

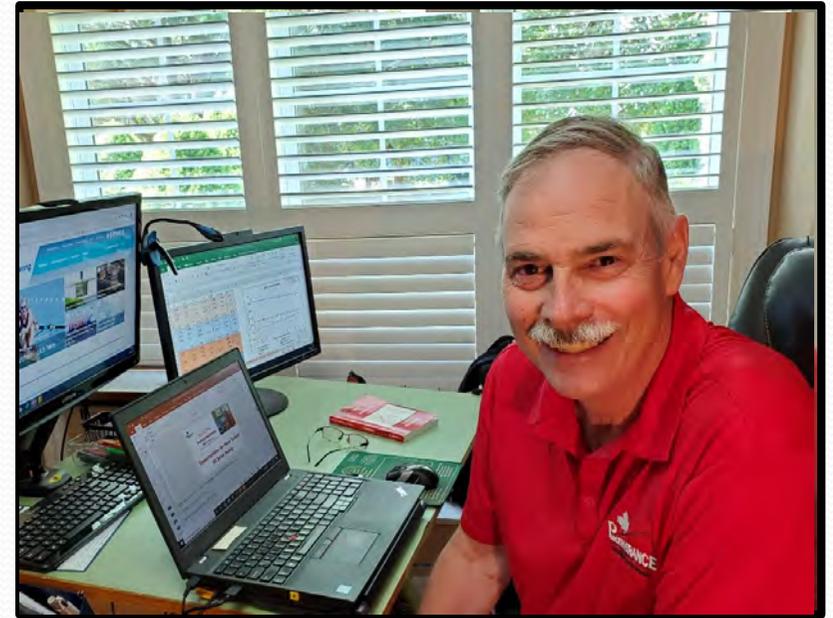


ROWING

Purcerverance

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Master Coach Developer, NCCP Certified



**BOAT SPEED CURVE
DEVELOPMENT**

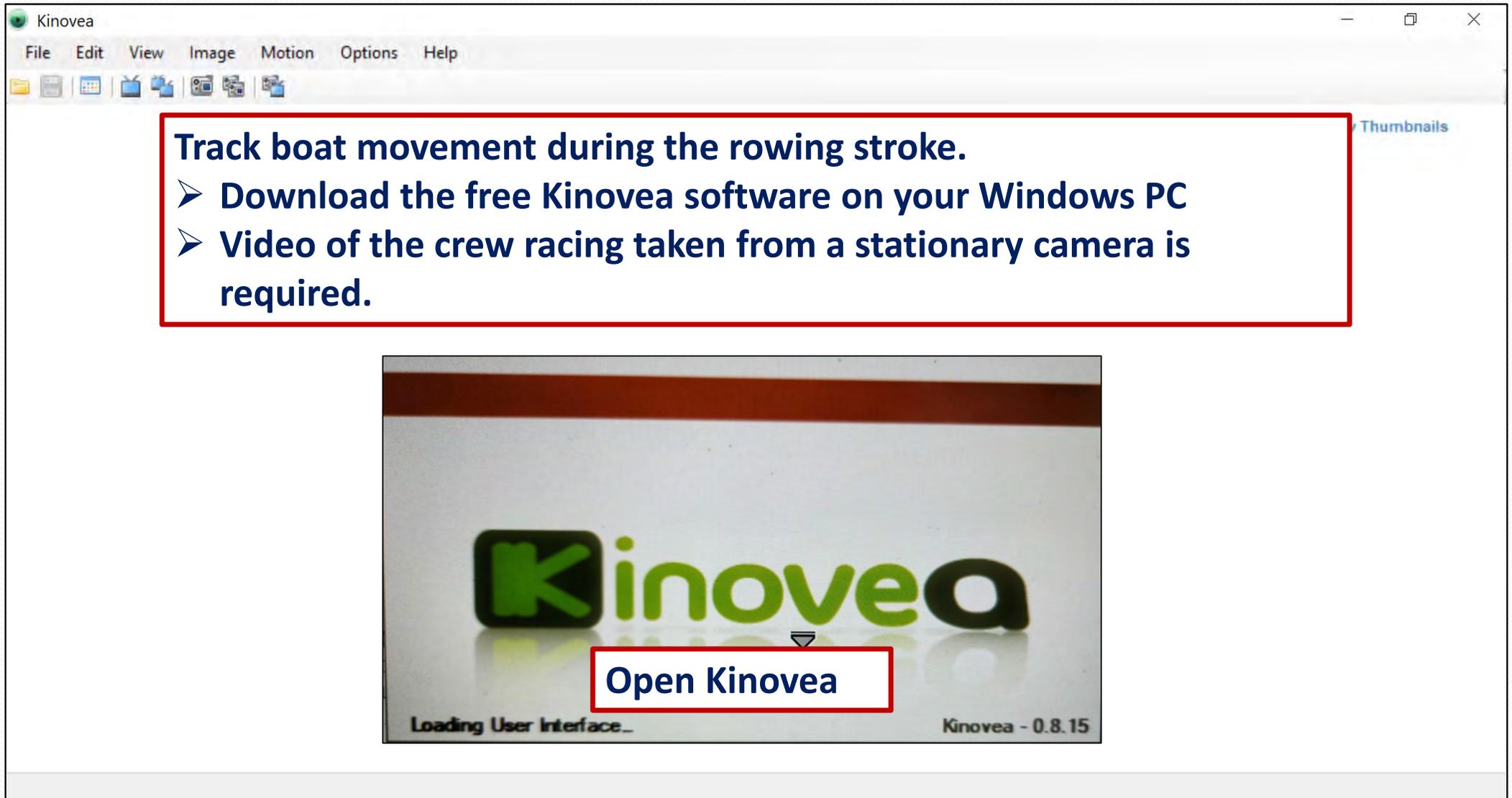
(Step by Step Instructions Using Kinovea)

