

SC Analysis Software



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1. Introduction

The **SCPCComateSC** analysis software provides a set of tools for storing, annotating and presenting rowing data. The **SC** and **HC** collect a vast amount of detailed data on a crew's performance. This software toolkit manages this information so coaches and rowers can better understand how they are rowing and how they can improve their performance. It operates with the **SC** (including **SCT** and **SC-RF**), **HC** and **SX** models.

The software provides 5 main functions:

- **[Connect]:** Connecting PC to **SC/HC/SX** and transferring data to PC
- **[Select]:** Lists rowing records, so they can be edited, annotated and selected for analysis
- **[Chart]:** A comprehensive set of charting tools for display and comparison of rowing data. Synchronised video images of rowing can also be displayed simultaneously.
- **[Splits]:** Display of split times, speeds etc in tabular form
- **[Setup]:** For setting up time/date and other configurable options in **SC/HC/SX**
- **Workout [HC Only]:** For programming and editing workouts in **HC/SX**.

PC Requirements: The software runs on Windows 2000/XP/Vista /Windows 7™. Without the synchronised video function, the processor/memory requirements are not exacting. It is necessary for PC to have a serial port and if application is to be used with a notebook which does not have a serial port, then a USB/serial adaptor will be required – supplied with PC kit for SC/HC. If the synchronised video is being used, then a 'slow' PC may slow down the video update rate.

2. Rowing Record

A '*record*' is created every time the timer (stopwatch) on the controller (SC,HC or SX) unit is run. Each *record* is time and date stamped in the controller. The *record* stores all the detailed information about the boat's performance whilst the timer runs. Once timer is reset and restarted, another *record* is started. The controller can be connected to a PC and the *records* transferred to the PC. Each *record* can then be annotated with such details as; crew make up, conditions eg wind, and other comments. There is no limitation on the length of these annotations. The annotations will then form a part of the *record* in the PC. All *records* in PC can be shown and selected for further analysis. Editing functions for deleting, importing and exporting *records* are also included.

The rowing *record* can be in one of two formats: Macro or Micro. In the HC and SX, the user can select format. In earlier versions of SC and SCT they are limited to Micro. The following data is stored and transferred to PC:

Micro: Speed(sampled every 20mS) rating and Heart Rate(for HC only)

Macro: Average Speed of each stroke, rating, Speed Ratio(min/max speed for each stroke) and Heart Rate(for HC only)

3. Installing the Software

To install software, copy the **SCPCComateSC .exe** from the CD supplied on to your computer. It is suggested you set up a folder especially for this. **Do not set this folder up in the Windows PROGRAM folder.** When the programme runs, it will set up a database within the same folder. If you wish to run demonstration programme, then copy across complete demonstration folder – this includes sample(.dat) records.

When the software is run for the first time it will display a window showing a 'lock key' number and requesting a 'matching unlock license key'. To receive this unlock key email your 'lock key number' to software@coxmate.com.au and an unlock key number will be emailed to you. This licensing arrangement ties the application to your PC. It can not be run on other PC's. If the software is not 'unlocked' then it will run, but will only store up to 10 records, and the **record delete, import and export** functions are disabled.

