

How to use RP3 indoor rower for (self) coaching

How to train with RP3 and improve your rowing consistency for better performance of rowers and crews

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Introduction

The principle of fast rowing is to transfer as much energy as possible on the water through the blade during a race. This accelerates the boat, increasing and maintaining boat speed. If you do this as uniformly or consistently as possible and minimize any disturbance or deceleration of the boat that compromises boat speed during recovery and reversal of the motion, you'll go the fastest!

Consistency as a rower is crucial. Changing movement will cause disturbance. The body weight within the system of rower(s) and boat is a large component in the bio-mechanics and physics of rowing. In crew boats it's essential for uniformity in the boat, enabling others to row in sync with you and vice versa, and also for race pacing. You could row as hard as possible for 50 strokes and give it your all, but if you can't maintain that for the next 50 strokes, it's pointless. Knowing how fast, with what kind of intensity, you can start and sustain until the end (and a bit more) is most beneficial. Proper pacing therefore is also part of the consistency.

Knowing what causes the inconsistency of the rowing movement when fatigueness kicks in is beneficial to anticipate and act on it as best as (still) possible. This could give direction for training the movement and learn how to act and react when circumstances are appearing.

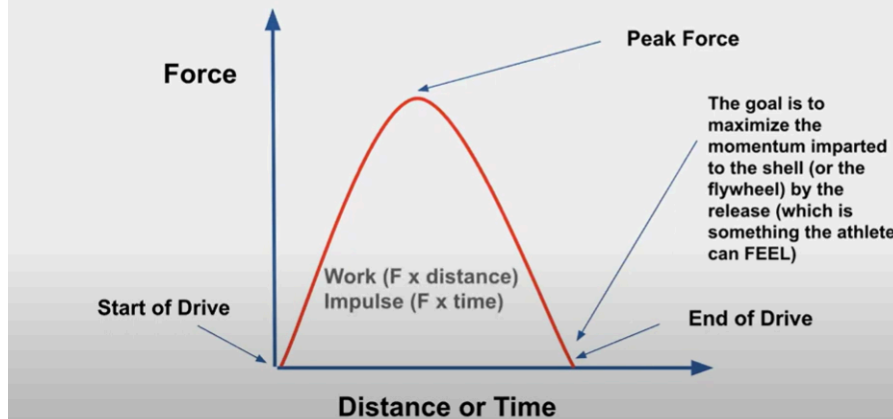
The Ideal stroke

An ideal stroke is theoretical and therefore always relative (personal). In terms of the Force Curve, it resembles a smooth haystack shape (see below), with a sufficiently broad base (stroke length) and peak (power). Research (based on 50,000 samples¹) indicates that the relative peak of the curve should be just before the midpoint. Based on RP3 data analysis, aiming between 45 - 48% of the stroke. Here, the oar(s) should be roughly perpendicular to the boat, where the "force times arm" propulsion is greatest.

This midpoint position yields a full / convexed curve throughout the stroke. In practice, an early peak hollows out the curve in the second part (loss of pressure), while a late peak results in a flat or even hollow curve at the front; a late catch and trailing behind in pressure, contributing little or nothing to boat acceleration. Too early applying force also could cause a splashy stroke (a white foam vortex) and loss of connection.

¹ https://biorow.com/index.php?route=information/news/news&news_id=108

What Is A Force Curve?



Source: coach Neil Bergenroth

“The Force Curve is a window into the effort of the force application during the drive phase”

Consistency for synchronization

Inequality at the catch in an eight has negative consequences on both sides. For rowers who have the best timing at the catch, are in synch, and have a fast connection, it becomes too heavy as they have to carry the latecomers. The late rowers, having late or delayed pressure, have to catch up, taking pressure from the early catchers. They often end up rowing too long and driving in a different - “later” - segment.

Uniformity in the catch and pressure application is thus crucial in crewboats like fours and eights. The challenge for the rower is knowing what happens when fatigue sets in. How does the rower respond to the synchronization challenge? Where does he / she compromise on quality of the force curve and where does he / she lose the ability to row consistently and synchronized, incl. connection and drive?

