

USING TIDAL CURVES

AIR DRAFT

**How to work out if you have enough air draft
to pass under bridges/power lines, etc**

Using Tidal Curves

This presentation deals with how you can to work out when it is safe to pass under bridges and power lines which at high water are lower than your mast

You Will Need

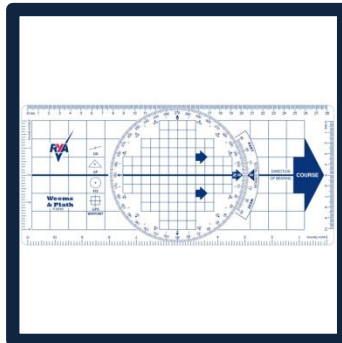
RYA Almanac



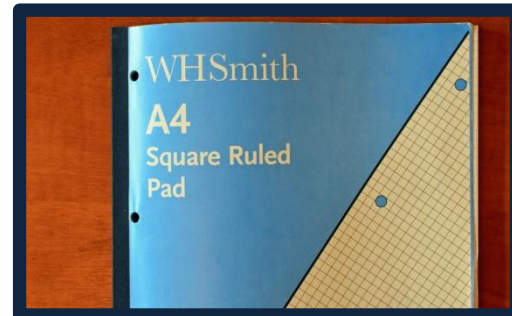
Pad of paper, pencil and rubber



RYA Chartplotter



Pad of Graph Paper

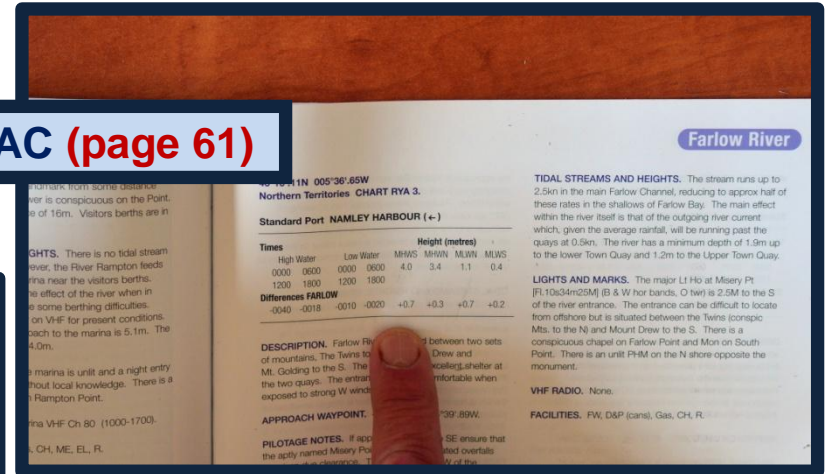
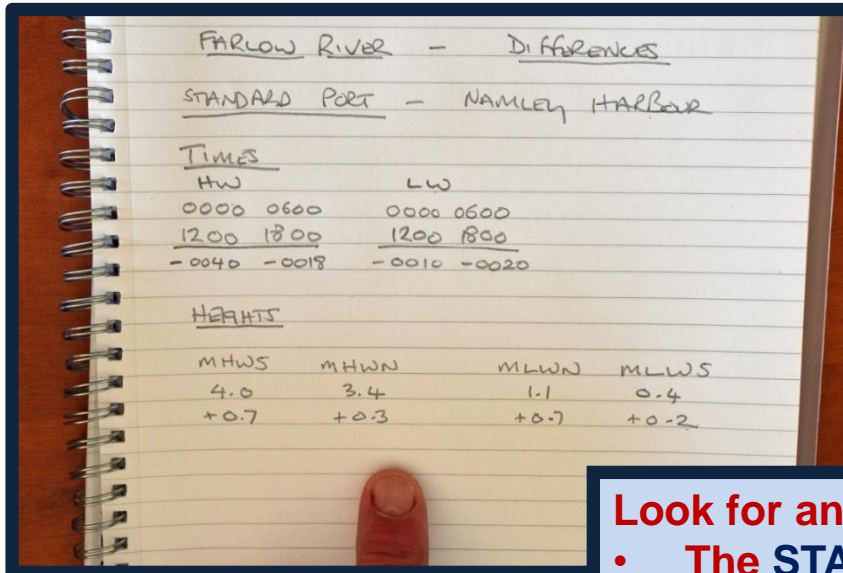


Question

- **At 15.30 DST on July 9th you are approaching the road bridge over the FARLOW RIVER.**
- **Your yacht has an AIR DRAFT of 14.5m**
- **What clearance will there be between the top of the mast and the bridge?**

Time of Tide

Find FARLOW RIVER in the RYA ALMANAC (page 61)

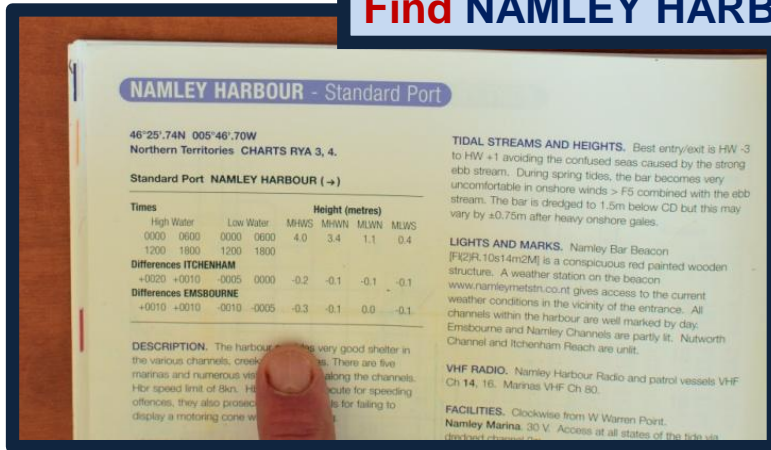


Look for and write down the following information:

- The STANDARD PORT
- The differences for FARLOW RIVER

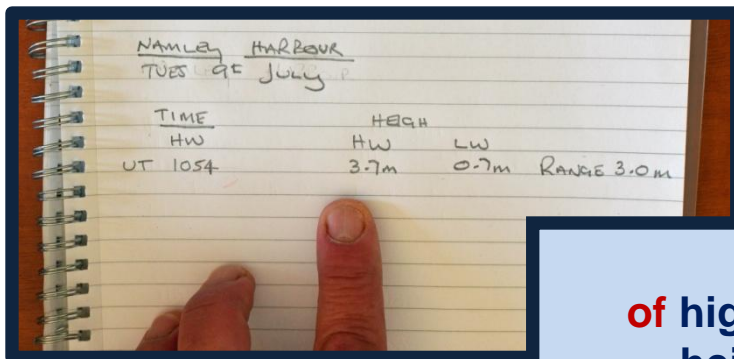
Time of Tide

Find **NAMLEY HARBOUR** in the RYA ALMANAC (from page 52)



19	0613 3.5 1156 1.1 W 1835 3.4	4	0619 3.2 1210 1.2 TH 1840 3.2	19	0019 0.6 0649 3.5 F 1239 1.1 1912 3.5	4	0104 1.0 0725 3.2 SU 1329 1.2 1953 3.2	19	0210 1.0 0842 3.3 M 1447 0.9 2114 3.5
20	0050 0.5 0719 3.5 TH 1312 1.0 1939 3.5	5	0052 0.9 0719 3.2 F 1315 1.2 1940 3.2	20	0128 0.6 0755 3.4 SA 1352 1.0 2019 3.5	5	0206 1.0 0829 3.3 M 1431 1.1 2058 3.3	20	0308 1.0 0945 3.5 TU 1551 0.7 2214 3.7
21	0155 0.5 0822 3.6 F 1416 0.9 2041 3.6	6	0148 0.9 0818 3.3 SA 1411 1.1 2039 3.3	21	0229 0.7 0859 3.5 SU 1457 0.9 2123 3.6	6	0303 0.9 0933 3.5 TU 1530 0.9 2201 3.5	21	0401 0.9 1039 3.7 W 1645 0.6 2306 3.8
22	0252 0.4 0921 3.7 SA 1514 0.8 2139 3.7	7	0239 0.8 0914 3.5 SU 1503 1.0 2135 3.4	22	0325 0.7 0959 3.6 M 1558 0.7 2223 3.7	7	0357 0.8 1031 3.6 W 1626 0.7 2256 3.7	22	0448 0.9 1126 3.8 TH 1731 0.4 O 2352 3.9
23	0345 0.4 1016 3.8 SU 1609 0.6 2235 3.8	8	0329 0.8 1007 3.6 M 1554 0.8 2226 3.6	23	0417 0.7 1053 3.7 TU 1653 0.6 2317 3.8	8	0447 0.8 1122 3.8 W 1716 0.5 • 2346 3.9	23	0529 0.8 1209 3.9 F 1810 0.4
24	0434 0.4 1107 3.8 M 1700 0.5 O 2326 3.6	9	0417 0.7 1054 3.7 TU 1642 0.7 2314 3.7	24	0504 0.7 1141 3.8 W 1742 0.5 O	9	0533 0.7 1208 3.9 F 1803 0.3	24	0034 3.9 SA 1247 3.8 1844 0.4
25	0519 0.5 1153 3.9 TU 1748 0.4	10	0503 0.7 1139 3.8 W 1729 0.6 • 2359 3.8	25	0006 3.9 0546 0.7 TH 1225 3.8 1826 0.4	10	0031 4.1 0615 0.6 SA 1252 4.0 1847 0.2	25	0112 3.8 0640 0.8 SU 1914 3.5 1914 0.8
26	0014 3.9 0600 0.6	11	0050 3.9 0625 0.8	26	0050 3.9 0625 0.8	11	0117 4.1 0656 0.6 • 1334 4.0	26	0143 3.7 0711 0.8 M 1346 3.7

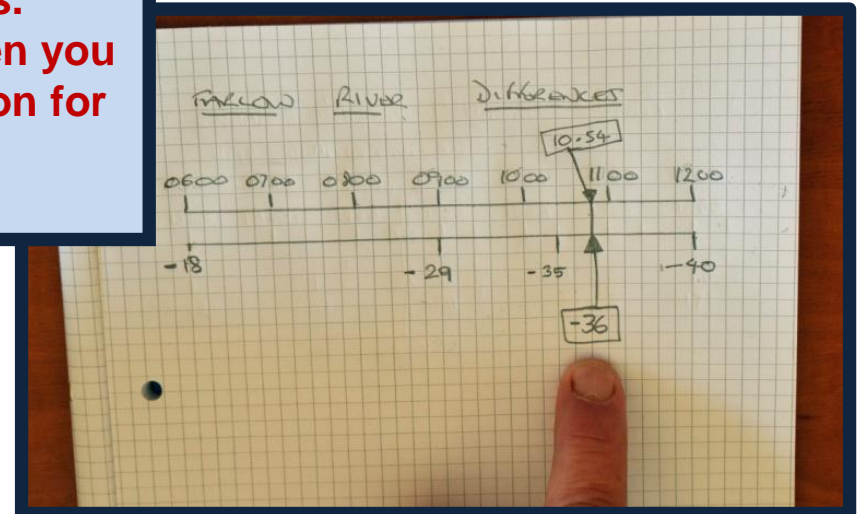
Look up 9th July and circle it with pencil (page 55)



Write down the time of high water in the afternoon and the heights for HW and the next LW and work out the range

Time of Tide

Next, you will need the graph paper to interpolate between the corrections. Firstly expand the HW data and then you can then read off the right correction for the HW time of 10.54 - in this case minus 36 minutes