4. Connecting to PC

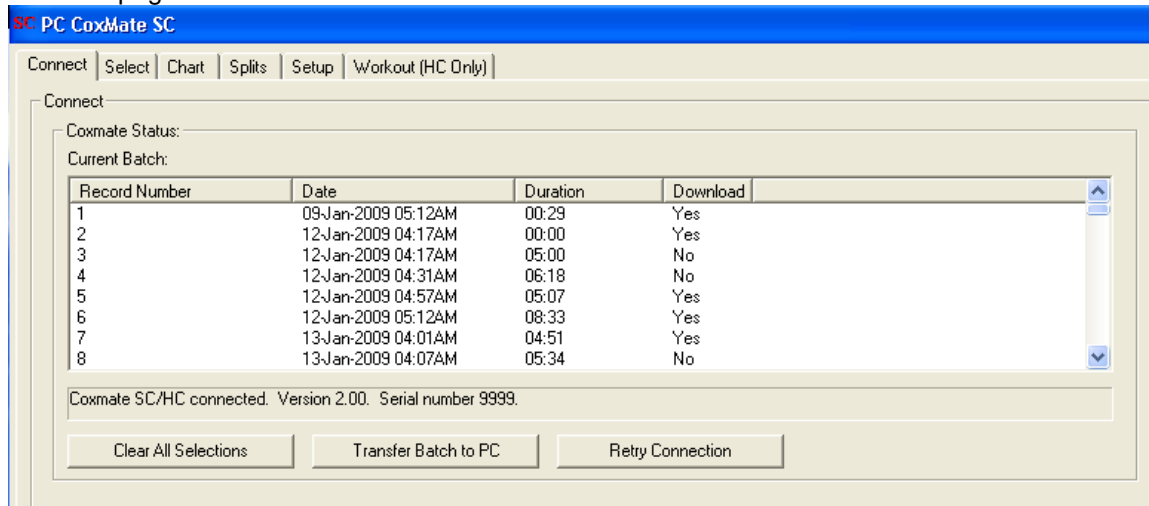
To communicate with the SC/SCT/HC/SX it is necessary to physically connect controller to PC with appropriate hardware interface provided in either the HC-PC-Analysis or SCT-PC-Analysis kit. For SCT/SC/HC, if PC does not have a serial port, then use the USB to serial adaptor provided in these kits. For the SX, connect USB lead between SX and PC. When the USB lead or adaptor is first connected to PC it will show 'found new hardware' window. The latest version (at June 2011 - silver cable with black connectors) will automatically download driver via Internet. **With earlier versions of USB adaptor (Either silver cable with blue/green connectors, or stubby black versions without cable, when loading USB driver, make sure you direct your PC to the Coxmate CD to find the USB driver – Do not let Windows select driver.** If you do not know what COM port the PC has allocated for USB adaptor, go to **Control Panel/System/Hardware/Device Manager/Ports(Com and LPT)**. This will identify which COM port has been allocated.

The COM port eg COM2 can then be selected under the **Set Up** tab – see section 8.
For SX, COM port is automatically assigned.

To communicate with PC:

- For SC/SCT:
 - Scroll through SC menu to 'Menu 9 Memory' and press **Ent**. This will bring up **'Memory PC Conn'** on SC display.
 - Press **Ent**. SC display will then show **'Waiting for PC'**.
- For HC:
 - Go to SET UP: With unit Ready ('Rdy' is displayed), press Menu key twice, then Scroll across options at bottom of screen until you get to PC
- For SX:
 - SX will automatically detect PC.
- Once communications is established the PC will display the SC/HC firmware version on **Connect** or **Setup SC** page. If there is no communications, then go to **Connect** page and click on **Retry Connection**.

Once the communications is established, then the records in the SC/HC are listed on the PC on the **Connect** page:



This list shows date and time of *record*, and length of *record*. You can select which records you want to transfer to PC. To add or delete a record for transfer, click on Yes/No under 'Download' – this will change status between Yes/No. **Clear all Selections** will change all to 'NO'. Clicking on **Transferring Batch to PC** will transfer the *records* to PC. The downloading to the PC will take a few minutes. Progress is displayed on screen. **It is strongly recommended that you do not use any other CPU intensive applications while download is running.**

Once download is complete then PC will ask if you want to clear SC memory. Pressing **Ent** or clicking on **Yes** will exit without clearing memory in SC/HC/SX. Selet **No** to clear. The downloaded *records* will be added to the list shown on the **[Select]** page. It is important that the records are annotated whilst the circumstance surrounding the rowing are fresh in your mind.

5. Select a Record

The screenshot shows the 'Data File Selection Setup' window in the PC CoxMate SC software. The window title is 'PC CoxMate SC'. The menu bar includes 'Connect', 'Select', 'Chart', 'Splits', 'Setup', and 'Workout (HC/SX Only)'. The main area is titled 'Data File Selection Setup' and contains a 'Record selection' section with a table of records. The table has the following columns: Bat., Mode, Date, Strokes, Duration, Rating, Speed, Ratio(Speed), Dist/Stroke, Heart Rate, Comments, Crew, Conditions, Cal K, and New Cal K. The record for '11/02/2000 11:09:34' is selected and highlighted in blue. Below the table are buttons for 'Import Record', 'Export Record', 'Delete Record', 'Clear Selection', 'Clear All Selections', 'Chart', and 'Export To Excel'. At the bottom, there are input fields for 'Crew', 'Conditions', 'Comments', 'Video/Audio name', 'Video/Audio Offset', 'Record Duration', and 'Calibration Adjust (New K)', along with an 'Update Details' button.

