 7	.53/ 7	.41/ 6	.32/ 13	.26/ 13	.22/ 13	.21/ 13
17	.75/ 7	.74/ 7	.70/ 7	.65/ 7	.58/ 7	.52/ 7	.42/ 7	.33/ 13	.26/ 13	.21/ 13	.19/ 13	.18/ 13	.18/ 13
19	.62/ 7	.61/ 7	.58/ 7	.53/ 7	.48/ 7	.41/ 7	.34/ 7	.27/ 13	.21/ 13	.18/ 13	.15/ 13	.13/ 13	.13/ 13
21	.51/ 7	.50/ 7	.48/ 7	.44/ 7	.40/ 7	.34/ 7	.29/ 7	.23/ 7	.19/ 13	.15/ 13	.12/ 13	.12/ 13	.11/ 13
15	7	2.30/ 7	2.27/ 7	2.21/ 7	2.10/ 7	1.94/ 7	1.72/ 7	1.46/ 7	1.17/ 6	.87/ 6	.60/ 6	.38/ 10	.23/ 10
9	2.32/ 7	2.29/ 7	2.18/ 7	2.02/ 7	1.81/ 7	1.55/ 7	1.27/ 7	.98/ 7	.71/ 6	.48/ 6	.31/ 10	.20/ 14	.16/ 14
11	1.91/ 7	1.87/ 7	1.78/ 7	1.64/ 7	1.45/ 7	1.23/ 7	.99/ 7	.76/ 7	.55/ 7	.37/ 6	.24/ 14	.17/ 17	.14/ 17
13	1.51/ 8	1.48/ 8	1.40/ 7	1.29/ 7	1.13/ 7	.96/ 7	.77/ 7	.59/ 7	.43/ 7	.29/ 6	.20/ 17	.14/ 20	.13/ 20
15	1.19/ 8	1.17/ 8	1.11/ 7	.92/ 7	.89/ 7	.76/ 7	.61/ 7	.47/ 7	.34/ 7	.23/ 14	.16/ 20	.12/ 20	.11/ 20
17	.95/ 8	.94/ 8	.89/ 8	.82/ 8	.72/ 7	.61/ 7	.49/ 7	.37/ 7	.27/ 7	.19/ 17	.14/ 20	.11/ 20	.10/ 20
19	.79/ 8	.77/ 8	.73/ 8	.67/ 7	.59/ 7	.50/ 7	.40/ 7	.31/ 7	.23/ 7	.16/ 20	.12/ 20	.09/ 20	.09/ 20
21	.65/ 8	.64/ 8	.61/ 8	.56/ 7	.49/ 7	.41/ 7	.33/ 7	.26/ 7	.19/ 7	.14/ 20	.10/ 20	.08/ 20	.08/ 20
20	7	2.53/ 8	2.51/ 8	2.45/ 8	2.34/ 7	2.17/ 7	1.93/ 7	1.63/ 7	1.29/ 7	.94/ 7	.62/ 6	.35/ 7	.18/ 13
9	2.80/ 8	2.76/ 8	2.63/ 8	2.55/ 8	2.17/ 8	1.50/ 8	1.14/ 7	.79/ 7	.50/ 7	.30/ 7	.22/ 13	.15/ 13	.10/ 13
11	2.37/ 8	2.33/ 8	2.21/ 8	2.02/ 8	1.78/ 8	1.49/ 8	1.19/ 7	.89/ 7	.61/ 7	.39/ 7	.22/ 13	.12/ 13	.09/ 13
13	1.89/ 8	1.85/ 8	1.76/ 8	1.60/ 8	1.40/ 8	1.17/ 8	.93/ 7	.69/ 7	.48/ 7	.30/ 7	.17/ 13	.10/ 23	.08/ 23
15	1.51/ 8	1.48/ 8	1.40/ 8	1.27/ 8	1.11/ 8	.92/ 8	.73/ 7	.54/ 7	.38/ 7	.24/ 7	.14/ 13	.09/ 23	.07/ 23
17	1.21/ 8	1.19/ 8	1.13/ 8	1.02/ 8	.89/ 8	.69/ 8	.49/ 8	.34/ 7	.23/ 7	.19/ 13	.12/ 23	.08/ 23	.07/ 23
19	.99/ 8	.97/ 8	.92/ 8	.84/ 8	.73/ 8	.61/ 8	.48/ 8	.36/ 7	.25/ 7	.16/ 13	.10/ 23	.07/ 26	.06/ 26
21	.82/ 8	.81/ 8	.76/ 8	.69/ 8	.61/ 8	.50/ 8	.40/ 8	.30/ 7	.21/ 7	.14/ 23	.09/ 26	.06/ 26	.05/ 26
25	7	2.69/ 8	2.68/ 8	2.64/ 8	2.54/ 8	2.37/ 8	2.13/ 7	1.81/ 7	1.44/ 7	1.05/ 7	.68/ 6	.37/ 9	.19/ 9
9	3.31/ 8	3.26/ 8	3.11/ 8	2.87/ 8	2.55/ 8	2.16/ 8	1.75/ 8	1.42/ 8	1.05/ 8	.71/ 7	.56/ 6	.29/ 17	.14/ 17
11	2.90/ 8	2.85/ 8	2.70/ 8	2.46/ 8	2.02/ 8	1.78/ 8	1.49/ 8	1.12/ 8	.82/ 8	.55/ 7	.43/ 7	.22/ 17	.11/ 17