Using the RP3 Indoor rower

In virtually all training programs for rowers, of all ages and levels, worldwide, the ergometer or indoor rowing machine holds a clear place. The rowing machine provides an easy and accessible way to improve both fitness and strength. The score indicates what the rower is capable of. By comparing scores, selections are made, and rowers in teams also know what to expect from each other.

It is customary to assess these scores quantitatively: how much you have trained (time or distance), what power you can deliver, and at what stroke rate - how many strokes per

minute - have been made. The "split score" (time spend over 500m) is a standard for comparing each other and for racing.

These quantitative scores have an implicit relationship with good and hard rowing. Fitness and strength are often prerequisites for good boat speed and results, but the most important factor for good rowing: "perfect coordination" is not measured.

The fittest or strongest individuals are not, or actually never, the best rowers. World record holders on the rowing machine from fitness or CrossFit sports will not often be good rowers. In good rowing, these three, and with the mental aspect included, four necessary athletic attributes come together. Training and improving the "Perfect Coordination" aspect is the hardest to improve while training to get more in shape and become stronger.

Using Qualitative Scores for perfecting rowing coordination

RP3 provides additional qualitative values during the workout and for analysis afterwards, representing the quality of your ideal rowing stroke, next to the quantitative numbers mentioned. A logical methodology or approach helps measure a rower's consistency. As fatigue sets in, which of the four qualitative parameters that are shaping the Force Curve do you first compromise on:

- Stroke length
- Peak force
- Relative peak force position
- R-Square²

You can easily determine this through various workouts. For example, analyze by dividing a 30, 45, or 60-minute session in equal segments at steady state. Minimize the quantitative values during this workout and look for the changes in the qualitative values. You could also compare steps in a pyramid workout or a HIIT session to see what happens when intensity differs or at the highest levels of intensity.

High Level Solution

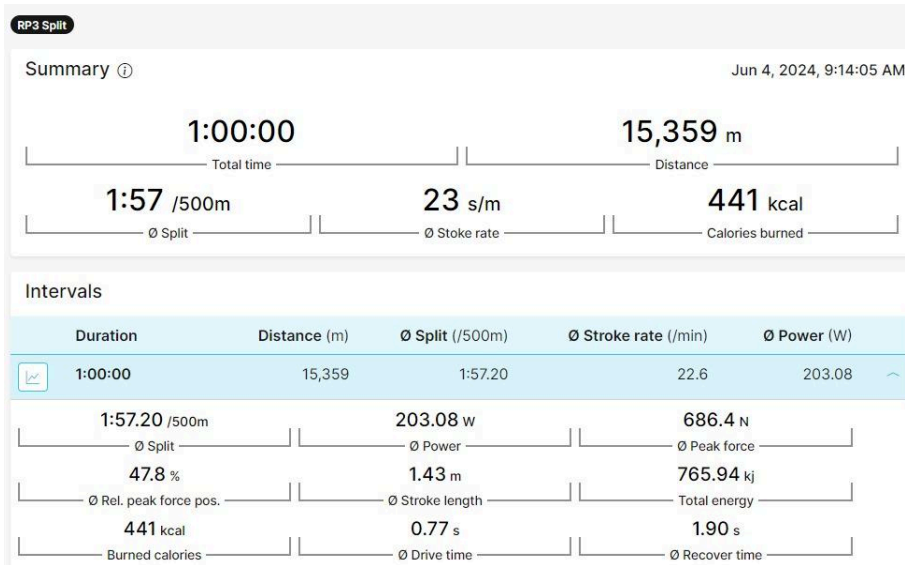
Use the RP3 App on your smartphone or tablet.

Create a RP3 Rowing account and login in the RP3 app before creating the training. It is also possible to claim your workout on a public device afterwards. See the RP3 Knowledge Base for instructions.³

Create one (or more different) workout that can be performed regularly for a steady state, piramide or high intensity interval training (HITT).