Click on the **[Select]** tab. The display shown above lists all the *records* available in the .dat file in the same folder as the **SCPCComateSC.exe**. Each record will display: Mode (Micro or Macro), Date and Time, number of Strokes, duration and K(calibration value) at time record was recorded. The other columns - Comments/Crew/Conditions are annotations which can be added to record. The New Cal K shows K value if it has been adjusted – see later for details.

To select a record, click on it. The box on right hand side will be highlighted in blue. To choose which variables to chart, click in the boxes under the appropriate heading – **Rating, Speed, Ratio(Speed), Dist/Stroke and Heart Rate**. In above example Rating and Speed are selected. The text in the selected box will switch between 'Chart', '2x' and blank. The '2x' function is included so that comparisons between different parts of the same *record* can be made.

Once *records/variables* have been selected, then click on **[Chart]**.

Clear Selection deselects a chosen *record*. **Clear All Selections** deselects all chosen *records*. **Delete Record** removes *record* from system.

The **Import** and **Export Record** functions are for moving files between systems.

Export To Excel is for transferring data for each stroke to Excel.

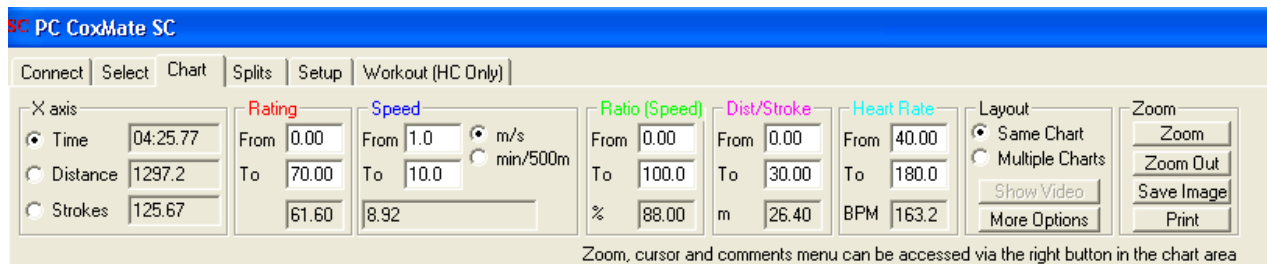
The area at the lower part of the screen is for annotating records. Details of **Crew** make up, weather **Conditions** or other **Comments** can be added.

The **Video/Audio name** enables a video or audio file to be selected. This video can be displayed on **Charting** display alongside the graph. The **Video/Audio Offset** shows the time offset between the graph and the video. This value is calculated when graph and video are synchronised. Once it has been determined it is stored for future use. See section **9. Synchronised Video/Audio**.

The **Calibration Adjust (new K)** is to enable the K value to be retrospectively corrected. E.g. if a race was rowed over 2000m with wrong K value, you could chart it to see what distance the software displayed, then correct value to get distance to 2000m.

Update Details: It is important to remember to use this if you are adding or editing the record.

6. Chart a Record



The Chart will display the selected variables on a single chart. Each variable has a different colour:

- **Rating** -Strokes per minute.
- **Speed** -Metres per second or time per 500 metres.
- **Ratio(Speed)** -Ratio of minimum to maximum velocity during each stroke, expressed as a percentage.
- **Dist/Stroke** -The distance covered on each stroke in metres.
- **Heart Rate** – Heart Rate – only with HC

When more than one record is displayed, the lines will be dotted/dashed to differentiate them.

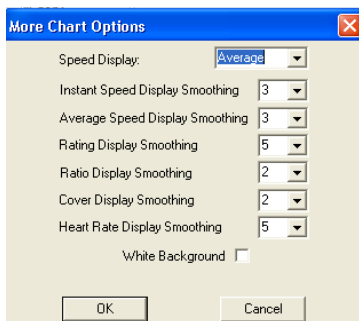
The X axis details are shown in 'X-Axis' box at top left. The axis defaults to time. When a record is first charted, the entire *record* will be displayed. The box on the top left enables X axis to be changed to either distance or stroke count. As the cursor is moved around the chart, Time, Distance and Strokes values are displayed.