MHS	MHWN	MLW
4.0	3.4	1.1
+0.7	+0.3	+0.0

NAMLEY HARBOUR
TUES 9th July

TIME	HEIGHT
HW	HW
UT 1054	3.7m
-36	
UT 1018	

Now take away the corrections from the NAMLEY HARBOUR tide times

Time of Tide

NAMLEY HARBOUR

TIME ZONE UT
For Summer Time add ONE hour in non-shaded areas

TIMES AND HEIGHTS OF HIGH AND LOW WATERS

JUNE			JULY		
Time	m		Time	m	
0145	3.8	1	0327	3.6	16
0726	0.7	1	0900	1.0	16
1404	3.7	1	1534	3.4	16
1954	0.6	1	2147	0.7	16
0227	3.7	2	0418	3.4	17
0806	0.8	2	0952	1.2	17
1446	3.6	2	1624	3.3	17
2039	0.6	2	2251	0.8	17
0316	3.6	3	0515	3.2	18
0852	0.9	3	1059	1.3	18
1535	3.4	3	1724	3.2	18
2132	0.7	3	2339	0.5	18
0412	3.5	4	0613	3.5	19
0947	1.1	4	1156	1.1	19
1633	3.3	4	1835	3.4	19
2237	0.7	4	2431	3.1	19

Check to see if you need to make an adjustment for **SUMMER TIME**

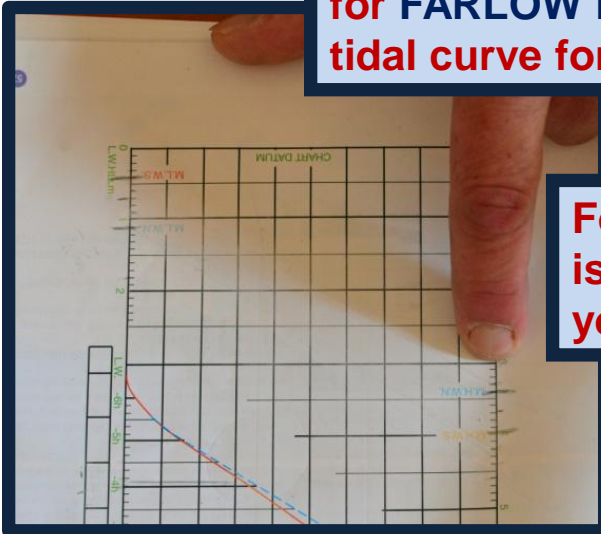
NAMLEY HARBOUR
TUES 9th July

TIME	HEIGHT
UT 1054	HW 3.7m
-36	LW 0.7m
UT 1018	
+ 0100	
<u>11.18</u>	

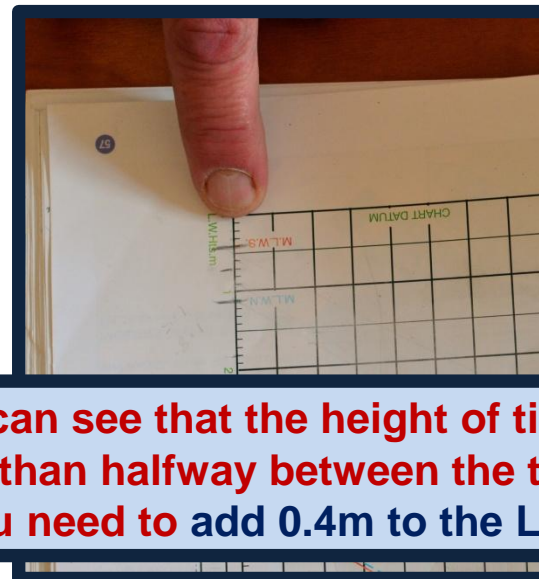
You can see you need add one hour to the times

Height of Tide

Now you can add the differences in heights for FARLOW RIVER. First find the tidal curve for NAMLEY HARBOUR (page 57)



For HW you can see that the height of tide for that day is approx. halfway between springs and neaps, therefore you need to add 0.5m to the HW height



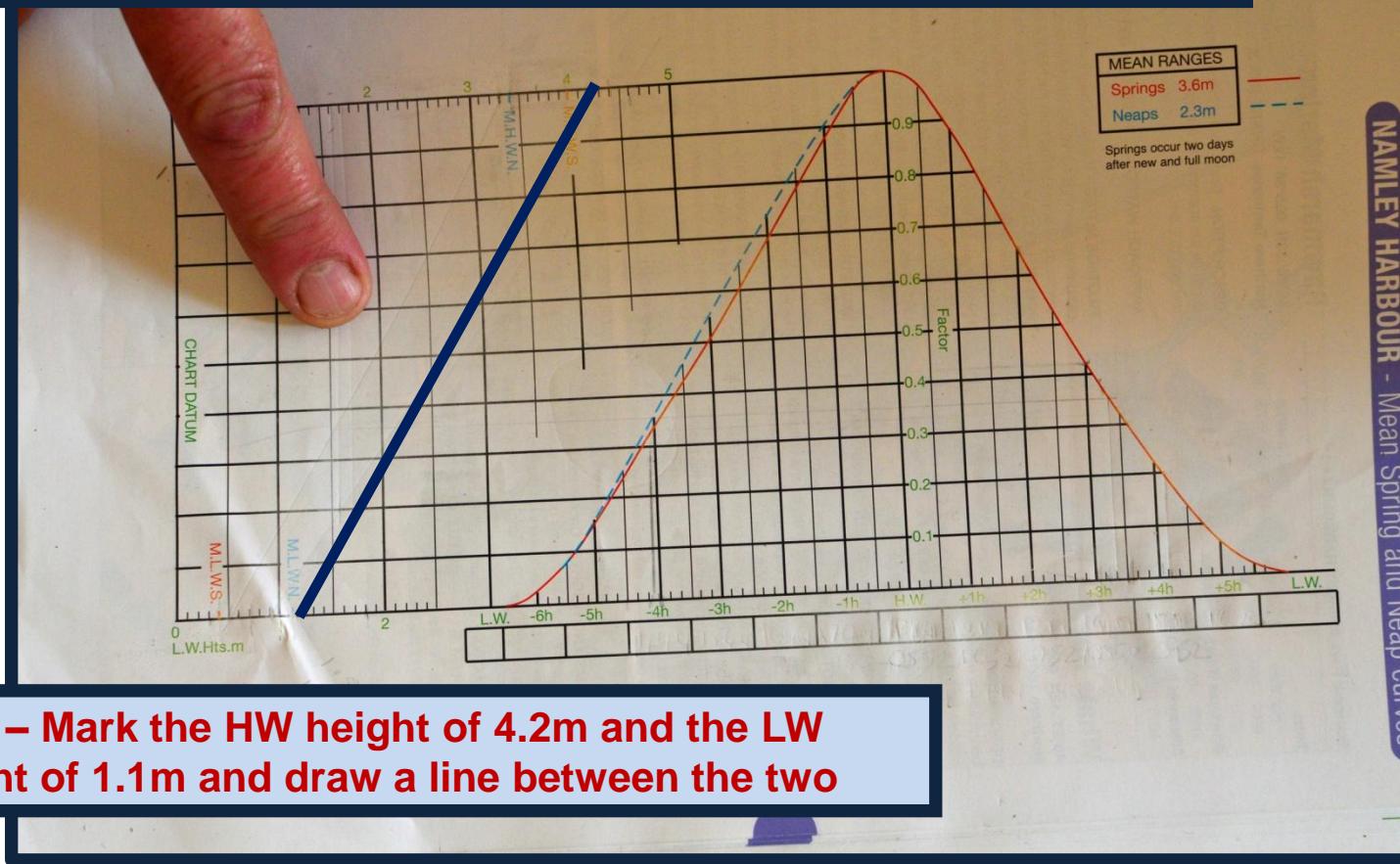
For LW you can see that the height of tide is just slightly less than halfway between the two figures, therefore you need to add 0.4m to the LW height