13	2.35/ 8	2.30/ 8	2.19/ 8	1.97/ 8	1.72/ 8	1.42/ 8	1.12/ 8	.82/ 8	.55/ 7	.33/ 7	.17/ 17	.09/ 17	.07/ 17
15	1.88/ 8	1.84/ 8	1.74/ 8	1.57/ 8	1.37/ 8	1.13/ 8	.88/ 8	.64/ 8	.43/ 7	.21/ 7	.14/ 17	.08/ 17	.06/ 17
17	1.52/ 8	1.49/ 8	1.40/ 8	1.27/ 8	1.10/ 8	.91/ 8	.71/ 8	.52/ 8	.35/ 7	.21/ 7	.12/ 17	.07/ 33	.05/ 33
19	1.24/ 8	1.22/ 8	1.15/ 8	1.04/ 8	.90/ 8	.74/ 8	.58/ 8	.42/ 8	.28/ 7	.17/ 7	.10/ 17	.06/ 23	.05/ 23

## ASR

SHORTCRESTED  
RMS LONGITUDINAL DISPLACEMENT IN FEET/ENCOUNTERED MODAL PERIOD,  $T_0$ , IN SECONDS  
ROLLER CHOCK - 0.0 FT AFT OF AP. ON CL. AND 26.07 FT ABOVE KEEL

V	T <sub>0</sub>	SHIP HEADING ANGLE IN DEGREES										150	165	180
		30	45	60	75	90	105	120	135	150	165			
0	.7	.05/.8	.05/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8
9	.08/10	.08/10	.07/10	.06/10	.05/10	.05/10	.05/10	.05/10	.05/10	.05/10	.06/10	.06/10	.06/10	.06/10
11	.10/12	.10/12	.09/12	.08/12	.07/12	.07/12	.06/12	.06/12	.06/12	.07/12	.07/12	.08/12	.08/12	.08/12
13	.12/14	.12/14	.11/14	.10/14	.09/14	.09/14	.07/14	.07/14	.07/14	.07/14	.08/14	.09/14	.09/14	.10/14
15	.13/16	.13/16	.12/16	.11/16	.09/16	.08/16	.07/16	.07/16	.08/16	.09/16	.09/16	.10/16	.10/16	.10/16
17	.14/18	.14/18	.13/18	.11/18	.10/18	.09/18	.08/18	.08/18	.08/18	.08/18	.09/18	.11/18	.11/18	.11/18
19	.14/18	.14/18	.13/18	.12/18	.10/18	.09/18	.08/18	.08/18	.08/18	.08/18	.09/18	.11/18	.11/18	.11/18
21	.16/21	.16/21	.14/21	.12/21	.11/21	.09/21	.08/21	.08/21	.08/21	.09/21	.10/21	.12/21	.12/21	.12/21
6	.7	.04/.7	.04/.7	.04/.6	.04/.6	.04/.6	.04/.6	.04/.6	.04/.6	.04/.6	.05/.10	.07/.10	.07/.10	.07/.10
9	.06/.10	.06/.10	.06/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.06/.10	.07/.10	.07/.10	.07/.10
11	.08/.13	.08/.13	.07/.13	.06/.13	.06/.13	.06/.13	.06/.13	.06/.13	.06/.13	.06/.13	.07/.13	.09/.13	.11/.13	.14/.13
13	.09/.14	.09/.14	.08/.14	.07/.14	.06/.14	.06/.14	.06/.14	.06/.14	.06/.14	.06/.14	.07/.14	.09/.14	.10/.14	.14/.14
15	.10/.16	.10/.16	.10/.16	.09/.16	.09/.16	.09/.16	.09/.16	.09/.16	.09/.16	.09/.16	.09/.16	.11/.17	.13/.17	.15/.17
17	.11/.18	.11/.18	.10/.18	.09/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.09/.18	.11/.18	.14/.19	.18/.19
19	.12/.21	.12/.21	.11/21	.10/21	.09/21	.08/21	.08/21	.08/21	.08/21	.08/21	.09/20	.11/20	.14/20	.18/20