The next four boxes, **Rating**, **Speed**, **Ratio(Speed)**, **Dist/Stroke** and **Heart Rate** show the Y axes scales. The From/To boxes can be edited to change scales – this can also be changed with Zoom function. At the bottom of each box is the value of the cursor position. If you want to read a precise value of a point on the chart, then the cursor should be moved to this position and its value read from the appropriate box. The speed box has the option of speed being displayed in m/s or time per 500m.

The next box is '**Layout**'. This provides the option of '**Same Chart**' or '**Multiple Chart**'. '**Same Chart**' draws all 'records' on the one chart. '**Multiple Chart**' draws each record on a separate chart.

There are two other options under '**Layout**', **Show Video** and **More Options**. **Show Video** is explained in more detail under **Video Synchronisation** section.

If the **More Options** box is clicked the following drop down display will appear.



'**Speed Display**' enables either, '**instant**', '**average**' or '**both**' to be charted. The '**instant**' shows the speed every approx 20mS. This will show the velocity profile through the stroke. The '**average**' is the average speed for the stroke and '**Both**' displays both '**instant**' and '**average**' speeds. Note: If record has been recorded in Macro mode, then Speed Display should be set to average.

The other 6 options are for the smoothing of the graphed variables. If record is recorded in Micro mode, the smoothing required will depend on where the speed sensor is mounted on the boat. The smoothing removes the 'noise' created by turbulent flow on sensor. This turbulence increases

with increased distance from bow and decreased distance from the hull. This latter value is normally fixed by virtue of the dimensions of the speed sensor fin. To minimise turbulence the sensor is best mounted as near to the bow as practicable.

The smoothing required for the other variables is governed by the user's interest e.g. if you want to look at the rating trend through a race, then smoothing would be required; if you wanted to look at the variation of rating between strokes, then no smoothing would be required, and the smoothing set to zero.

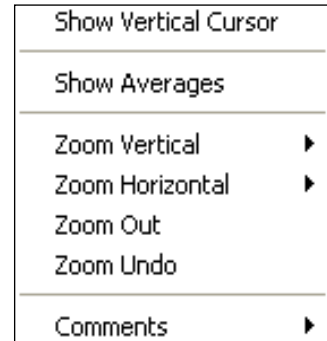
The **White Background** option sets background to black or white. Generally black is better for viewing on a PC screen, but white is preferable for overhead data projectors.

If a record is selected '2x' then it is treated as two separate records, and can be displayed on two separate charts. This enables different parts of the same record eg the start and finish of a race to be compared graphically.

Clicking on 'Zoom' brings up the following Menu – this is also accessed by clicking right mouse button:

Show Vertical Cursor: This draws a vertical line, which is moved horizontally with mouse. The boxes at the top of screen will display the values of all the charted variables at the point where the cursor line intersects the charted variable. *Note: This can only be used when one record is being charted.*

Show Averages: If this is selected the left mouse button can be held down while the mouse is dragged across the area of interest – this area will change colour. The boxes at top of screen will display the average values of the variables in the white area. *Note: This can only be used when one record is being charted*



Zoom Vertical: Clicking on this brings up a list of all the Y variables (Rate, Speed etc.). Each one can be selected and the left button held down while the mouse is dragged across the area you wish the chart to zoom into.

Zoom Horizontal: This allows zooming in and also scrolling chart horizontally across screen.