NAMLEY HARBOUR
TUES 9th July

TIME	HEIGHT	
UT 1054	HW	3.7m
-36		+0.5m
UT 1018		4.2m
+ 0100		
11.18		
	LW	0.7m
		+0.4m
		1.1m
		RANGE 3.0m

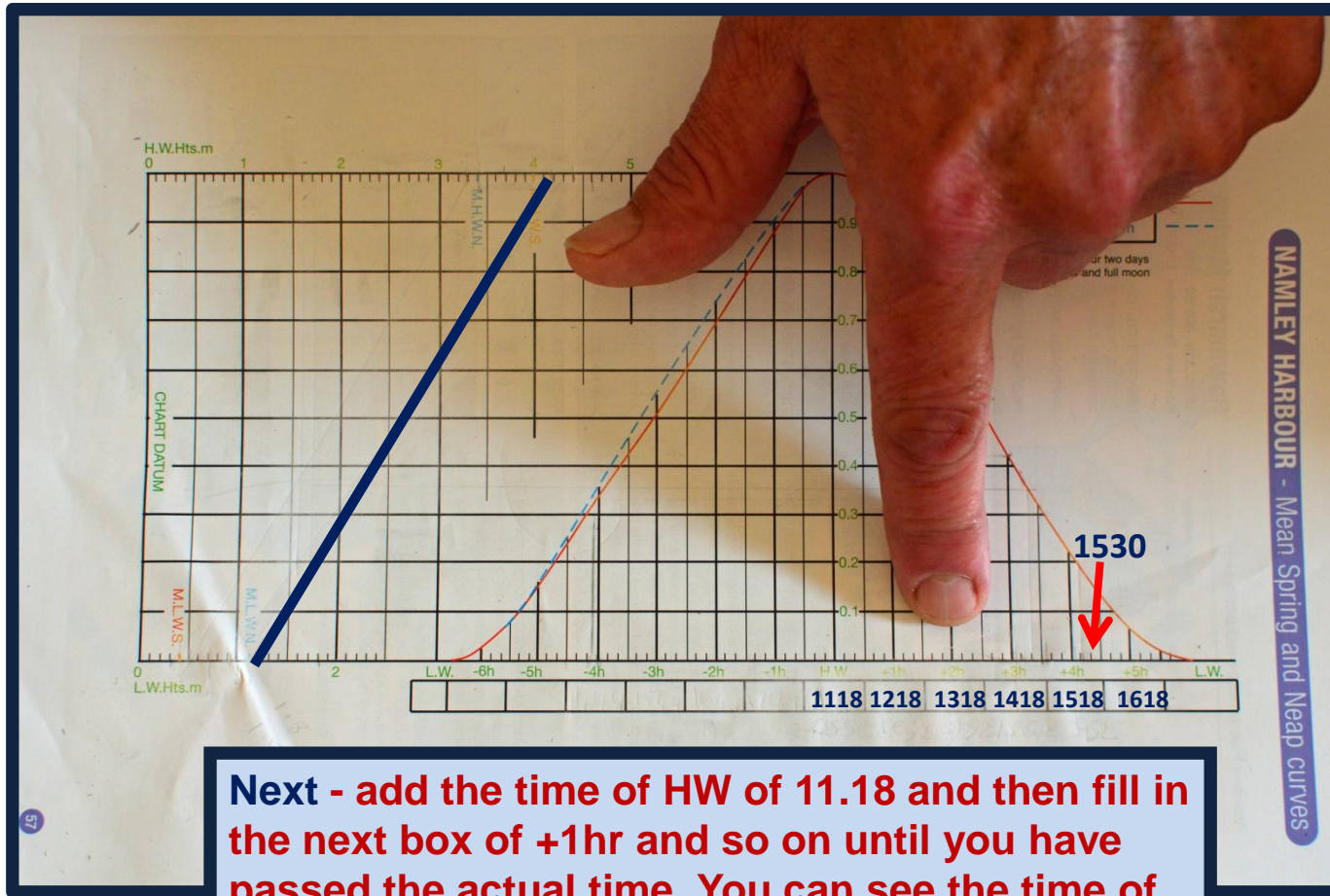
Using Tidal Curves

Now you know the heights of HW and LW at FARLOW RIVER, you are now able work out the height of tide at 15.30