21	.13/.21	.12/.21	.12/21	.10/21	.09/21	.08/21	.08/21	.08/21	.08/21	.08/21	.09/22	.12/22	.16/22	.18/22
10	.7	.04/.7	.04/.7	.04/.7	.04/.7	.04/.7	.04/.7	.04/.7	.04/.7	.04/.7	.05/.13	.07/.13	.07/.13	.07/.13
9	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.05/.10	.06/.13	.08/.13	.09/.13	.14/.13
11	.06/.13	.06/.13	.06/.13	.06/.13	.06/.13	.06/.13	.06/.13	.06/.13	.06/.13	.06/.13	.07/.13	.09/.14	.12/.14	.23/.15
13	.07/.14	.07/.14	.07/.14	.06/.14	.06/.14	.06/.14	.06/.14	.06/.14	.06/.14	.06/.14	.07/.14	.09/.15	.12/.15	.16/.15
15	.09/.16	.09/.16	.09/.16	.08/.16	.08/.16	.07/.16	.07/.16	.07/.16	.07/.16	.07/.16	.09/.16	.11/.17	.13/.17	.17/.17
17	.09/.18	.09/.18	.09/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.09/.18	.11/.18	.14/.19	.17/.19
19	.10/.21	.10/21	.09/21	.09/21	.09/21	.08/21	.08/21	.08/21	.08/21	.08/21	.09/21	.10/20	.14/20	.17/20
21	.11/21	.11/21	.10/21	.09/21	.09/21	.09/21	.09/21	.09/21	.09/21	.09/21	.10/22	.13/23	.16/23	.22/24
15	.7	.04/.7	.04/.7	.04/.7	.04/.7	.04/.7	.04/.7	.04/.7	.04/.7	.04/.7	.05/.14	.06/.13	.06/.13	.06/.13
9	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.06/.14	.07/.14	.07/.14	.07/.14
11	.06/.14	.06/.14	.06/.14	.06/.14	.06/.14	.06/.14	.06/.14	.06/.14	.06/.14	.06/.14	.07/.14	.08/.17	.09/.17	.10/.17
13	.07/.16	.07/.16	.07/.16	.07/.16	.07/.16	.07/.16	.07/.16	.07/.16	.07/.16	.07/.16	.08/.17	.09/.17	.10/.17	.12/.17
15	.08/.18	.08/.18	.08/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.08/.18	.09/.17	.10/.17	.12/.17
17	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.08/.18	.09/.17	.10/.17	.11/.17	.13/.17
19	.09/.21	.09/.21	.09/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.08/.21	.09/.21	.10/.20	.12/.20	.14/.20
21	.10/21	.09/21	.09/21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.09/21	.10/23	.12/23	.14/24
20	.7	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8
9	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8
11	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13
13	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14
15	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16
17	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18	.07/.18