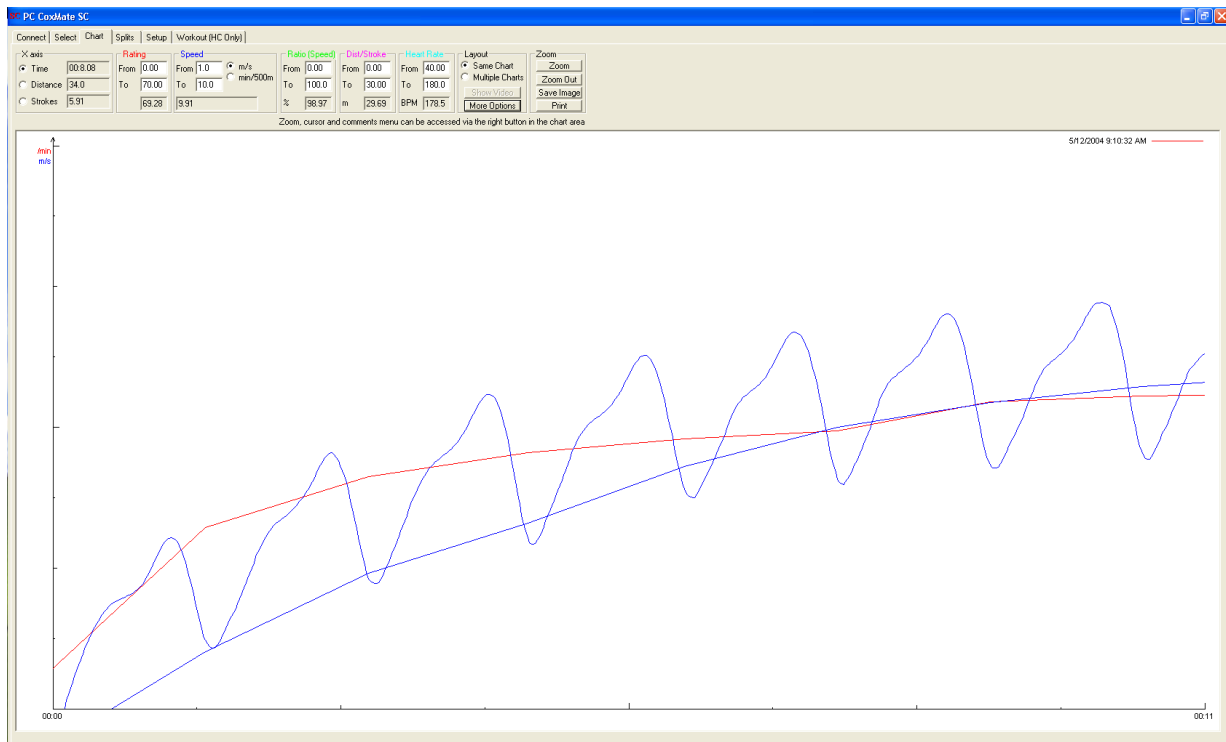
Zoom Out: Zooms out fully in both axes

Zoom Undo: Reverses the last Zoom

Comments: This offers four options: Add, Edit Delete and Show(Hide) comments. It provides the facility to add comments to a particular part of record. If comments are shown a fine vertical line with a 10 character text box will appear. If the box is clicked on, the full text will be shown.

There are four functions in the **Zoom** box – top right: **Zoom** - brings up **Zoom** menu; **Zoom Out** - zooms out; **Save Image** - saves screen image as a .jpg file; **Print** - for printing Chart (The print output includes a light grid and all scales); **Save Image** for saving image as a .jpg.

An example of a chart follows:



The above graph shows the first 7 strokes of a start. The blue lines show both instantaneous speed and average speed (averaged over a stroke speed). The instantaneous speed shows how the boat speeds up and slows down through the stroke.

The red line is the rating, and the purple line is the distance travelled for each stroke. As expected the rating is high for the first few strokes, and drops off once the boat is up to speed.

7. Display Splits

Record Date/Time	Distance	Split Dista...	Time	Av Rating	Av Speed	Cumulativ...	Time	Av Rating	Av Speed
11/03/2006 10:39:18...	2048	0-250	0min 43.6s	39.3st/min	5.73m/s	250	0min 43.6s	39.3st/min	5.73m/s
		250-500	0min 44.7s	36.4st/min	5.59m/s	500	1min 28.4s	37.8st/min	5.66m/s
		500-750	0min 47.0s	34.8st/min	5.32m/s	750	2min 15.4s	36.8st/min	5.54m/s
		750-1000	0min 48.6s	34.1st/min	5.15m/s	1000	3min 4.0s	36.1st/min	5.44m/s
		1000-1250	0min 48.2s	34.0st/min	5.18m/s	1250	3min 52.2s	35.6st/min	5.38m/s
		1250-1500	0min 48.4s	33.8st/min	5.17m/s	1500	4min 40.6s	35.3st/min	5.35m/s
		1500-1750	0min 48.4s	34.0st/min	5.17m/s	1750	5min 28.9s	35.1st/min	5.32m/s
		1750-2000	0min 47.6s	34.7st/min	5.26m/s	2000	6min 16.5s	35.1st/min	5.31m/s
		2000-2250	0min 11.7s	28.1st/min	4.07m/s	2250	6min 28.2s	34.9st/min	5.27m/s

The Splits function enables the rating and speed to be displayed for preset intervals. In the example above the 2000 metre record is broken into 250 metre intervals. Time, average rating and average speed displayed. In addition to the values for individual splits, the cumulative values are also displayed. Intervals can be 50, 100, 200, 250 500 or 1000 metres. Any records which have had a variable selected for charting will be displayed in *Splits table*.