First – Mark the HW height of 4.2m and the LW height of 1.1m and draw a line between the two

Using Tidal Curves

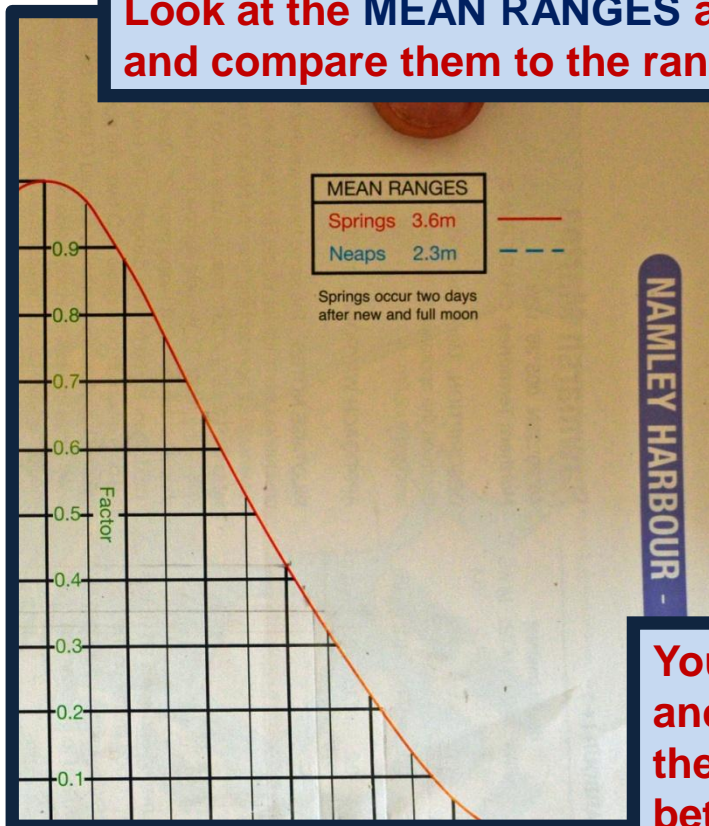


Next - add the time of HW of 11.18 and then fill in the next box of +1hr and so on until you have passed the actual time. You can see the time of 15.30 is just over 4 hours after HW

Using Tidal Curves

SPRINGS OR NEAPS?

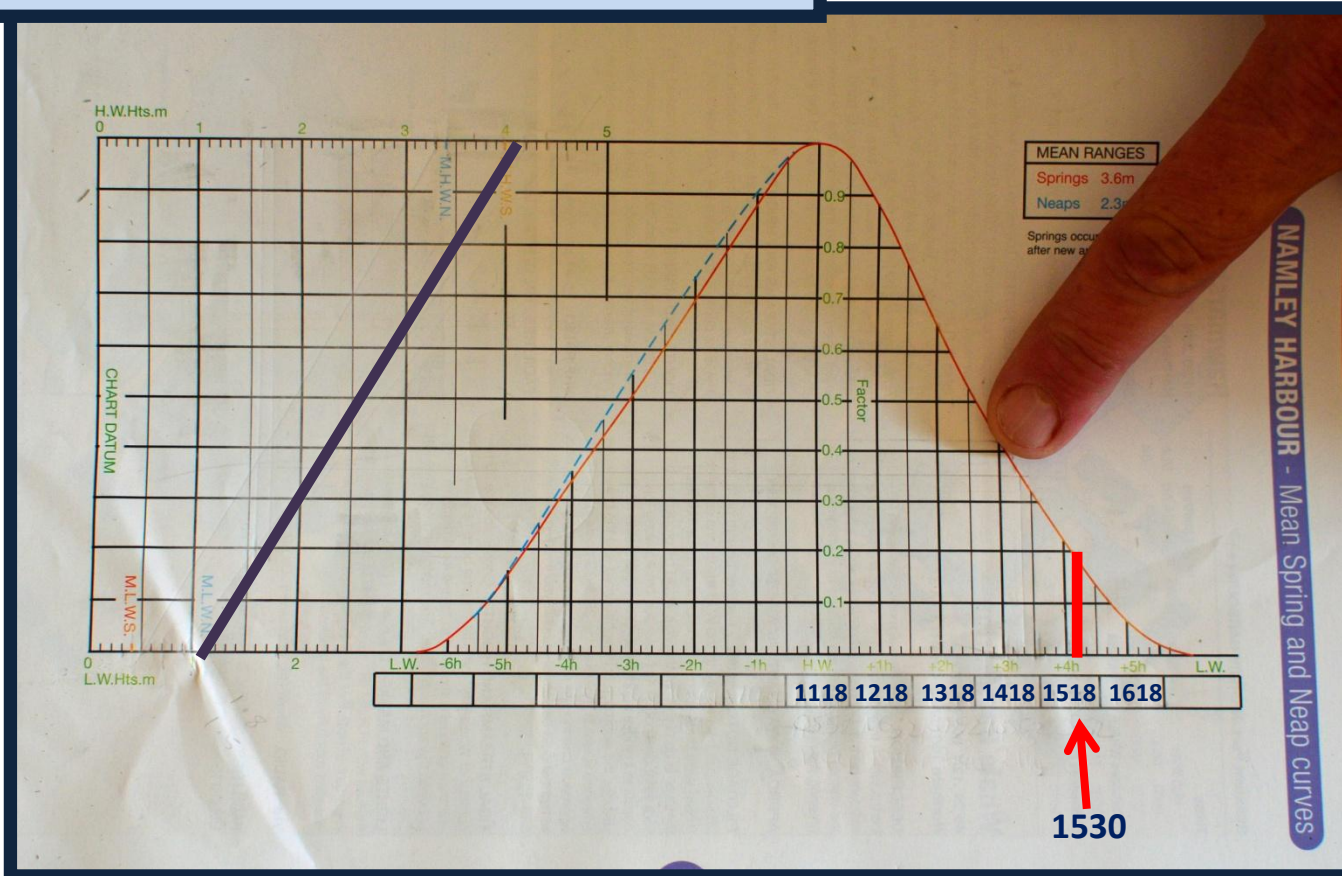
Look at the **MEAN RANGES** and write them down and compare them to the range on the 9th July