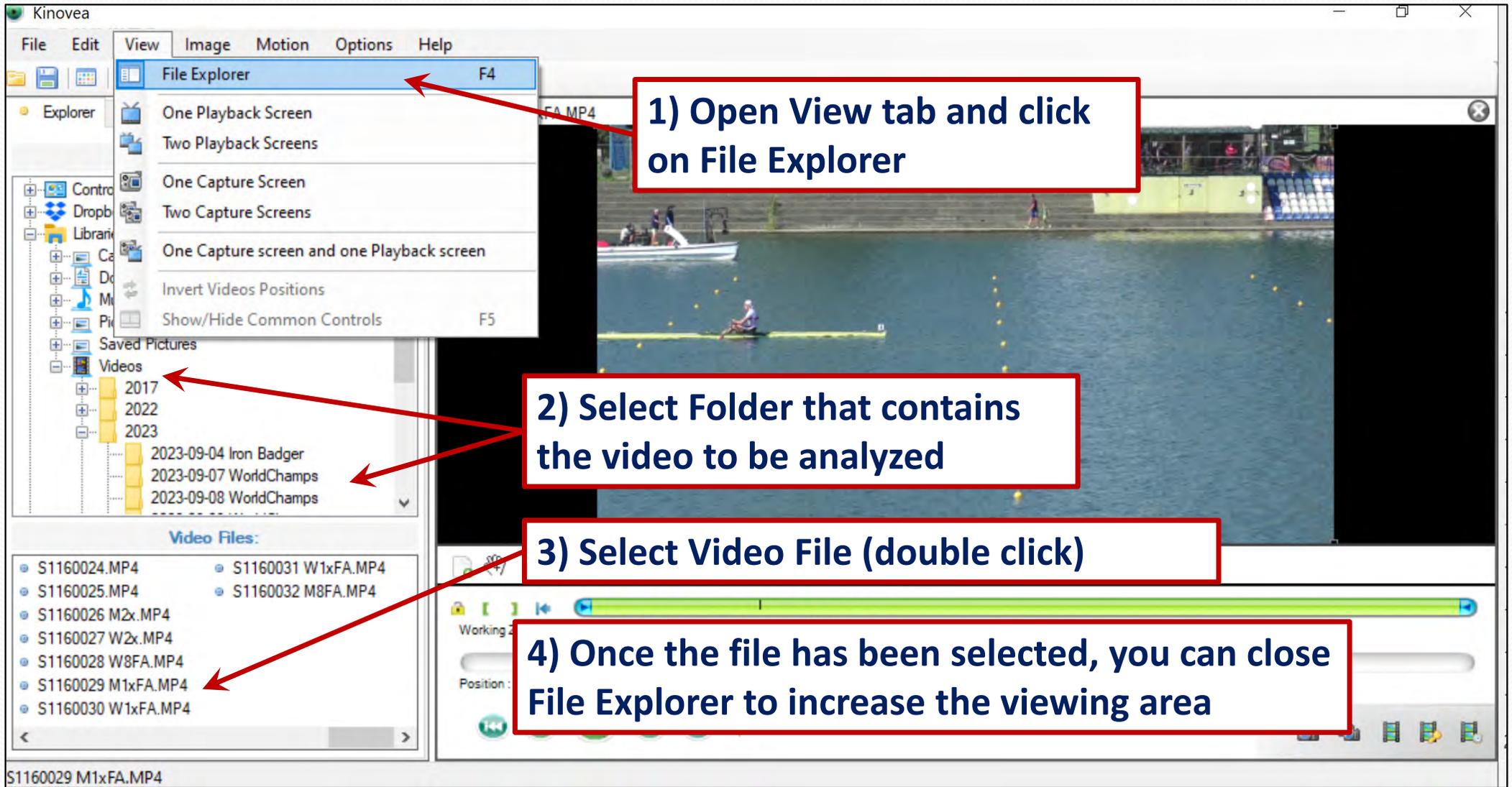
Setting up Kinovea Review

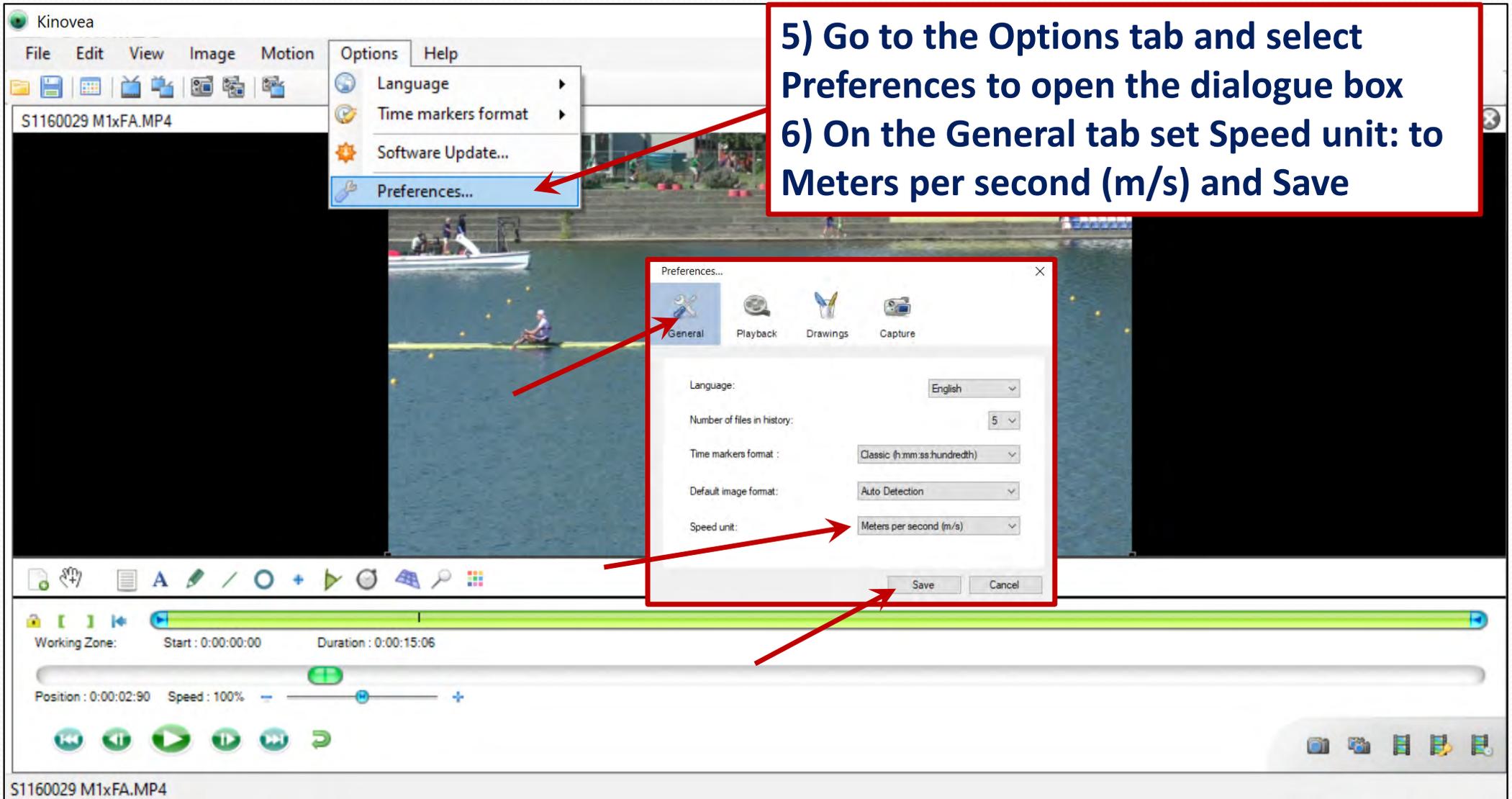
Kinovea is a video software that can be downloaded from the website at <https://www.kinovea.org/>. The following assumes that you have downloaded and are running the Kinovea software.

This is a step-by-step outline of how to use **Kinovea** software and the **Purcerverance Boat Speed Curve Analysis.xlsx** to develop a boat speed curve.

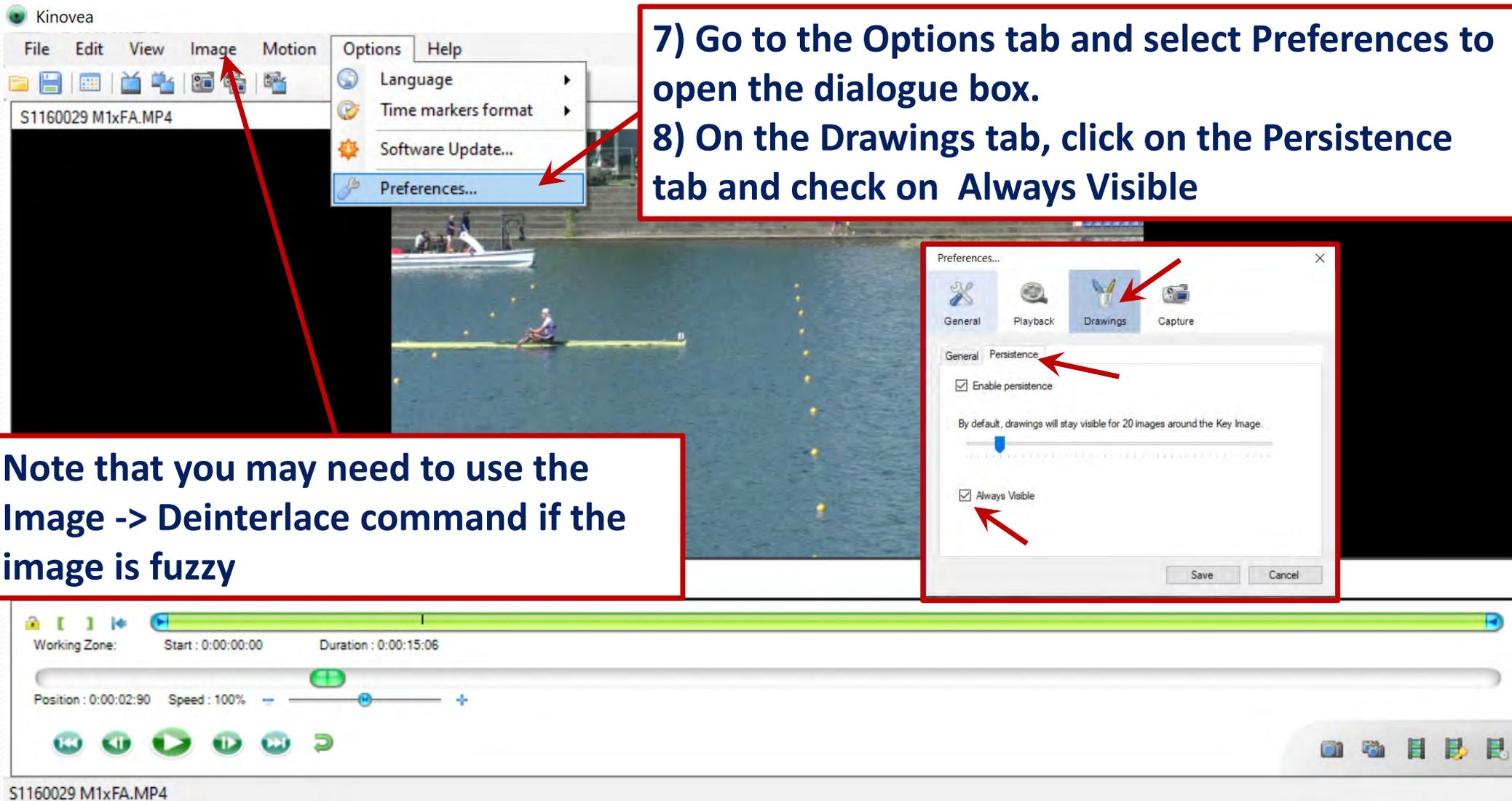
Video of a crew taken as outlined in the **Purcerverance Video Capture Setup** must be saved on your computer.





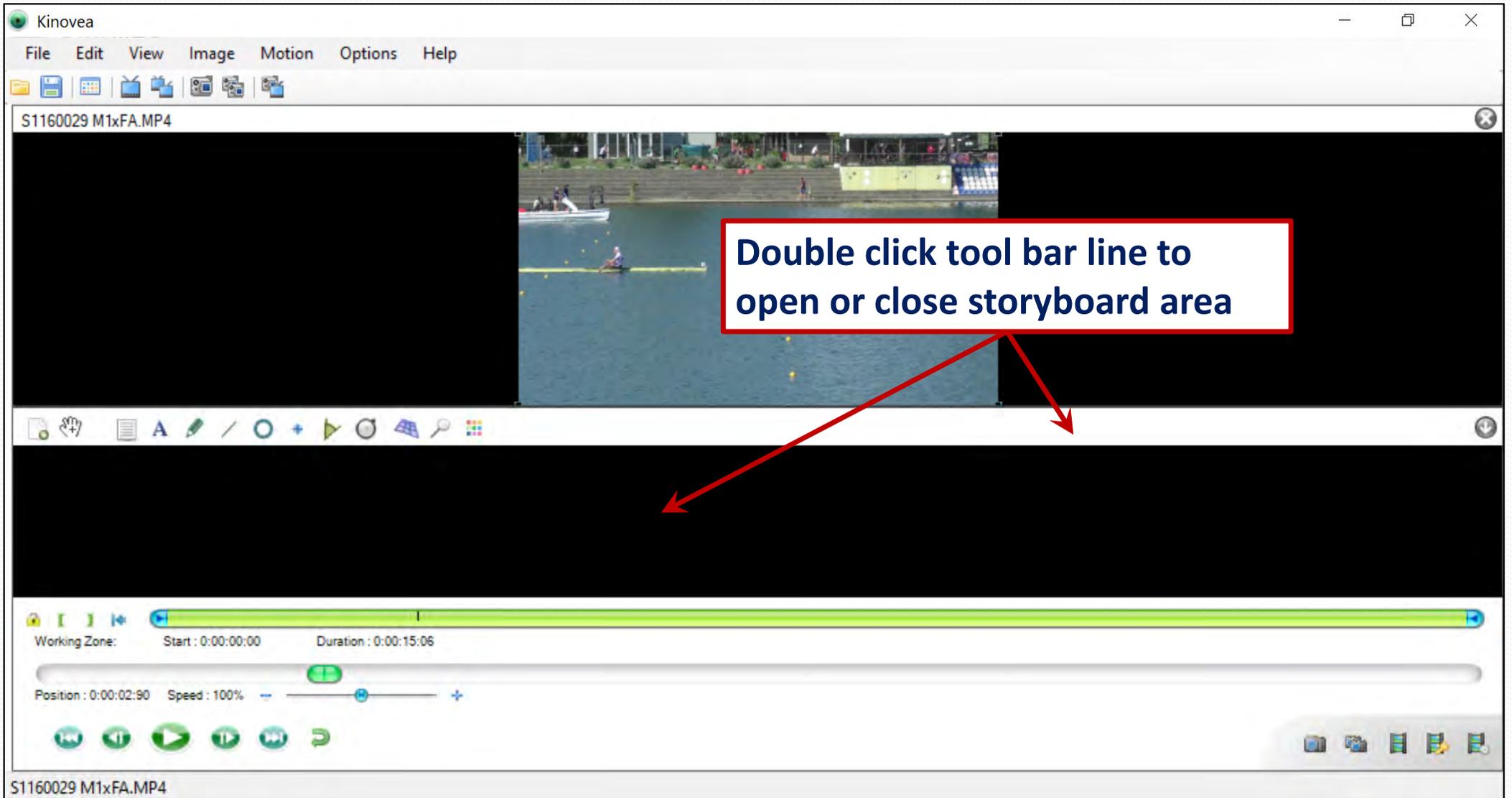


5) Go to the Options tab and select Preferences to open the dialogue box
6) On the General tab set Speed unit: to Meters per second (m/s) and Save