Note: These intervals can also be seen in real time on the **SC/HC**, if an interval distance is set.

8. Setup HC/SC

PC Setup
 Communications Port: COM2 | Coxmate SC connected. Version 1.04. Serial number 9999.

Coxmat SC
 Date and time: 28-Nov-2004 04:57PM | Update | SC Firmware Download
 Default radio channel: 1 | Update
 Speed display units: time per 500 metres | Update
 Split distance for SC: 250 | Update
 SC Status Display: Ratio and Stroke Count | Update
 Current SC Values | Clear SC Memory

Coxmat SC Print Options
 Club Name: Alice Springs Rowing Club | Apply

To set up communications with the **SC/HC**, see section 4 **Connecting to PC**.

The following items in the **SC/HC** can be set up from PC:

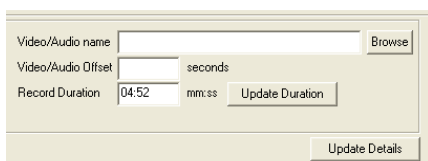
- Date and time for the SC
- Speed display units – either m/s or min:sec per 500m
- Split distance for **SC/HC**. This is independent of any split display on PC
- The club name- this will appear on any printouts

The **Current SC Values** tab will show current SC values for those items listed above. The **Clear SC Memory** will clear memory in SC.

The **SC Firmware Download** enables a new software (firmware) version to be downloaded into the SC. Only available with SC/SCT models

9. Synchronised Video/Audio

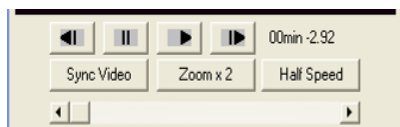
The software enables a video or audio file to be synchronised and shown (heard in case of audio) on the same screen as the charting. A digital video/audio file has to be accessible in the PC. To enable the charting and video to be synchronised, the real time clocks of both the camera and the SC should be synchronised as close as possible. This will make managing *records* and synchronisation easier. The videoing should start ahead of the start of the *record* in the SC. When the '**record**' on the SC is started, i.e. the **timer** is started, the cox should give a clear visible (on video) or audible signal – this can then be used to achieve a more precise synchronisation. It is recommended that the video file name includes the time and date of the starting point. This will make identification of the correct filename easier, as the *record* is also identified with time and date. There are several ways video files can be imported into a PC. The tools/programmes for doing this are available from third parties eg video camera suppliers. The video file should be in .mpg, avi or m4v format. Synchronising of audio files is less critical and can be achieved with cox stating date and time or some other reference. The audio must be in wma, wav or mpg3 formats. It is preferable for the video/audio files to be stored in a folder within the Coxmate folder – this will make finding them easier. It is recommended that the video/audio be checked to see if it runs with Windows Media Player or similar – supplied with Windows operating systems, The Coxmate software assumes any CODECS needed to run the video/audio are supplied by others. No support for importing or translating video files into different formats is available from Coxmate.



The selection of video/audio file is made on the **select** page. The adjacent picture shows the relevant part of screen. The video file location/name can be entered or selected through the **browse** function. The file path will default to the Coxmate folder. Once entered/selected, then **update details** should be clicked. When the video/audio is synchronised with the chart, the time offset between

the two will be automatically stored in the **Video/Audio Offset** box.

After the video file has been selected and the **chart** page has been entered, then the **Show Video/Audio** button will be active and can be selected. This will bring up the video window which can be dragged to any position on the screen.