You can see the spring range is 3.6m and neap range is 2.3m. On 9th July the range is 3.0m, which is about half-way between the inner **RED** spring range line and the outer **BLUE** neap range line

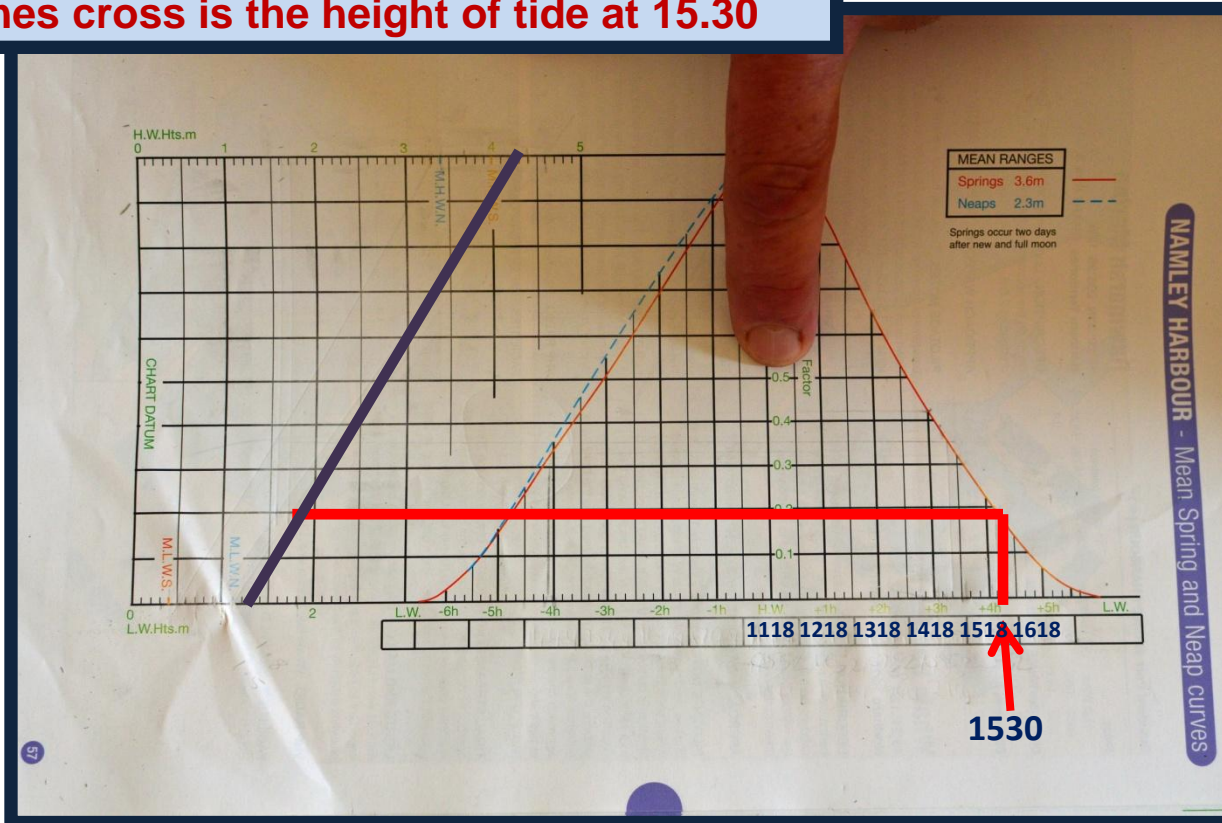
Using Tidal Curves

Now draw a line from the time to the tidal curve



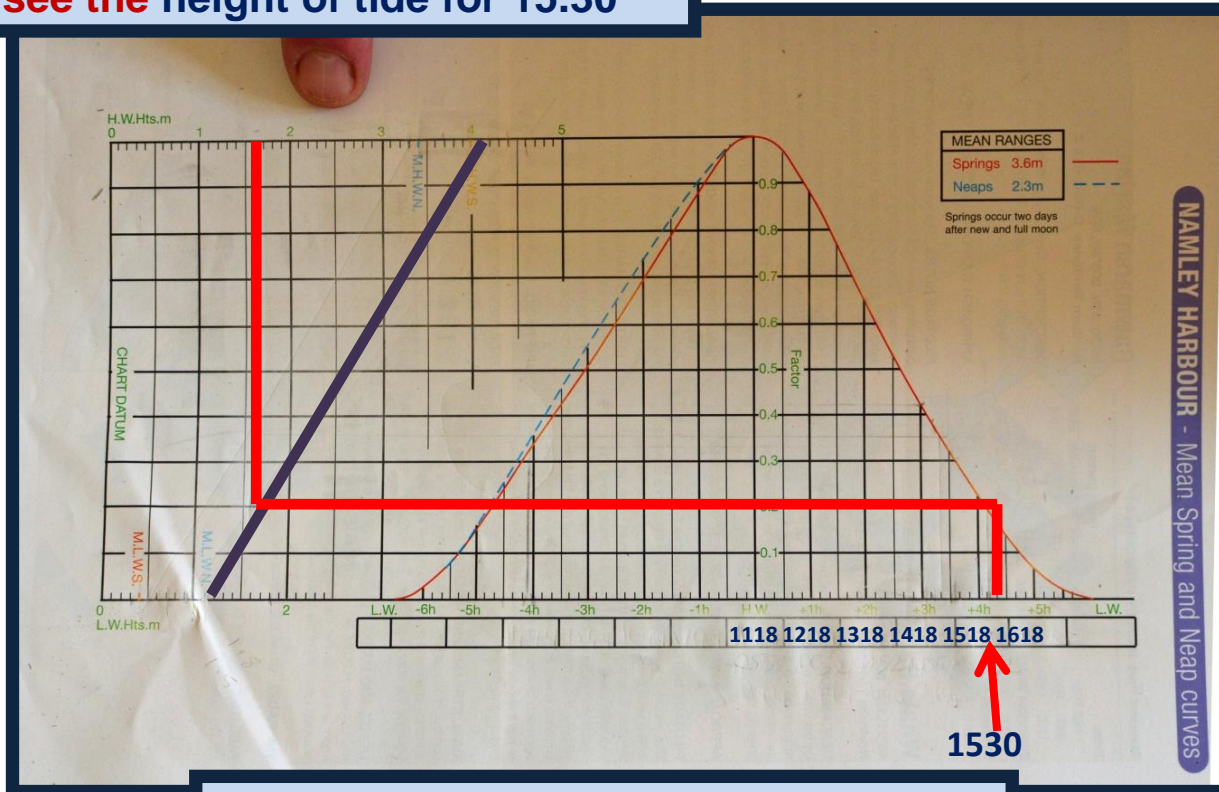
Using Tidal Curves

Then draw a line across to the tidal heights line and where the lines cross is the height of tide at 15.30



Using Tidal Curves

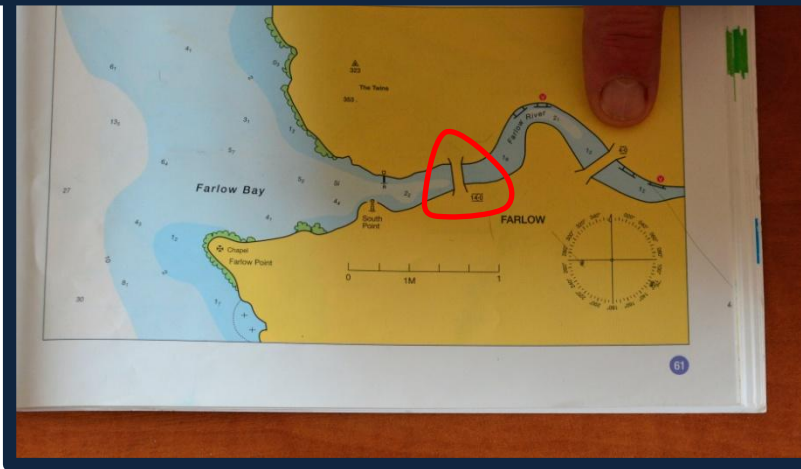
You can now see the height of tide for 15.30



Height of Tide at 15.30 = 1.7m

Finding Bridge Clearance

You've just worked out that at 15.30 the height of tide is 1.7m