Note that you may need to use the Image -> Deinterlace command if the image is fuzzy

7) Go to the Options tab and select Preferences to open the dialogue box.
8) On the Drawings tab, click on the Persistence tab and check on Always Visible



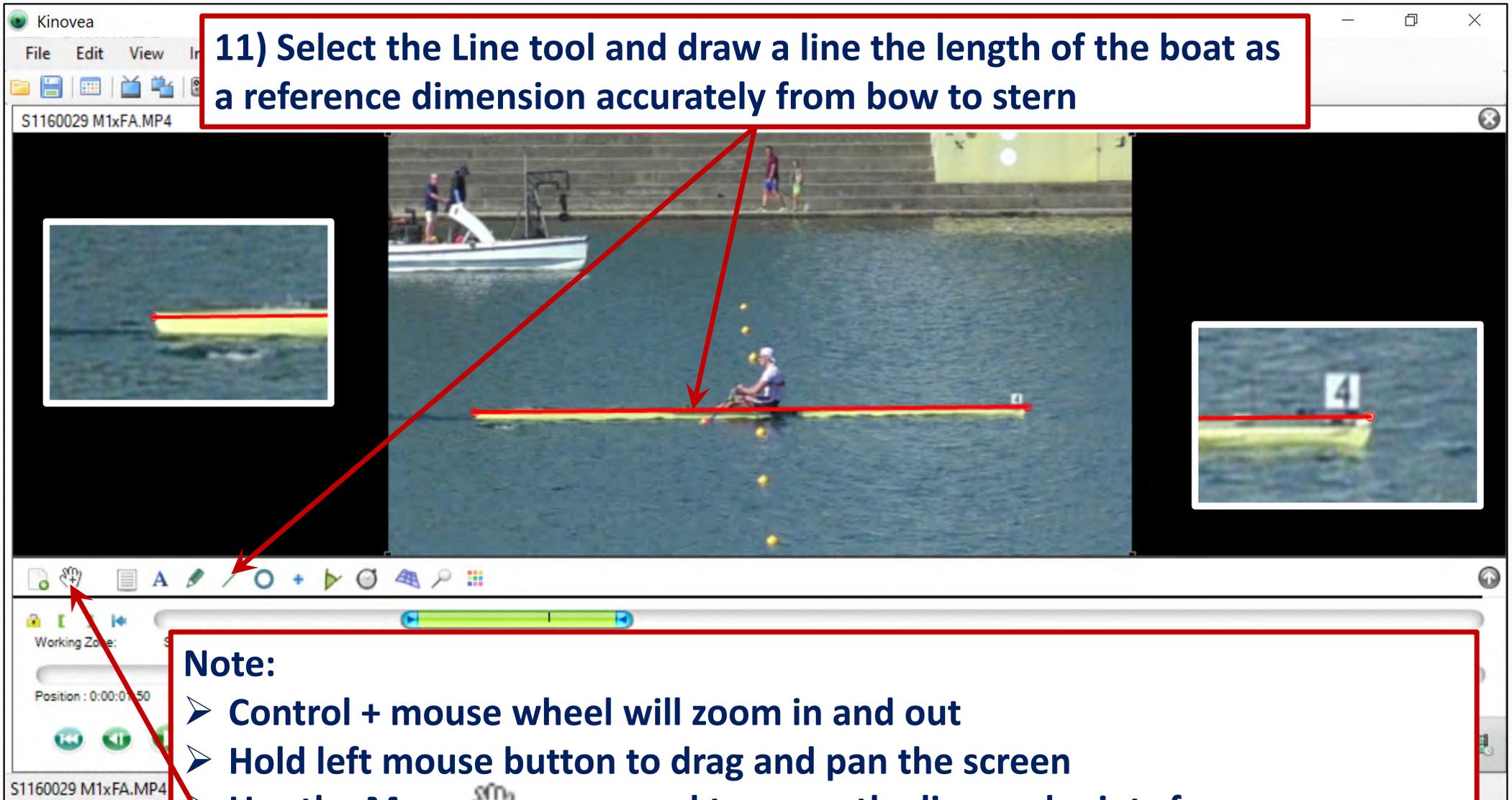
The image shows a screenshot of the Kinovea software interface. The window title is "Kinovea". The menu bar includes "File", "Edit", "View", "Image", "Motion", "Options", and "Help". Below the menu bar is a toolbar with various icons. The main video area displays a video titled "S1160029 M1xFA.MP4". A red-bordered box with white text contains the instruction: "9) Select the stroke to be analyzed and set the cue-in point (when oar is perpendicular on recovery) before the athlete is at full reach and cue-out point after a complete stroke when the oar is perpendicular following entry2". Below this, another red-bordered box with white text contains the instruction: "10) Use frame by frame buttons to forward video". At the bottom of the interface is a control panel with a "Working Zone" section showing "Start : 0:00:02:94" and "Duration : 0:00:02:28". Below that is a "Position : 0:00:01:0" and "Speed : 50%" section with a speed slider. At the bottom are several playback control buttons. Red arrows point from the text boxes to the "Frame by Frame" button and the "Next Frame" button in the control panel. A red-bordered box with white text contains the "Note:" section with two bullet points: "➤ Hold left mouse button down to drag and pan the video on the screen" and "➤ Control + mouse wheel will zoom in and out".

9) Select the stroke to be analyzed and set the cue-in point (when oar is perpendicular on recovery) before the athlete is at full reach and cue-out point after a complete stroke when the oar is perpendicular following entry2

10) Use frame by frame buttons to forward video

Note:

- Hold left mouse button down to drag and pan the video on the screen
- Control + mouse wheel will zoom in and out

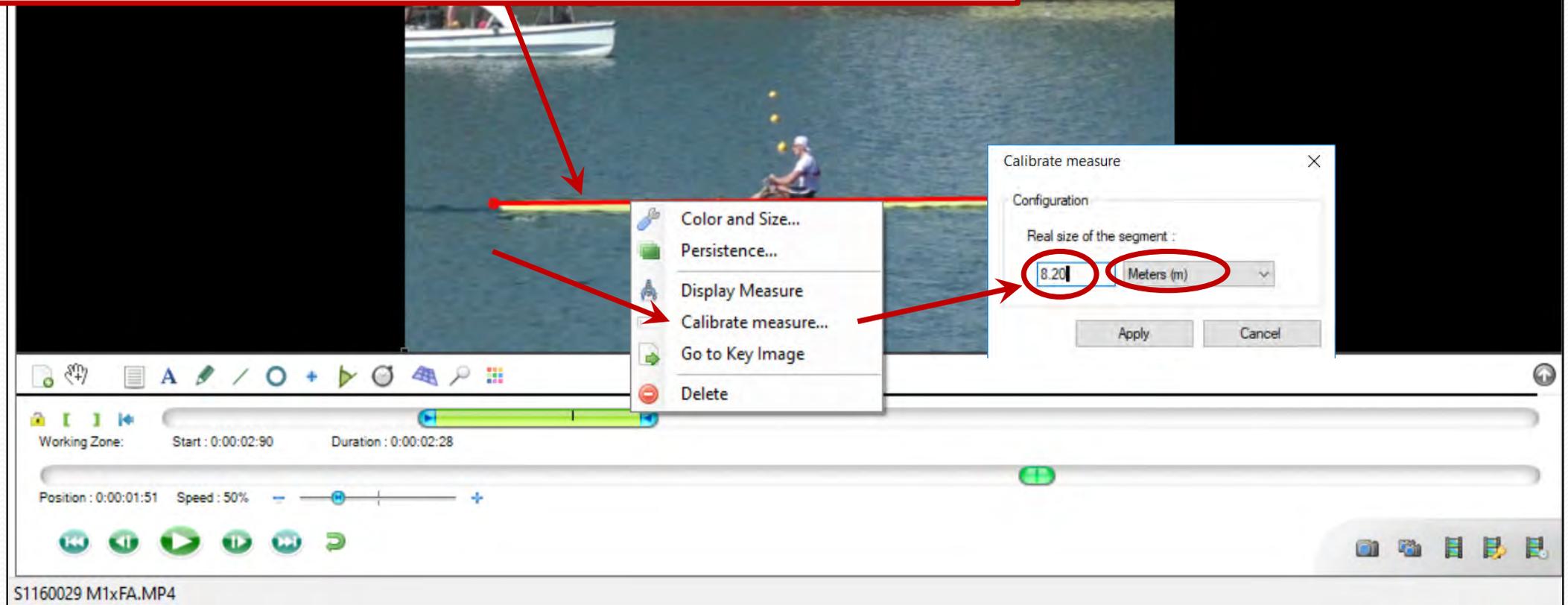


11) Select the Line tool and draw a line the length of the boat as a reference dimension accurately from bow to stern

Note:

- Control + mouse wheel will zoom in and out
- Hold left mouse button to drag and pan the screen
- Use the Move  command to move the line endpoints for accuracy

- 12) Right click on the line and select Calibrate measure...
- 13) Set the Real size of segment distance as the length of the boat (eg. 8.20) and set Meters (m)



