

Sight Reduction and DR

Dead-Reckoning problem Leg 13 XXXXXX Test your knowledge!

On 12/05/96 19-42-00 ZT, we are at DR(36d 13.9'N 10d 54.4'E), on a TC of 111.3d at 7.8 kts bound for Masabb Dumyat(31d 30.1.N 31d 50.0'E).

We decide on a set of 3 bodies for a FIX during Evening Nautical Twilight.

Body	Time	Hs	Zn
Sirius	19-42-56	11d 46.2'	239.1d
Alioth	19-48-27	61d 55.8'	035.8d
Spica	19-54-40	31d 59.7'	137.5d

1) What is our FIX position using Spica as the plotting time?

What is the Dist Off?

Note:

Lat & Lo = XXd XX.X', **Date=DD/MM/YY**, HE 8 Feet, Index correction  $-2'$ , Time hh-mm-ss in UTC/GMT. Silicon Sea is a medium displacement sailing vessel, 40 Feet LOA. 38 Feet LWL; Cutter rigged. Looks a lot like a Mason. Can tack to 45d.

Adjust all zone times to Zulu Time: subtract one hour.

ALMANAC DATA					
sirius		alioth		spica	
18 h	140° 47.0	18h	140° 47.0	18 h	140° 47.0
42m 56s	10° 45.8	48m 27s	12° 08.7	54m 40s	13° 42.2
SHA	258° 45.4	SHA	166° 31.7	SHA	158° 44.6
GHA	410° 18.2	GHA	319° 27.4	GHA	313° 13.8
A.P. long	11°		11°		11°
	411° 18.2		330° 27.4		324° 13.8
	360°				
LHA	61° 18.2		330° 27.4		324° 13.8
Decl	S 16° 43.0		N 55° 58.9		S 11° 08.6
A.P. lat	N 36°		N 36°		N 36°

Find Hc and Zn using

$$\sin Hc = \sin d \sin L + \cos d \cos L \cos H$$

$$\cos Z = (\sin d - \sin L \cos Hc) / (\cos L \cos Hc)$$

	sirius	alioth	spica
Hc	11° 42.7	61° 45.5	32° 02.1
Zn	239.1°	035.7°	137.7°

Apply corrections of dip, index correction and refraction to sextant readings Hs to obtain Ho

	sirius	alioth	spica
Hs	11° 46.2	61° 55.8	32° 59.7
dip	- 2.7	- 2.7	- 2.7
ic	- 0.2	- 0.2	- 0.2
refr	- 4.6	- 0.5	- 1.6
Ho	11° 38.7	61° 52.5	31° 55.2

Find the intercept from the assumed position,

	sirius	alioth	spica
Ho	11° 38.7	61° 52.5	31° 55.2
Hs	11° 46.2	61° 55.8	32° 59.7
p	4.0A	6.9T	6.9A

Find the distance traveled on course 111.3° True, at 7.8 knots to advance all lops to the time of spica's sight (18:54:40 Z)

	sirius	alioth	spica
time (minutes)	11.7	6.2	0
distance (nm)	1.5	0.8	0

Recap of the data for plotting:

96May12 Sun Crs 111.3° T/7.8 <sup>kts</sup> A.P. N 36° E 11°				
DR 1842Z N 36° 13.9 E 10° 54.4				
body	Time	intercept	Zn	d adj
sirius	1843 Z	4A	239.1°	1.5
alioth	1848 Z	6.9T	035.7°	0.8
spica	1855 Z	6.9A	137.4°	0.0