² R-square is a relative value for the shape of the curve: pre-peak, post-peak and total, compared with the perfect stroke that could have been made: a measure for the full, smooth, convex shape of the curve

³ <https://rp3rowing.com/customers/knowledge-base>

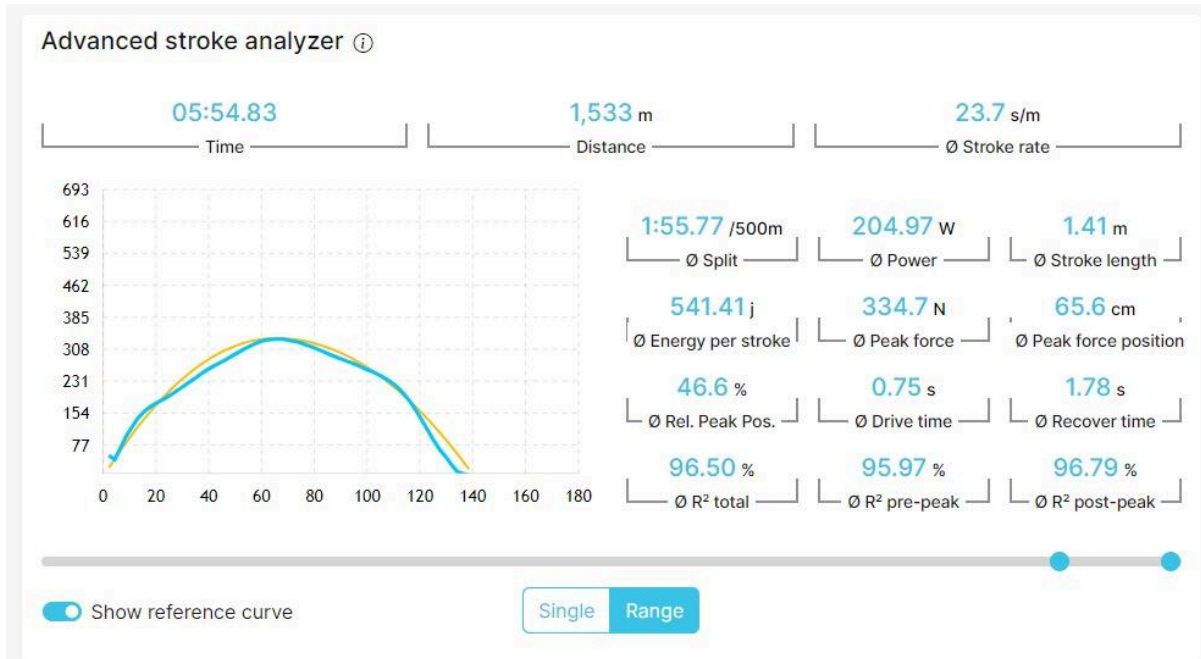


Select the 10% option in the Split Table:

Split times ⓘ 10 % ▾

	Duration	Ø Split (/500m)	Ø Power (W)	Ø Stroke rate (/min)	Ø Heart rate (bpm)
Interval 1					
1,535 m	06:06.92	1:59.48	189.77	22.0	106.6
1,535 m	06:01.19	1:57.62	200.64	21.4	119.4
1,535 m	06:02.50	1:58.05	198.59	21.5	122.6
1,535 m	05:59.19	1:56.97	203.28	21.7	125.6
1,535 m	05:57.29	1:56.35	203.70	22.2	130.7
1,535 m	05:52.95	1:54.94	210.26	22.9	134.3
1,535 m	05:59.71	1:57.14	201.33	22.5	137.1
1,535 m	05:54.56	1:55.46	210.46	23.2	140.7
1,535 m	05:56.35	1:56.04	207.36	23.6	143.1
1,535 m	05:56.31	1:56.03	204.97	23.7	145.6

Activate the RP3 Portal **Advanced edition** to be able to compare segment parts of the workout.



With the Advanced Stroke Analyzer you can view the averages of a segment (part) of the workout and therefore compare them with each other. The R2-Square is the drawn yellow line that could have been the ideal stroke with the values rowed. The blue line is the realized average and you can therefore see the deviation.