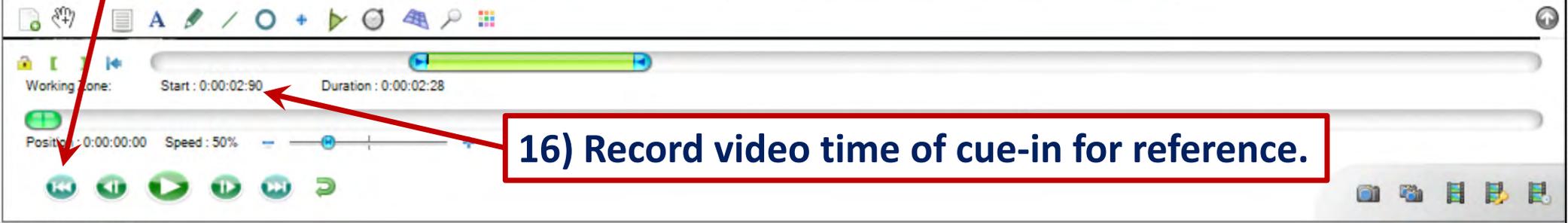
Note: control + mouse wheel will zoom in and out

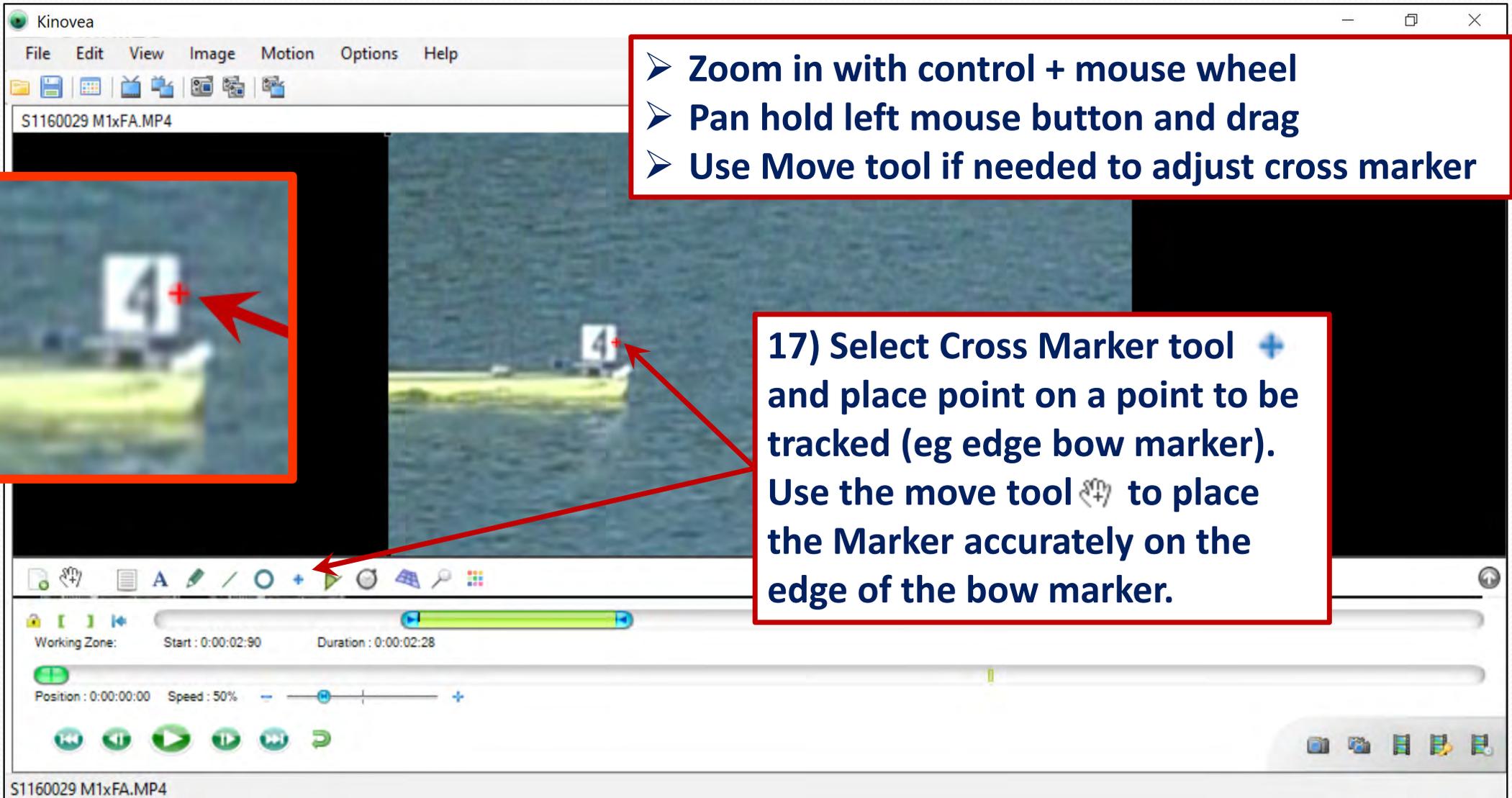
14) Drag line up to have clear view of stroke

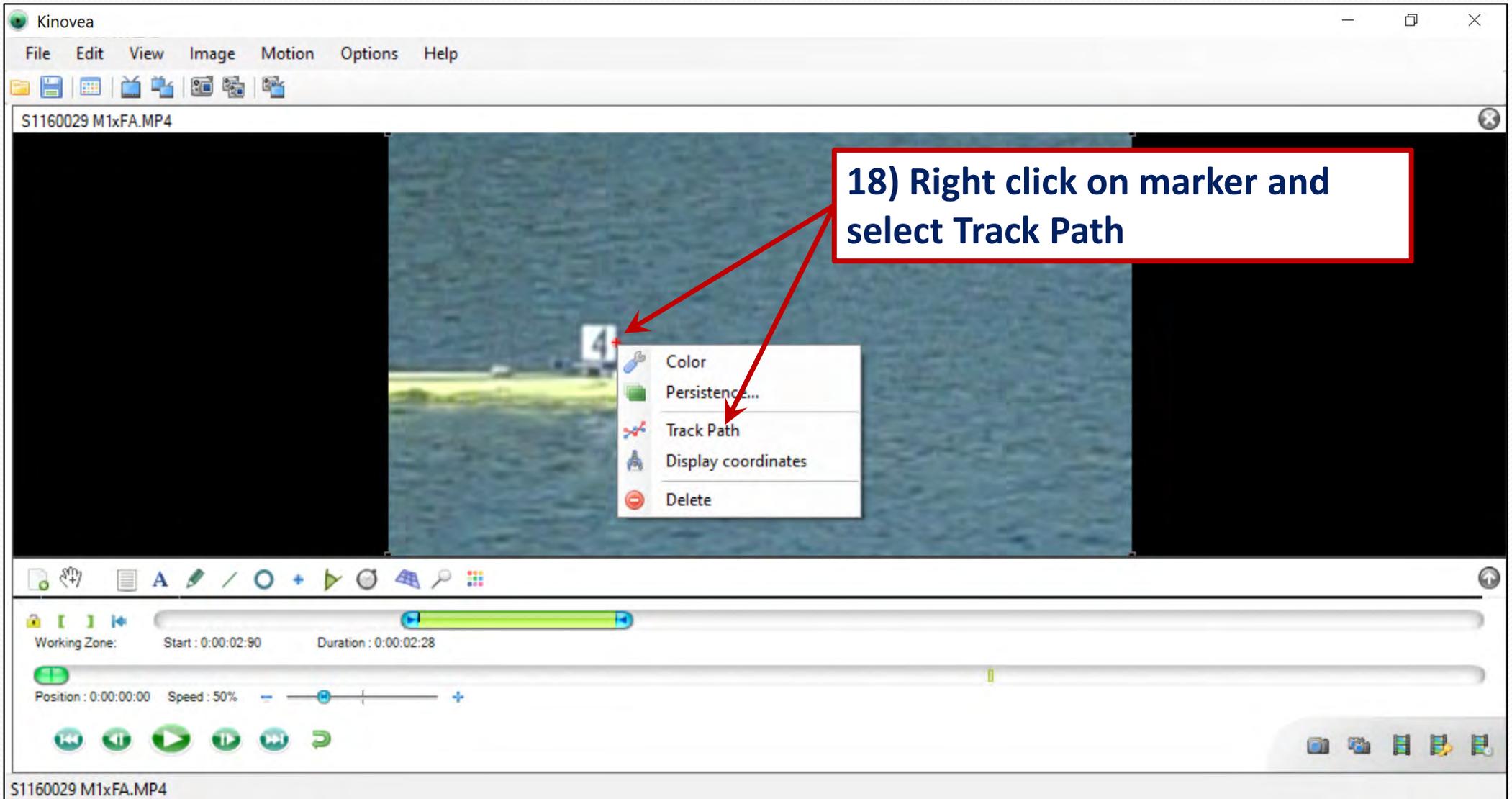


15) Reset the video to cue-in point by clicking back to beginning button

16) Record video time of cue-in for reference.