19	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.09/21	.10/23	.12/23	.14/24
21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.09/21	.10/23	.12/23	.14/24
25	.7	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8	.04/.8
9	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8	.05/.8
11	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13	.05/.13
13	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14	.05/.14
15	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16	.06/.16
17	.06/.18	.06/.18	.06/.18	.06/.18	.06/.18	.06/.18	.06/.18	.06/.18	.06/.18	.06/.18	.06/.18	.06/.18	.06/.18	.06/.18
19	.07/21	.07/21	.07/21	.07/21	.07/21	.07/21	.07/21	.07/21	.07/21	.07/21	.07/21	.07/21	.07/21	.07/21
21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21	.08/21

RMS LONG VEL IN FPS/ENCOUNTERED MODAL PERIOD, T, IN SECONDS  
 SHORTCRESTED  
 ROLLER CHOCK - 8.0 FT AFT OF AP, ON CL, AND 26.07 FT ABOVE KEEL  
 ASR

## ASR

RMS LON ACC IN G'S/ENCOUNTERED MODAL PERIOD, T<sub>0</sub>' IN SECONDS  
 SHORTCRESTED  
 (ACC. X 100)

ROLLER CHOCK - 8.0 FT AFT OF AP. ON CL. AND 26.07 FT ABOVE KEEL

V	T <sub>0</sub>	0	15	30	45	60	SHIP HEADING ANGLE IN DEGREES	90	105	120	135	150	165	180
0	7	.12/ 8	.12/ 8	.12/ 7	.12/ 5	.13/ 5	.13/ 5	.12/ 5	.12/ 5	.12/ 5	.11/ 8	.11/ 8	.11/ 8	.11/ 8
1	9	.13/ 9	.13/ 9	.12/ 9	.12/ 9	.11/ 9	.11/ 8	.11/ 8	.10/ 8	.10/ 8	.11/ 8	.11/ 8	.11/ 8	.11/ 8
11	10	.13/10	.12/10	.11/10	.10/10	.09/10	.09/10	.09/10	.08/10	.08/10	.09/10	.09/10	.09/10	.09/10
13	11	.11/11	.11/11	.10/11	.09/11	.08/11	.08/11	.08/10	.07/10	.07/10	.09/10	.09/10	.10/10	.11/10
13	12	.10/13	.10/13	.09/13	.08/13	.07/13	.07/13	.07/13	.07/13	.07/13	.08/13	.08/13	.09/13	.10/11
15	14	.09/14	.09/14	.08/14	.07/14	.06/14	.06/14	.06/14	.06/14	.06/14	.07/14	.07/14	.08/14	.08/14
17	14	.08/14	.08/14	.07/14	.06/14	.05/14	.05/14	.05/14	.05/14	.05/14	.06/14	.06/14	.07/14	.07/14
18	14	.08/14	.08/14	.07/14	.06/14	.05/14	.05/14	.05/14	.05/14	.05/14	.06/14	.06/14	.07/14	.07/14
21	16	.07/16	.06/16	.05/16	.04/16	.04/16	.04/16	.04/16	.04/16	.04/16	.05/16	.05/16	.06/16	.06/16
5	7	.17/ 6	.17/ 6	.17/ 6	.17/ 6	.16/ 6	.15/ 6	.13/ 6	.12/ 5	.12/ 5	.10/ 9	.10/ 9	.10/ 9	.10/ 9
5	9	.16/ 6	.16/ 6	.15/ 6	.14/ 6	.13/ 6	.12/ 6	.11/ 6	.10/ 6	.10/ 6	.11/ 10	.11/ 10	.12/ 10	.13/ 10