Now look up the height of the bridge ABOVE HAT (page 61)
This shows there is 14m clearance at HAT

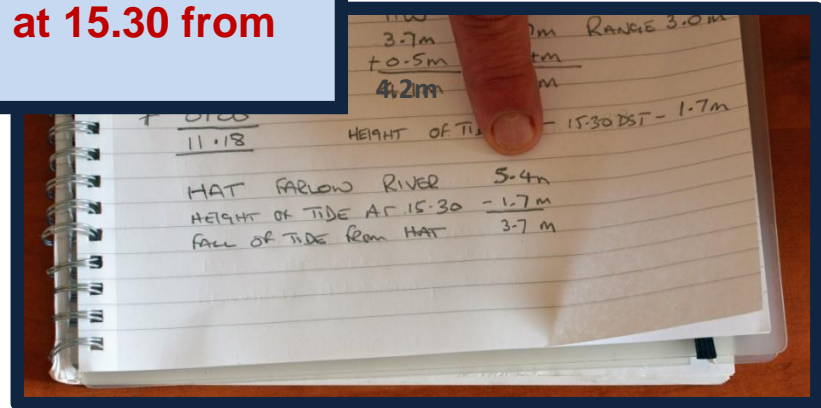


	MHWS	MHWN	MLWN	MLWS
PORT VICTORIA	5.6	4.4	2.0	0.7
Bramhope Creek	5.9	4.5	2.1	0.8
DUNBARTON	4.2	3.5	1.6	0.8
Soy Bay Marina	4.0	3.4	1.1	0.4
PORT FRASER	4.2	3.6	1.3	0.4
Stewinstown	4.0	3.4	1.1	0.3
NAMLEY HARBOUR	4.0	3.6	1.3	0.4
Itchenham	3.8	3.3	1.0	0.3
Ernsburne	3.7	3.3	1.1	0.4
Whale Bay Marina	3.9	3.5	1.3	0.5
Rawmarsh Marina	3.8	3.5	1.7	0.6
Port Rempston	5.1	4.5	3.6	1.8
Farlow	5.4	4.7	3.7	1.9
Walton Bay	4.5	4.2	3.5	1.7
Parvin Sound	3.1	3.9	3.5	1.5
Endal Marina	5.1	4.6	3.2	1.6
Rozelle Cove	5.0	4.4	3.6	1.8
India Harbour	4.2	4.0	3.6	1.8
HAMILTON SOUND	6.2	5.8	4.7	1.5
November Bay	6.0	5.6	4.8	1.4
	5.7	5.4	4.5	1.2