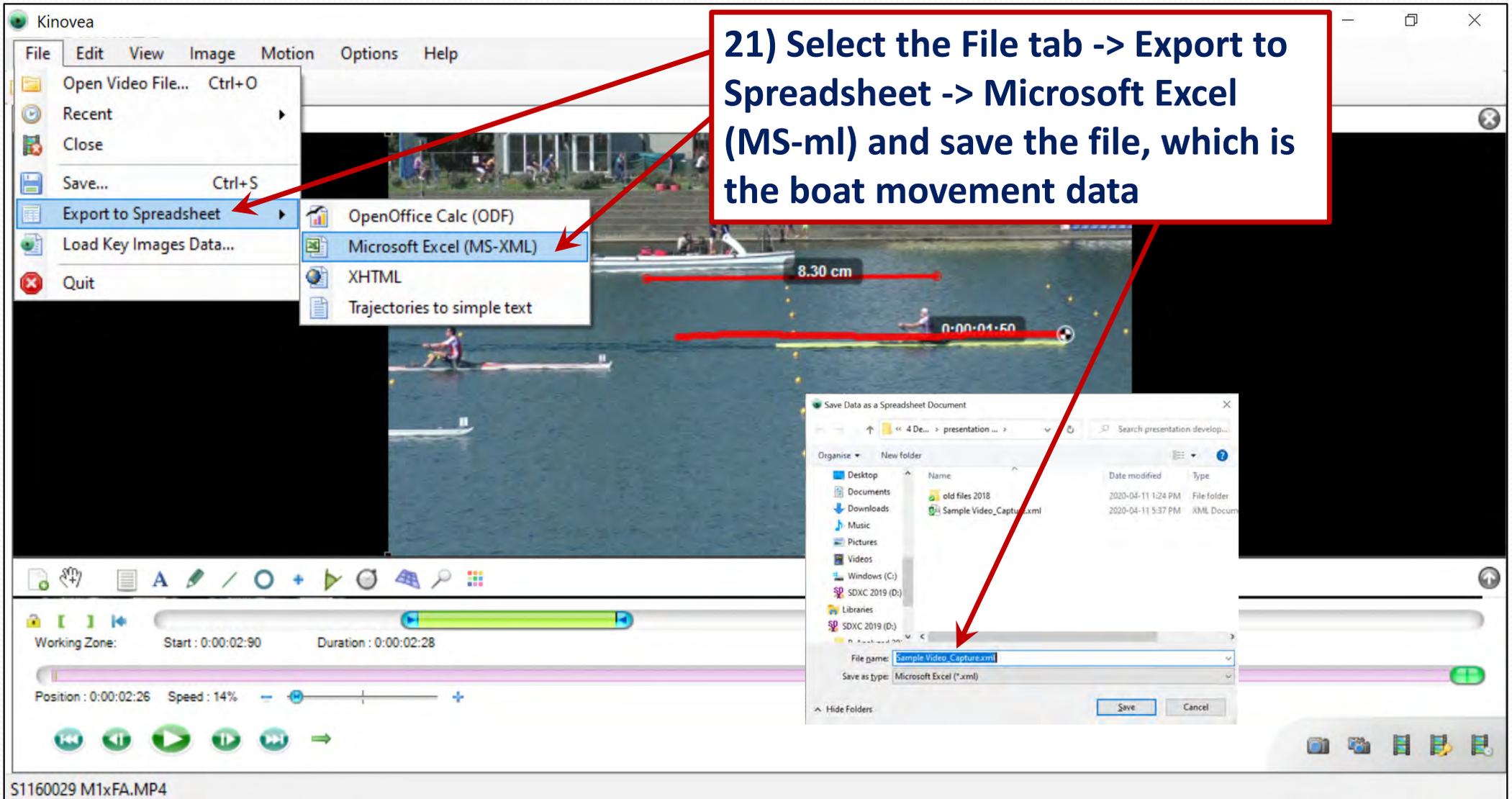






The screenshot shows the Kinovea software interface. The main window displays a video of a boat race on a lake. A red double-headed arrow indicates a distance of 8.30 cm between two points on the water. A red line with a circular marker at the end is drawn over the video, following the path of a boat. The marker is labeled with the time 0:00:01:50. Below the video is a control panel with various icons and a timeline. The timeline shows a working zone from 0:00:02:90 to 0:00:02:28. The current position is 0:00:02:26 and the speed is 14%. A red dashed circle highlights the 'Repeat' icon (a green arrow pointing right) in the control panel. A red box contains the following instructions:

Set Change Repeat Mode to: →
19) Set video Speed to 15%
20) Play video. (the Marker will follow with the boat and show a track line)



Open Excel
22) Open the exported (.xml) file that contains the boat movement data

Key Images		
Title	Time	
0:00:00:00	0:00:02:93	
0:00:01:80	0:00:04:73	

Lines		
Length (m)	Time	Key Image
8.2	0:00:04:73	0:00:01:80

Track		
Label :	Label	
Coords (x,y;m; t:time)		
x	y	t
0	0	0:00:00:00
0.1	0	0:00:00:01
0.19	0.01	0:00:00:03
0.28	0.01	0:00:00:05

x column is the distance the boat moved from the previous frame

y column is vertical distance (not needed)

t column is video frame time

Each row in the spreadsheet represents a frame in the video

Key Image			
Title			
0:00:00:00	0		
0:00:01:80	0:00:04:73		
Lines			
Length (m)	Time	Key Image	
8.2	0:00:04:73	0:00:01:80	
Track			
Label :	Label		
Coords (x,y:m; t:time)			
x	y	t	
0	0	0:00:00:00	
0.1	0	0:00:00:01	
0.19	0.01	0:00:00:03	
0.28	0.01	0:00:00:05	

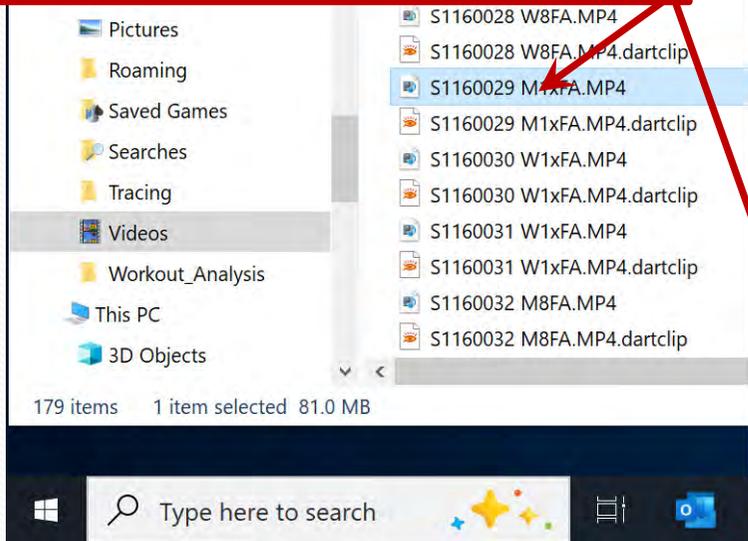
24) Copy the x,y,t, data from the exported.xml file to the new Curve Analysis file.xlsx on the Dist to Speed tab

COPY RAW DATA HERE				FPS			
raw data				display	59.94	speed calculation	
x	y	t		time	time	dist x	speed
0	0	0:00:00:00		0	0.000	0	
0.1	0	0:00:00:01		0.01	0.0167	0.1	5.99
0.18	0	0:00:00:03		0.03	0.033	0.18	4.80
0.28	0	0:00:00:05		0.05	0.050	0.28	5.99
0.37	0.01	0:00:00:06		0.06	0.067	0.37	5.39
0.47	0.01	0:00:00:08		0.08	0.083	0.47	5.99
0.55	0.01	0:00:00:10		0.10	0.100	0.55	4.80
0.65	0.01	0:00:00:11		0.11	0.117	0.65	5.99
0.75	0.01	0:00:00:13		0.13	0.133	0.75	5.99
0.85	0.01	0:00:00:15		0.15	0.150	0.85	5.99
0.93	0.03	0:00:00:16		0.16	0.167	0.93	4.80
1.03	0.03	0:00:00:18		0.18	0.184	1.03	5.99
1.12	0.03	0:00:00:20		0.20	0.200	1.12	5.39
1.21	0.03	0:00:00:21		0.21	0.217	1.21	5.39
1.3	0.03	0:00:00:23		0.23	0.234	1.3	5.39
1.39	0.04	0:00:00:25		0.25	0.250	1.39	5.39
1.47	0.04	0:00:00:26		0.26	0.267	1.47	4.80

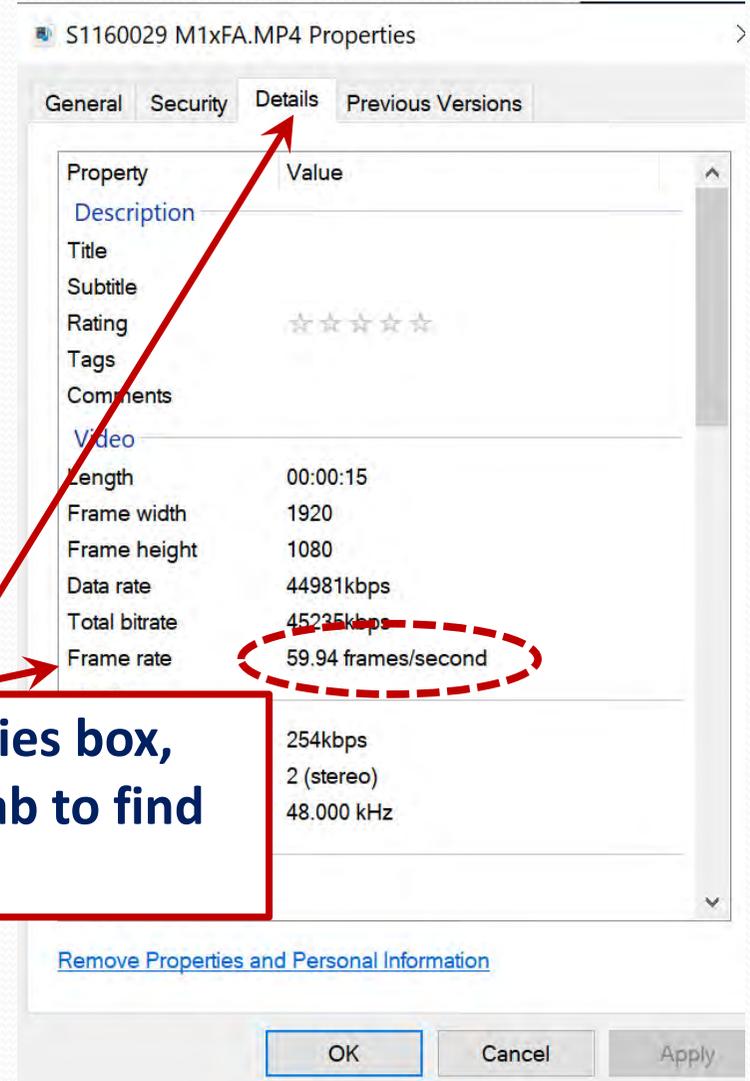
Dist to Speed

25) Using a file manager, locate the video file and find the frames per second

26) Right click on video file and select properties



27) In the properties box, click the Details tab to find the Frame rate



28) In the Curve Analysis Sheet.xlsx file, input the video frames per second value