11	10	.14/10	.14/10	.13/10	.12/10	.11/10	.10/10	.09/10	.09/10	.09/10	.11/11	.11/11	.12/12	.13/12
13	12	.12/12	.12/12	.11/12	.11/11	.09/11	.08/11	.08/12	.08/12	.08/12	.10/13	.11/13	.12/13	.12/13
15	13	.11/13	.11/13	.09/13	.08/13	.07/13	.07/13	.07/13	.07/13	.07/13	.09/13	.10/13	.10/13	.11/13
17	14	.09/14	.09/14	.08/14	.07/14	.06/14	.06/14	.06/14	.06/14	.06/14	.08/14	.09/15	.09/15	.09/15
19	16	.08/16	.08/16	.08/16	.07/16	.06/16	.05/16	.05/15	.05/15	.05/15	.06/16	.06/16	.08/16	.08/16
21	16	.07/16	.07/16	.06/16	.05/16	.04/16	.04/16	.04/16	.04/16	.04/16	.05/17	.06/17	.07/17	.07/17
10	7	.23/ 7	.23/ 7	.22/ 7	.21/ 7	.19/ 7	.19/ 7	.17/ 6	.15/ 6	.13/ 6	.12/13	.12/13	.12/13	.12/13
10	9	.21/ 9	.20/ 9	.19/ 7	.18/ 7	.16/ 7	.15/ 7	.13/ 7	.12/ 7	.11/ 7	.12/13	.12/13	.13/13	.14/13
11	7	.17/ 7	.17/ 7	.16/ 7	.15/ 7	.13/ 7	.12/ 7	.11/ 7	.11/ 7	.11/ 7	.12/13	.12/13	.13/13	.14/13
13	14	.14/ 7	.14/ 7	.13/ 7	.12/ 7	.10/ 7	.10/ 7	.09/ 13	.09/ 13	.09/ 13	.10/14	.10/14	.13/14	.13/14
15	13	.12/13	.12/13	.11/13	.10/13	.09/13	.08/13	.08/14	.08/14	.08/14	.09/15	.09/15	.11/15	.12/15
17	14	.10/14	.10/14	.10/14	.09/14	.08/14	.07/14	.07/15	.07/15	.07/15	.08/15	.08/15	.10/16	.10/16
19	16	.09/16	.08/16	.08/16	.07/16	.06/16	.06/16	.06/16	.06/16	.06/16	.07/17	.07/17	.08/17	.09/17
21	16	.08/16	.08/16	.07/16	.06/16	.05/16	.05/16	.05/17	.05/17	.05/17	.06/17	.07/17	.08/18	.08/18
15	7	.26/ 7	.26/ 7	.25/ 7	.24/ 7	.22/ 7	.22/ 7	.19/ 7	.17/ 6	.15/ 6	.13/13	.12/13	.12/13	.12/13
15	9	.25/ 7	.25/ 7	.23/ 7	.22/ 7	.19/ 7	.19/ 7	.17/ 7	.15/ 7	.13/ 7	.12/13	.12/13	.13/13	.14/13
11	7	.20/ 7	.19/ 7	.19/ 7	.17/ 7	.15/ 7	.15/ 7	.13/ 7	.12/ 7	.11/ 7	.12/17	.12/17	.13/20	.14/20
13	7	.16/ 7	.16/ 7	.15/ 7	.14/ 7	.12/ 7	.12/ 7	.11/ 7	.10/ 7	.10/ 7	.10/17	.11/17	.12/20	.13/20
15	7	.14/ 7	.13/ 7	.13/ 7	.12/ 7	.10/ 7	.10/ 7	.09/ 14	.08/ 17	.08/ 17	.09/20	.09/20	.11/20	.12/20
17	7	.12/ 7	.11/ 7	.10/ 7	.09/ 7	.09/ 7	.09/ 7	.08/ 14	.07/ 17	.07/ 17	.08/20	.09/20	.10/20	.10/20
19	7	.10/ 7	.10/ 7	.09/ 16	.08/ 16	.07/ 16	.06/ 16	.06/ 17	.06/ 17	.06/ 17	.07/20	.08/20	.09/20	.09/20
21	18	.09/18	.08/18	.08/18	.07/16	.06/16	.06/16	.05/17	.05/17	.05/20	.06/20	.07/20	.08/20	.08/20
20	7	.28/ 7	.28/ 7	.27/ 7	.26/ 7	.23/ 7	.21/ 7	.18/13	.14/13	.11/13	.09/13	.08/13	.07/13	.07/13