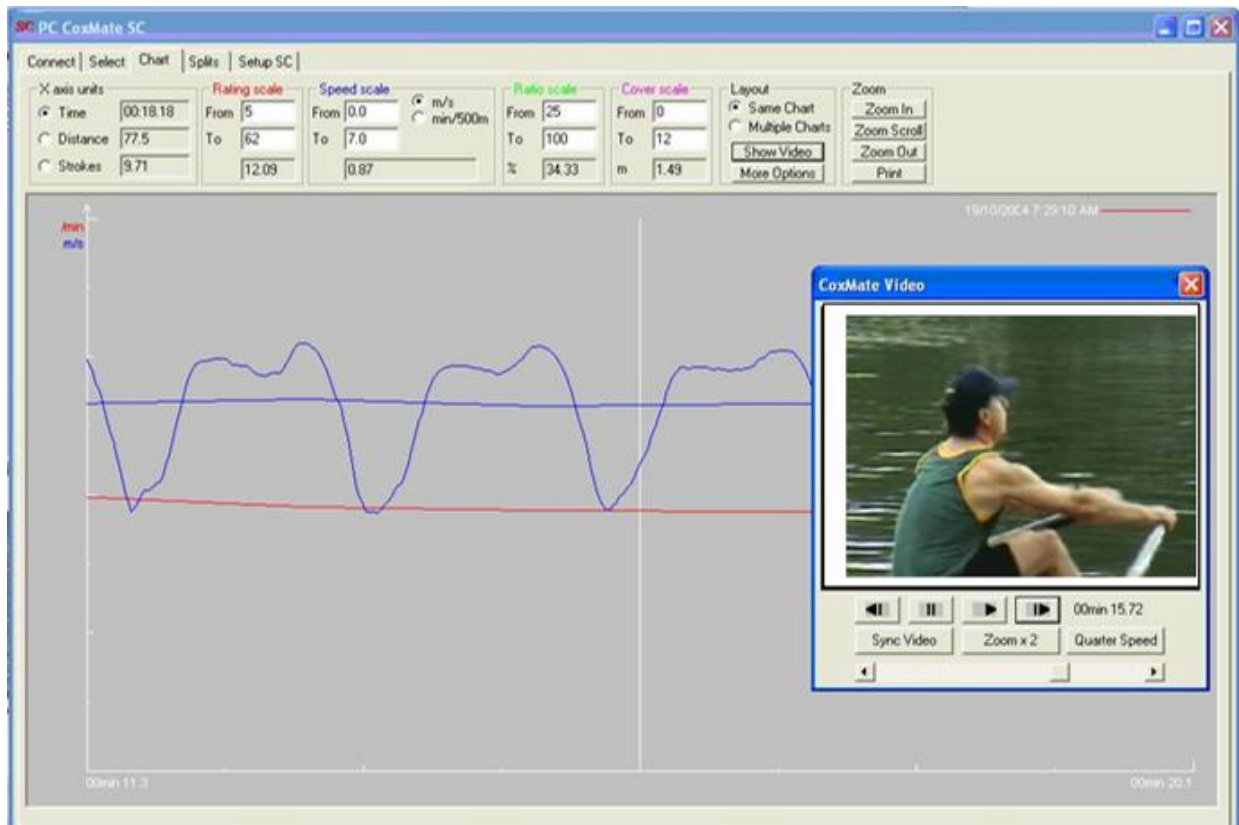
Before playing video, zoom in on chart such that only a few strokes are displayed on the chart - see following sample display.

The video controls shown on adjacent picture are from left to right:

Manually Inch Reverse, Stop, Start, and Manually Inch Forward.

When the **Start** is pressed a vertical white line will appear on chart and video will start. This line moves across screen to centre and stops. The chart will then progress through the white line. When the synchronisation point is reached eg the cox drops his arm as he starts the timer, the **Synch Video** button is clicked. The video and graph will then be synchronised.

The time on the right hand side of panel displays elapsed time. The **Zoom x2** doubles the size of the video image. The **Half Speed** reduces the display speed by half or a quarter. This button rotates through **Half Speed, Quarter Speed** and **Full Speed**. The scroll bar at bottom of panel shows how far video has progressed. The bar can be manually dragged to any point. If the video is stopped, the **Manual Inch** buttons can be used to step through frame by frame. An example display of synchronised video is shown below:



11.Support

The **SCPCComateSC** analysis software is a sophisticated and powerful toolkit for rowing coaches. Invariably it will evolve and develop as feedback from coaches is received. If you have any suggestions for improvement or find any of the inevitable bugs, then please email Coxmate at software@coxmate.com.au.

The software also includes a function for downloading new versions of software (firmware) for the SC. This means that new versions can be emailed to you and you can update the system through the **[Set Up]** page. Similarly new versions of the PC software can also be emailed.

Acknowledgement is given to those in the rowing world whose ideas have helped in the development of the SC.

Coxmate™ Pty Ltd

www.coxmate.com.au

Manual: SC SW 08/11 Copyright 2004/2005/6/7/8/9/10/11

Due to continuing development, specifications may change without warning.