COPY RAW DATA HERE			FPS		speed calculation		copy data to Speed Profile Paste VALUE only					
x	y	t	time	time	dist x	speed	display	time	dist	speed	accel.	display
0	0	0:00:00:00	0	0.000	0	5.99						
0.1	0	0:00:00:01	0.01	0.0167	0.1	5.99						
0.18	0	0:00:00:03	0.03	0.033	0.18	4.80						
0.28	0	0:00:00:05	0.05	0.050	0.28	5.99						
0.37	0.01	0:00:00:06	0.06	0.067	0.37	5.39						
0.47	0.01	0:00:00:08	0.08	0.083	0.47	5.99						
0.55	0.01	0:00:00:10	0.10	0.100	0.55	4.80						
0.65	0.01	0:00:00:11	0.11	0.117	0.65	5.99						
0.75	0.01	0:00:00:13	0.13	0.133	0.75	5.99						
0.85	0.01	0:00:00:15	0.15	0.150	0.85	5.99	0.150	0.150	0.093	5.60		0.15
0.93	0.03	0:00:00:16	0.16	0.167	0.93	4.80	0.160	0.167	0.186	5.56		0.16
1.03	0.03	0:00:00:18	0.18	0.184	1.03	5.99	0.180	0.184	0.278	5.52	-2.366	0.18
1.12	0.03	0:00:00:20	0.20	0.200	1.12	5.39	0.200	0.200	0.370	5.48	-2.800	0.20
1.21	0.03	0:00:00:21	0.21	0.217	1.21	5.39	0.210	0.217	0.460	5.42	-3.160	0.21
1.3	0.03	0:00:00:23	0.23	0.234	1.3	5.39	0.230	0.234	0.550	5.37	-3.475	0.23
1.39	0.04	0:00:00:25	0.25	0.250	1.39	5.39	0.250	0.250	0.638	5.30	-3.807	0.25
1.47	0.04	0:00:00:26	0.26	0.267	1.47	4.80	0.260	0.267	0.726	5.23	-4.288	0.26
1.57	0.04	0:00:00:28	0.28	0.284	1.57	5.99	0.280	0.284	0.812	5.15	-4.981	0.28
1.65	0.04	0:00:00:30	0.30	0.300	1.65	4.80	0.300	0.300	0.896	5.05	-5.775	0.30
1.73	0.04	0:00:00:31	0.31	0.317	1.73	4.80	0.310	0.317	0.978	4.95	-6.515	0.31

The Dist to Speed sheet converts boat movement to boat speed and provides a smoothing factor to the data

29) Copy data from the Dist to Speed sheet to the Input sheet using the Paste Special command to transfer data values only.

raw data	time	speed
0	0.0000	0
0.1	0.000001	5.39
0.18	0.000003	4.80
0.28	0.000005	5.39
0.37	0.000006	5.39
0.47	0.000008	5.39
0.55	0.000010	4.80
0.65	0.000011	5.39
0.75	0.000013	5.39
0.85	0.000015	5.39
0.93	0.000016	4.80
1.03	0.000018	5.39
1.12	0.000020	5.39
1.21	0.000021	5.39
1.3	0.000023	5.39
1.39	0.000025	5.39
1.47	0.000026	4.80
1.57	0.000028	5.39
1.65	0.000030	4.80
1.73	0.000031	4.80
1.82	0.000033	5.39
1.89	0.000035	4.20
1.97	0.000038	4.20
2.04	0.000038	4.20
2.11	0.000040	4.20
2.19	0.000041	4.80
2.25	0.000043	4.20
2.32	0.000045	4.20
2.37	0.000046	4.20
2.44	0.000048	4.20
2.5	0.000050	3.60
2.55	0.000051	3.60
2.61	0.000053	3.60
2.66	0.000055	3.00
2.7	0.000056	2.40
2.76	0.000058	3.60
2.82	0.000060	3.60
2.87	0.000061	3.60
2.93	0.000063	3.60
2.98	0.000065	4.20
3.05	0.000068	4.20

display	time	dist	speed	accel	display
0.30	0.300	0.930	3.059	-5.175	0.30
0.31	0.317	0.978	4.945	-6.515	0.31
0.33	0.334	1.059	4.826	-7.125	0.33
0.35	0.350	1.137	4.698	-7.536	0.35
0.36	0.367	1.213	4.565	-7.910	0.36
0.38	0.384	1.287	4.430	-8.039	0.38
0.40	0.400	1.359	4.296	-8.058	0.40
0.41	0.417	1.428	4.162	-8.067	0.41
0.43	0.434	1.496	4.026	-8.095	0.43
0.45	0.450	1.561	3.891	-8.076	0.45
0.46	0.467	1.623	3.757	-7.919	0.46
0.48	0.484	1.684	3.630	-7.568	0.48
0.50	0.501	1.742	3.512	-6.949	0.50
0.51	0.517	1.799	3.410	-5.997	0.51
0.53	0.534	1.855	3.300	-4.685	0.53
0.55	0.551	1.909	3.277	-3.059	0.55
0.56	0.567	1.964	3.256	-1.284	0.56
0.58	0.584	2.018	3.265	0.351	0.58
0.60	0.601	2.073	3.295	1.562	0.60
0.61	0.617	2.123	3.335	2.236	0.61
0.63	0.634	2.185	3.377	2.458	0.63
0.65	0.651	2.242	3.418	2.366	0.65
0.66	0.667	2.300	3.453	2.079	0.66
0.68	0.684	2.358	3.481	1.783	0.68
0.70	0.701	2.416	3.507	1.631	0.70
0.71	0.717	2.475	3.538	1.904	0.71
0.73	0.734	2.535	3.577	2.310	0.73
0.75	0.751	2.596	3.623	2.708	0.75
0.76	0.767	2.657	3.673	2.976	0.76
0.78	0.784	2.719	3.725	3.096	0.78
0.80	0.801	2.782	3.778	3.114	0.80
0.81	0.817	2.846	3.829	3.068	0.81
0.83	0.834	2.911	3.879	2.976	0.83
0.85	0.851	2.976	3.927	2.846	0.85
0.86	0.868	3.042	3.971	2.708	0.86
0.88	0.884	3.109	4.015	2.615	0.88
0.90	0.901	3.177	4.058	2.537	0.90
0.91	0.918	3.245	4.101	2.643	0.91
0.93	0.934	3.315	4.147	2.772	0.93
0.95	0.951	3.385	4.196	3.031	0.95
0.96	0.968	3.456	4.253	3.410	0.96
0.98	0.984	3.528	4.317	3.789	0.98
1.00	1.001	3.601	4.386	4.020	1.00

The Dist to Speed sheet converts boat movement to speed and provides a smoothing factor to the data,

	A	B	C	D	E	F
1	display	time	dist	speed	accel.	display
2	0.30	0.300	0.896	5.055	-5.775	0.30
3	0.31	0.317	0.978	4.945	-6.515	0.31
4	0.33	0.334	1.059	4.826	-7.125	0.33
5	0.35	0.350	1.137	4.698	-7.596	0.35
6	0.36	0.367	1.213	4.565	-7.910	0.36
7	0.38	0.384	1.287	4.430	-8.039	0.38
8	0.40	0.400	1.359	4.296	-8.058	0.40
9	0.41	0.417	1.428	4.162	-8.067	0.41
10	0.43	0.434	1.496	4.026	-8.095	0.43
11	0.45	0.450	1.561	3.891	-8.076	0.45
12	0.46	0.467	1.623	3.757	-7.919	0.46
13	0.48	0.484	1.684	3.630	-7.568	0.48
14	0.50	0.501	1.742	3.512	-6.949	0.50
15	0.51	0.517	1.799	3.410	-5.997	0.51
16	0.53	0.534	1.855	3.330	-4.685	0.53
17	0.55	0.551	1.909	3.277	-3.059	0.55
18	0.56	0.567	1.964	3.256	-1.284	0.56
19	0.58	0.584	2.018	3.265	0.351	0.58
20	0.60	0.601	2.073	3.295	1.562	0.60
21	0.61	0.617	2.129	3.335	2.236	0.61
22	0.63	0.634	2.185	3.377	2.458	0.63

Video Description	
W4-	Boat Class
U23W4-	Race Category
RCA	Crew Name
S1380016.MP4	Video Name
Henley Course 180	Video Location
Analysis	Video Description
8:00	Video Time
2025-06-05	Video Date
1ST	Race finish Position
06:35.36	Race Finish Time
2000	Race distance
19	Air Temperature
cloudy wind 1.9m/s	Weather Conditions
slight 5-9cm	Water
13.19	Boat Length (m)

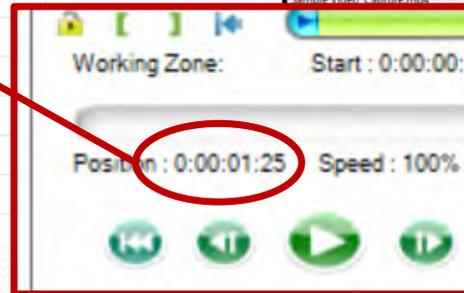
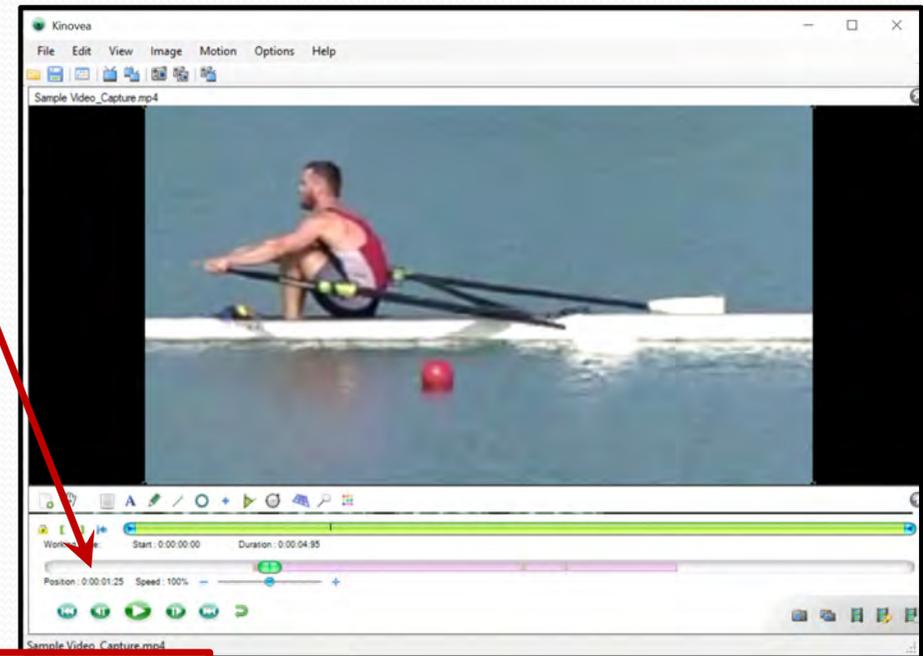
Key Position	
0.38	full reach
0.58	blade full bury
0.93	perpendicular
1.18	extraction
1.28	feather

30) Complete the Video Description information on the input sheet to provide details of the crew and video time, date and conditions.

Next complete the stroke Key Positions information (see following slides)

Open the video in Kinovea and the analysis spreadsheet together. Using Kinovea, identify the frame time for each stroke position.