9	8	.29/ 8	.28/ 8	.27/ 8	.25/ 8	.22/ 8	.22/ 8	.19/ 7	.16/ 7	.13/ 7	.11/19	.10/19	.09/19	.09/19
11	8	.24/ 8	.23/ 8	.22/ 8	.20/ 8	.19/ 8	.17/ 8	.15/ 7	.13/ 7	.11/ 7	.10/19	.10/19	.10/23	.10/23
13	8	.19/ 8	.19/ 8	.18/ 8	.16/ 8	.14/ 8	.14/ 8	.12/ 7	.10/ 7	.09/ 7	.09/23	.09/23	.10/23	.10/23
15	8	.15/ 8	.15/ 8	.14/ 8	.13/ 8	.11/ 8	.11/ 8	.10/ 7	.09/ 7	.08/ 7	.08/23	.08/23	.10/26	.10/26
17	8	.13/ 8	.13/ 8	.12/ 8	.11/ 8	.10/ 8	.09/ 8	.08/ 8	.07/ 8	.07/ 8	.08/26	.08/26	.09/26	.09/26
19	8	.11/ 8	.11/ 8	.10/ 8	.09/ 8	.09/ 8	.09/ 8	.08/ 7	.07/ 7	.06/ 23	.07/26	.07/26	.08/26	.08/26
21	8	.09/ 8	.09/ 8	.08/ 8	.07/ 8	.07/ 8	.06/ 8	.05/ 7	.05/ 7	.06/ 23	.06/ 23	.07/26	.07/26	.07/26
25	7	.29/ 8	.29/ 8	.28/ 8	.27/ 8	.24/ 7	.24/ 7	.22/ 7	.22/ 7	.18/ 7	.15/ 17	.12/ 17	.09/ 17	.07/ 17
9	8	.32/ 8	.32/ 8	.30/ 8	.27/ 8	.24/ 8	.24/ 8	.21/ 7	.17/ 7	.13/ 7	.10/ 17	.09/ 17	.07/ 17	.07/ 17
11	8	.27/ 8	.27/ 8	.25/ 8	.23/ 8	.20/ 8	.20/ 8	.17/ 7	.14/ 7	.11/ 7	.09/ 17	.08/ 17	.08/ 17	.08/ 17
13	8	.22/ 8	.21/ 8	.20/ 8	.18/ 8	.16/ 8	.16/ 8	.13/ 7	.11/ 7	.09/ 7	.08/ 17	.08/ 17	.08/ 17	.08/ 17
15	8	.18/ 8	.17/ 8	.16/ 8	.15/ 8	.13/ 8	.13/ 8	.11/ 7	.09/ 7	.08/ 7	.07/ 17	.07/ 17	.08/ 17	.08/ 17
17	8	.14/ 8	.14/ 8	.13/ 8	.12/ 8	.10/ 8	.10/ 8	.09/ 7	.08/ 7	.07/ 7	.07/ 17	.07/ 17	.07/ 17	.07/ 17
19	8	.12/ 8	.12/ 8	.11/ 8	.10/ 8	.09/ 8	.09/ 8	.07/ 7	.06/ 7	.06/ 7	.06/ 17	.06/ 17	.06/ 17	.06/ 17

**DTNSRDC ISSUES THREE TYPES OF REPORTS**

1. DTNSRDC REPORTS, A FORMAL SERIES, CONTAIN INFORMATION OF PERMANENT TECHNICAL VALUE. THEY CARRY A CONSECUTIVE NUMERICAL IDENTIFICATION REGARDLESS OF THEIR CLASSIFICATION OR THE ORIGINATING DEPARTMENT.
2. DEPARTMENTAL REPORTS, A SEMIFORMAL SERIES, CONTAIN INFORMATION OF A PRELIMINARY, TEMPORARY, OR PROPRIETARY NATURE OR OF LIMITED INTEREST OR SIGNIFICANCE. THEY CARRY A DEPARTMENTAL ALPHANUMERICAL IDENTIFICATION.
3. TECHNICAL MEMORANDA, AN INFORMAL SERIES, CONTAIN TECHNICAL DOCUMENTATION OF LIMITED USE AND INTEREST. THEY ARE PRIMARILY WORKING PAPERS INTENDED FOR INTERNAL USE. THEY CARRY AN IDENTIFYING NUMBER WHICH INDICATES THEIR TYPE AND THE NUMERICAL CODE OF THE ORIGINATING DEPARTMENT. ANY DISTRIBUTION OUTSIDE DTNSRDC MUST BE APPROVED BY THE HEAD OF THE ORIGINATING DEPARTMENT ON A CASE-BY-CASE BASIS.