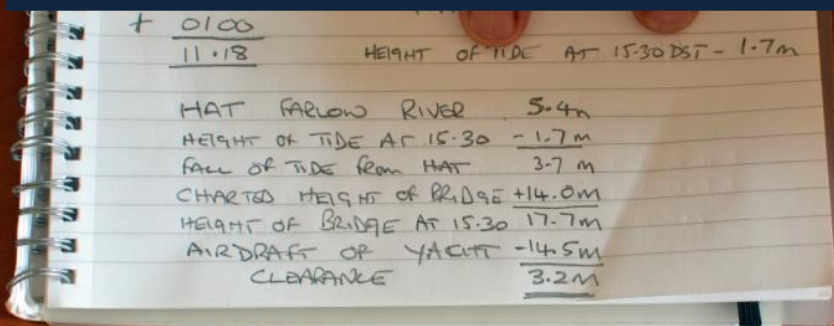
Next - you need to find the HAT figure for FARLOW RIVER
You'll find this in the almanac on page 12 in the TIDAL LEVELS TABLE

Finding Bridge Clearance

First of all take away the height of tide at 15.30 from HAT at FARLOW RIVER



Next - add the height of the bridge (3.7m + 14.0m = 17.7m) and then finally take away your air draft (17.7m - 14.5m = 3.2m)



So you will have 3.2m clearance at 15.30 which.....is enough to proceed

Answer

1. Farlow River	9 th July	<u>Time</u>	<u>Heights</u>	
		HW	HW	LW
Namley Harbour	(UT)	10.54	3.7m	0.7m
difference		- <u>00.36</u>	+ <u>0.5m</u>	+ <u>0.4m</u>
Farlow River	(UT)	10.18	4.2m	1.1m
correction for DST		+ 01.00		
Farlow River	(DST)	11.18		

2. HAT at Farlow River	5.4m
Height of tide at 15.30	- <u>1.7m</u>
Fall of tide from HAT	3.7m
Charted height of bridge	+ <u>14.0m</u>
Height of bridge at 15.30	17.7m
Air draught	- <u>14.5m</u>
Clearance	3.2m

Top Tips

Practical Tips for On-board Use



TOP TIP

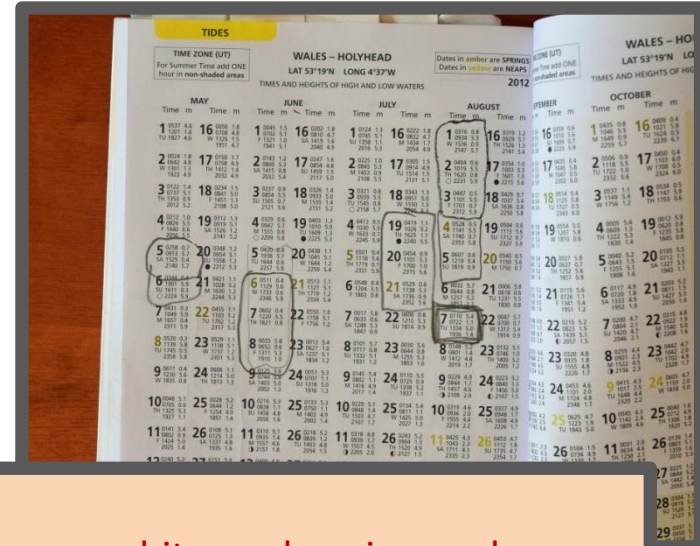
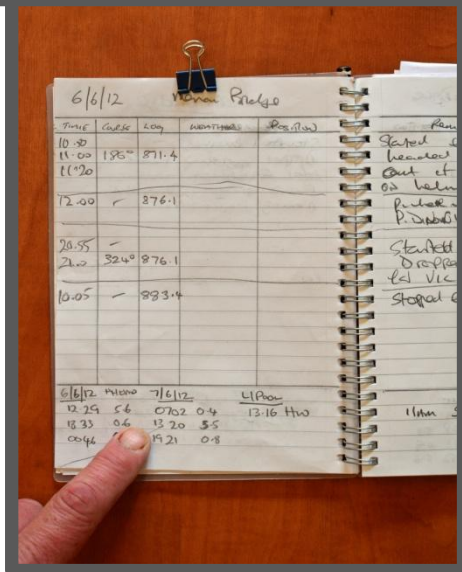
In practical situations you may not have time to use the 'graph paper method' to interpolate tidal differences. With practice and experience you will be able to quickly compute in your head reasonably accurate figures.

If in doubt make sure you give yourself a bigger for margin for error.

Top Tips

TOP TIP

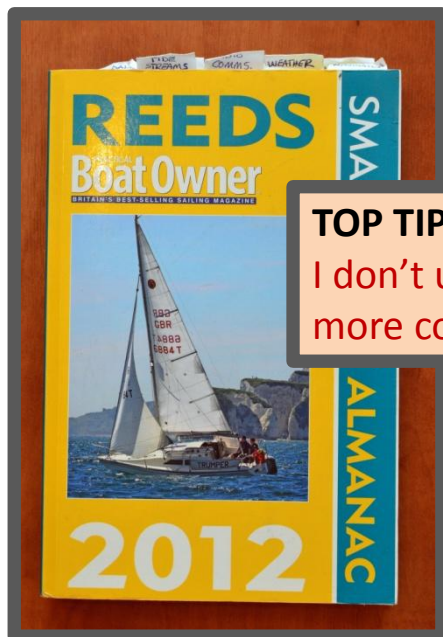
In the real world I write down my tidal information in my **LOGBOOK** on the page that I intend to use during the passage. That way I always have the information to hand when I need to refer to it.



TOP TIP

As almanacs are one hit wonders, ie, you buy a new one each year, I always circle the range of dates I am using. This is so I don't get confused and copy the wrong data and it makes checking much easier and quicker.

Top Tips



TOP TIP

I don't use a full almanac and prefer the **PBO Cruising Almanac**....it's more compact, better value for money and has all the information I need.



TOP TIP

Almanacs have load of pages of similar looking information. To make it easy to find tide times of ports I often use, I make tabs out of stickers. This way I can find the information I need quickly when I need to refer to it.

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Thank you for your honesty.

Further Reading



We highly recommend Tim Bartlett's
RYA Navigation Handbook (G6)

You can buy a copy of this book by visiting our on-line shop

www.penguinsailing.com