	F	G	H	I	J
15	0.51		slight 5-9cm	Water	
16	0.53		13.19	Boat Length (m)	
17	0.55			Key Position	
18	0.56		0.38	full reach	
19	0.58		0.58	blade full bury	
20	0.60		0.93	perpendicular	
21	0.61		1.18	extraction	
22	0.63		1.28	feather	
23	0.65		2.16	full reach	
24	0.66		2.33	blade full bury 2	
25	0.68		0.08	Blade Slip seat 1 (m)	
26	0.70			seat 3	
27	0.71			seat 5	
28	0.73			seat 7	
29	0.75		0.08	Blade slip	
30	0.76				



Use frame-by-frame movement to find key position frame

31) Move video forward frame-by-frame and identify athlete at full reach

13.19	Boat Length (m)
	Key Position
0.38	full reach
0.58	blade full bury
0.93	perpendicular
1.18	extraction
1.28	feather
2.16	full reach
2.33	blade full bury 2
0.08	Blade Slip seat 1 (m)
	seat 3
	seat 5
	seat 7
0.08	Blade slip

32) Record Full reach frame time on the Input sheet in the spreadsheet



33) Move video forward frame-by-frame and identify athlete at entry (blade buried)

13.19	Boat Length (m)
	Key Position
0.38	full reach
0.58	blade full bury
0.93	perpendicular
1.18	extraction
1.28	feather
2.16	full reach
2.33	blade full bury 2
0.08	Blade Slip seat 1 (m)
	seat 3
	seat 5
	seat 7
0.08	Blade slip

34) Record the blade entry frame time on the Input sheet in the spreadsheet

The image shows a screenshot of the Kinovea software interface. On the left, a spreadsheet lists key positions and blade slip data. The main window displays a video of a rower in a red tank top and blue shorts on a boat. The video player at the bottom shows the current position at 0:00:01:33 and speed at 100%. Red arrows point from the spreadsheet to the video player, indicating the process of identifying the athlete at entry and recording the blade entry frame time.

35) Move video forward frame-by-frame to oars perpendicular to boat

13.19	Boat Length (m)
	Key Position
0.38	full reach
0.58	blade full bury
0.93	perpendicular
1.18	extraction
1.28	feather
2.16	full reach
2.33	blade full bury 2
0.08	Blade Slip seat 1 (m)
	seat 3
	seat 5
	seat 7
0.08	Blade slip

36) Record oar perpendicular frame time on the Input sheet in the spreadsheet

The screenshot displays the Kinovea software interface. On the right, a video player shows a side-view shot of a male rower in a red and white tank top and black shorts, captured mid-stroke on a body of water. The video title is 'Sample Video_Capture.mp4'. On the left, a spreadsheet overlay is visible, listing key positions and their corresponding frame times. A red arrow points from the '0.93' time point in the spreadsheet to the video frame where the oars are perpendicular to the boat. Another red arrow points from the '0.08' time point to the video's playback controls, which show the current position at 0:00:01:78. The software's toolbar includes various editing and playback tools, and the bottom status bar shows the file name 'Sample Video_Capture.mp4'.

37) Move video forward frame-by-frame to blade extraction

13.19	Boat Length (m)
	Key Position
0.38	full reach
0.58	blade full bury
0.93	perpendicular
1.18	extraction
1.28	feather
2.16	full reach
2.33	blade full bury 2
0.08	Blade Slip seat 1 (m)
	seat 3
	seat 5
	seat 7
0.08	Blade slip

The screenshot shows the Kinovea software interface. The main window displays a video of a rower in a boat on water. The video player controls at the bottom show the current position at 0:00:01:98 and a speed of 100%. A red box highlights the video player's position indicator, with an arrow pointing to the spreadsheet table. The spreadsheet table lists key positions and their corresponding times. A red box also highlights the 'blade extraction' step in the table, with an arrow pointing to the video player's position indicator.

38) Record extraction frame time on the Input sheet in the spreadsheet

39) Move video forward frame-by-frame to blades feathered

13.19	Boat Length (m)
	Key Position
0.38	full reach
0.58	blade full bury
0.93	perpendicular
1.18	extraction
1.28	feather
2.16	full reach
2.33	blade full bury 2
0.08	Blade Slip seat 1 (m)
	seat 3
	seat 5
	seat 7
0.08	Blade slip



40) Record blade feather frame time on the Input sheet in the spreadsheet

41) Move video forward frame-by-frame to full reach2

13.19	Boat Length (m)
	Key Position
0.38	full reach
0.58	blade full bury
0.93	perpendicular
1.18	extraction
1.28	feather
2.16	full reach
2.33	blade full bury 2
0.08	Blade Slip seat 1 (m)
	seat 3
	seat 5
	seat 7
0.08	Blade slip

42) Record full reach2
frame time on the Input
sheet in the spreadsheet

The image shows a screenshot of the Kinovea software interface. The main window displays a video of a rower in a boat on water. A spreadsheet overlay is visible on the left side of the video, listing key positions and their corresponding frame times. A red arrow points from the 'full reach2' entry in the spreadsheet to the video player's playback controls. The playback controls show the video is at position 0:00:02:90 with a speed of 100%. The video file name 'Sample Video_Capture.mp4' is visible at the bottom of the window.

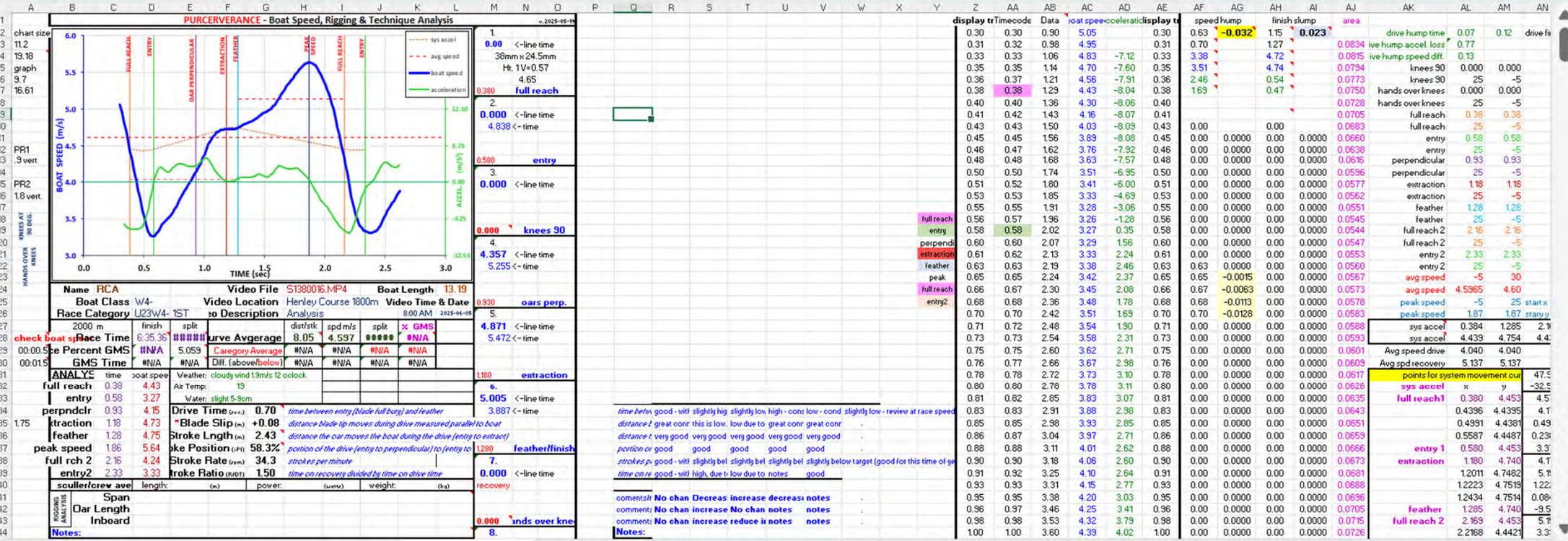
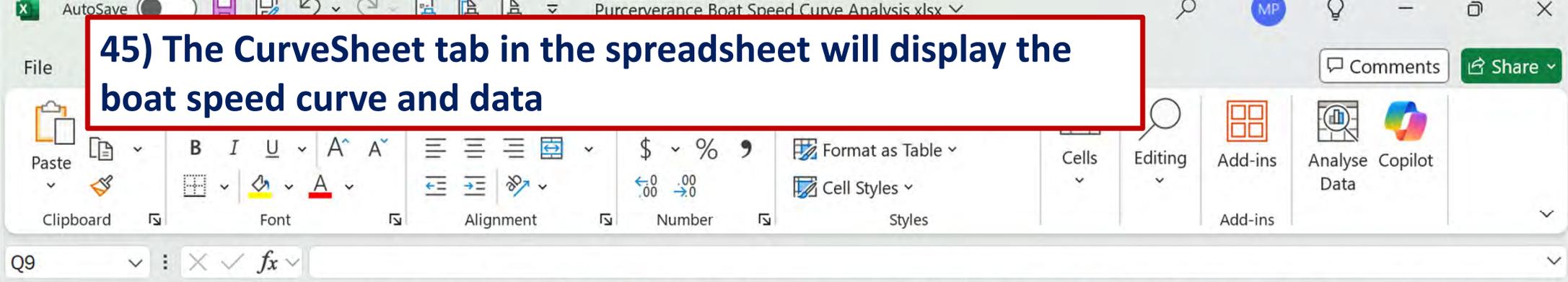
43) Move video forward frame-by-frame to entry2

13.19	Boat Length (m)
	Key Position
0.38	full reach
0.58	blade full bury
0.93	perpendicular
1.18	extraction
1.28	feather
2.16	full reach
2.33	blade full bury 2
0.08	Blade Slip seat 1 (m)
	seat 3
	seat 5
	seat 7
0.08	Blade slip

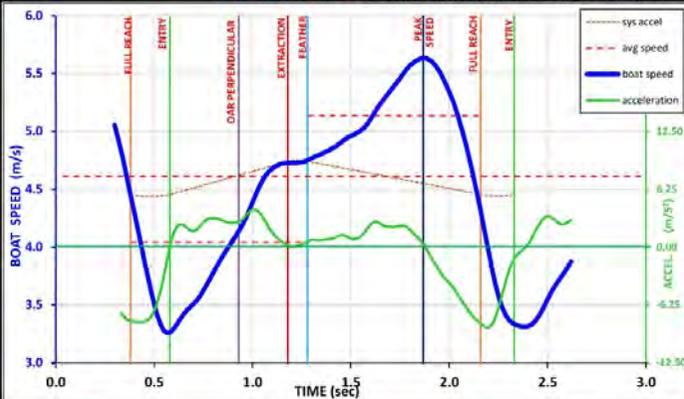
**44) Record blade entry2
frame time on the Input
sheet in the spreadsheet**

The image shows a screenshot of the Kinovea software interface. The main window displays a video of a rower in a boat on water. The video title is 'Sample Video_Capture.mp4'. The software's control bar at the bottom shows the 'Position' as 0:00:03:01 and 'Speed' as 100%. A red box highlights the 'Position' field, with a red arrow pointing to the '0.08' value in the spreadsheet table. Another red arrow points from the '0.08' value in the spreadsheet to the 'Position' field in the software. The spreadsheet table is overlaid on the left side of the video.

45) The CurveSheet tab in the spreadsheet will display the boat speed curve and data

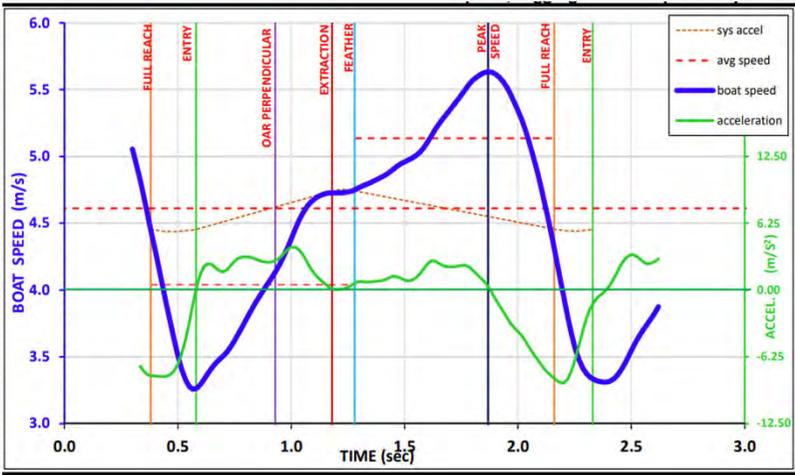


PURCERVERANCE - Boat Speed, Rigging & Technique Analysis



1.	0.00	<-line time
	38mm x 24.5mm	
	Ht: 1 V=0.57	
	4.65	
0.380	full reach	
2.	0.000	<-line time
	4.838	<- time
0.580	entry	
3.	0.000	<-line time
0.000	knees 90	
4.	4.357	<-line time
	5.255	<- time
0.930	oars perp.	
5.	4.871	<-line time
	5.472	<- time
1.180	extraction	
6.	5.005	<-line time
	3.887	<- time
7.	0.000	<-line time
	recovery	
8.	0.000	<-line time
	6.389	<- time
1.860	peak speed	
9.	5.789	<-time
	6.389	<- time
2.160	full reach2	
10.	6.056	<-time
	6.639	<- time
2.330	entry 2	

48) Print the sheet to review data



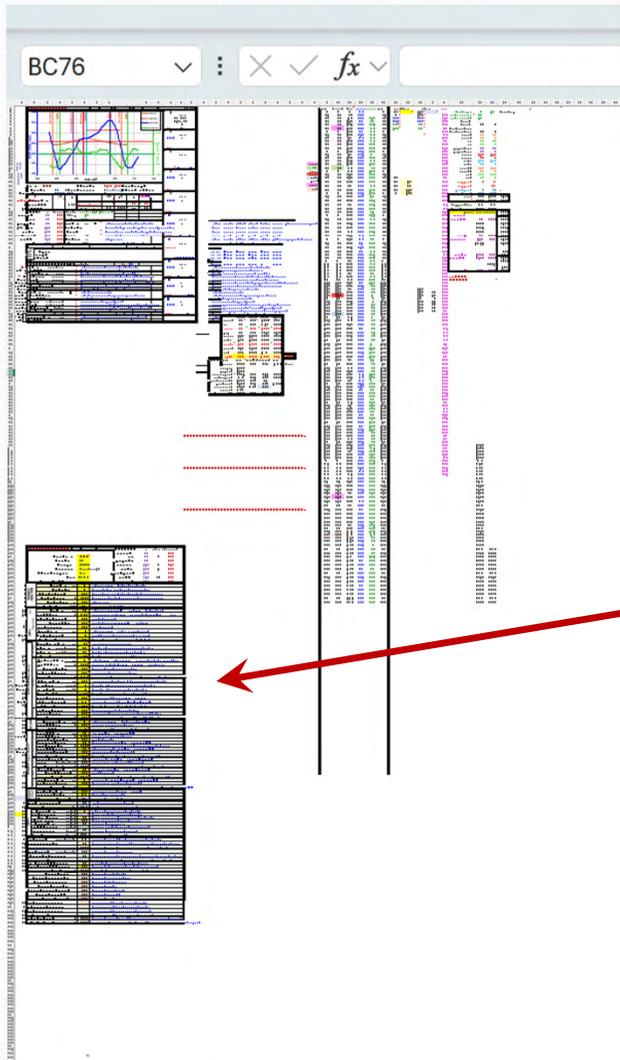
Name	RCA	Video File	S1380016.MP4	Boat Length	13.19		
Boat Class	W4-	Video Location	Henley Course 1800m	Video Time & Date	8:00 AM 2025-06-05		
Race Category	U23W4-	1ST	Video Description	Analysis			
2000 m	finish	split	dist/stk	spd m/s	split	% GMS	
speed	Race Time	6:35.36	1:38.84	8.05	4.597	1:48.78	90.61%
Race Percent GMS	99.72%	5.059	Category Average	0.00	0.000	#DIV/0!	#DIV/0!
GMS Time	6:34.24	1:38.56	Diff. (above/below)	8.05	4.597	#DIV/0!	#DIV/0!

ANALYSIS	time	boat speed	Waather: cloudy wind 1.9m/s 12 o'clock
full reach	0.38	4.43	Air Temp: 19
entry	0.58	3.27	Water: slight 5-9cm
perpndr	0.93	4.15	* Drive Time (sec.)
extraction	1.18	4.73	* Blade Slip (m)
feather	1.28	4.75	Eff. Stroke Lngth (m)
peak speed	1.86	5.64	Stroke Position (ppl)
full rch 2	2.16	4.24	* Stroke Rate (spm)
entry2	2.33	3.33	Stroke Ratio (R/O1)

sculler/crew average:	length:	(m)	power:	(watts)	weight:	(kg)
Span						
Oar Length						
Inboard						

Notes:	
TECHNIQUE ANALYSIS	
Distance per Stroke: 8.05 Ref: W4-	
1	Entry Time (full reach to entry) 0.18 time between full reach position and entry (blade full bury)
	Entry Time % of Stk Cycle 10.5% Entry Time as percentage of entire stroke cycle time
	* Drive Hump. (t*accel.) -0.032 drive hump is acceleration loss after catch multiplied by time.
	* Drive Accel. (entry to extract) 2.43 boat acceleration between blade full bury and blade extraction.
	Drive Accl. Eff. (entry to extract) 108.0% percentage of area curve compared to straight line accel.
	Perp to Extract Accel. (m/s ²) 2.32 boat acceleration between blade perpendicular and blade extraction.
	Drive Speed % of Avg. Speed 87.9% drive average speed as percent of total stroke average speed
	System Speed Change (m/s) 0.32 boat speed change - full reach to feather
5	Release Time (extract to feather) 0.10 time blade extraction to feather
	Release Time % of Stk Cycle 5.7% time blade extraction to feather as percentage of stroke cycle
	Release Speed Change (m/s) +0.03 speed change - extraction to feather
6	Recovery Accel. (feather to peak) 1.51 acceleration feather to peak speed
	Rec. Accel Eff. (feather to peak) 89.8% percentage of area under the curve compared to straight line accel.
	Recovery Peak Speed (% of Rec) 66.0% percentage of recovery (feather~fullreach2) to peak speed
	Recovery Speed % of Avg. Spd. 111.8% recovery average speed as percent of total stroke average speed
	Deceleration (peak to entry2) -4.94 deceleration between peak speed to entry2
	Deceleration Time (sec.) 0.54 time boat is in negative acceleration following peak speed.
	Deceleration Time % of Stk Cycle 31.0% Deceleration Time as percentage of entire stroke cycle time

TECHNIQUE ANALYSIS		Distance per Stroke	8.05	Ref: W4-
CATCH	1	Entry Time (full reach to entry)	0.18	time between full reach position and entry (blade full bury)
		Entry Time % of Stk Cycle	10.5%	Entry Time as percentage of entire stroke cycle time
	2	Drive Hump. (t*accel.)	-0.032	drive hump is acceleration loss after catch multiplied by time.
		Drive Accel. (entry to extract)	2.43	boat acceleration between blade full bury and blade extraction.
BLADE BURY	Drive Accl. Eff. (entry to extract)	108.0%	percentage of area curve compared to straight line accel.	
	Perp to Extract Accel. (m/s ²)	2.32	boat acceleration between blade perpendicular and blade extraction.	
	Drive Speed % of Avg. Speed	87.9%	drive average speed as percent of total stroke average speed	
	* System Speed Change (m/s)	0.32	boat speed change - full reach to feather	
RELEASE	5	Release Time (extract to feather)	0.10	time blade extraction to feather
		Release Time % of Stk Cycle	5.7%	time blade extraction to feather as percentage of stroke cycle
		Release Speed Change (m/s)	+0.03	speed change - extraction to feather
RECOVERY	6	Recovery Accel. (feather to peak)	1.51	acceleration feather to peak speed
		Rec. Accel Eff. (feather to peak)	89.8%	percentage of area under the curve compared to straight line accel.
		Recovery Peak Speed (% of Rec)	66.0%	percentage of recovery (feather~fullreach2) to peak speed
		Recovery Speed % of Avg. Spd.	111.8%	recovery average speed as percent of total stroke average speed
		Deceleration (peak to entry2)	-4.94	deceleration between peak speed to entry2
	Deceleration Time (sec.)	0.54	time boat is in negative acceleration following peak speed.	
	Deceleration Time % of Stk Cycle	31.0%	Deceleration Time as percentage of entire stroke cycle time	



49) Additional data can be found on the spreadsheet in rows 130 and down

HOPE YOU FIND THIS USEFUL

Questions/comments to:

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<https://purcerverance.ca>

Facebook group: ROWING PURCERVERANCE