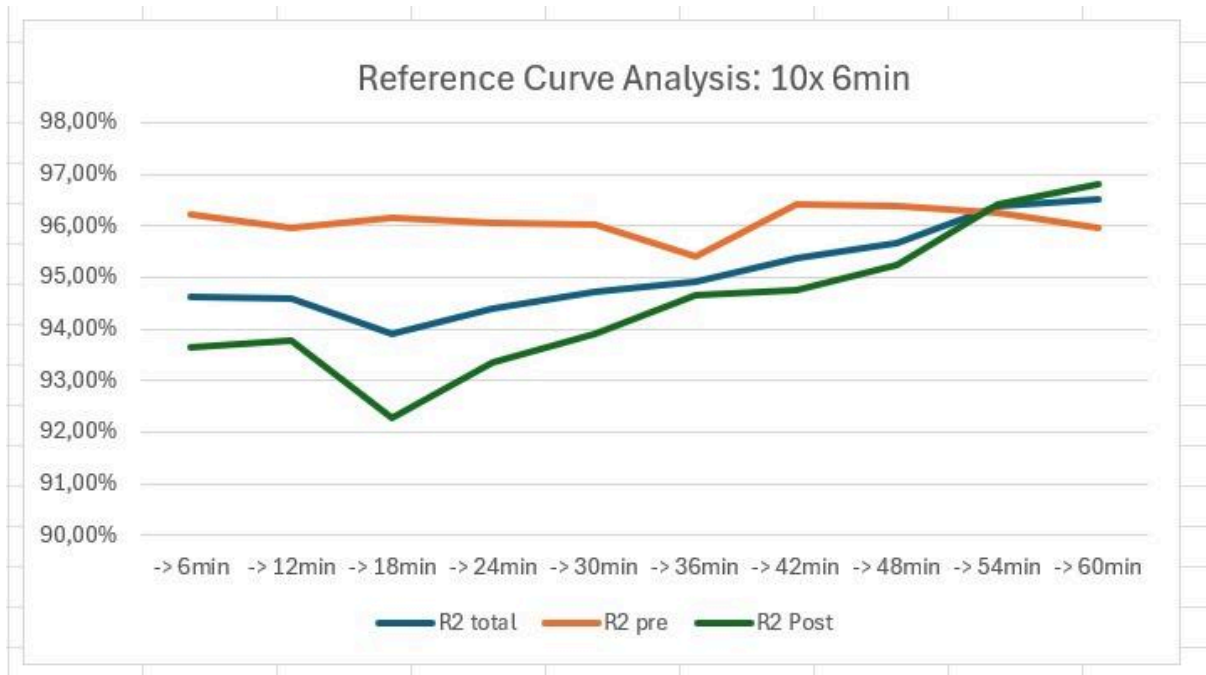
Solution Details

Create a report like below:

Workout Progression Analysis										
60min steady state										
	-> 6min	-> 12min	-> 18min	-> 24min	-> 30min	-> 36min	-> 42min	-> 48min	-> 54min	-> 60min
R2 total	94,63%	94,59%	93,89%	94,39%	94,71%	94,92%	95,36%	95,68%	96,37%	96,50%
R2 pre	96,22%	95,95%	96,14%	96,05%	96,02%	95,39%	96,41%	96,39%	96,25%	95,97%
R2 Post	93,63%	93,76%	92,27%	93,36%	93,92%	94,64%	94,74%	95,25%	96,43%	96,79%
Averages Quantity values										
1 split (/500m)	1:59,47	1:56,85	1:57,25	1:56,37	1:56,21	1:54,89	1:56,59	1:54,87	1:55,41	1:55,77
2 rate (s/m)	22,0	21,4	21,5	21,7	22,2	22,9	22,5	23,2	23,6	23,7
3 distance (m)	1.527	1.539	1.539	1.537	1.531	1.529	1.536	1.537	1.537	1.533
4 power (W)	189,77	200,64	198,59	203,28	203,70	210,26	201,33	210,46	207,36	204,97
5										
Averages Quality values										
7 Length (cm)	148	148	145	143	143	143	142	142	141	141
3 Peak force (N)	336,9	357,6	360,1	370,0	362,0	360,8	353,6	358,1	345,1	334,7
3 rel PFP (%)	48,9%	48,7%	48,7%	48,2%	48,3%	47,5%	48,0%	47,1%	46,7%	46,6%
3 EpS (j)	555,75	584,98	575,80	582,52	573,59	572,98	559,23	567,47	552,61	541,41

The RP3 Portal Advanced Edition will be able to provide a report like this (in development) with a “create report” call or make snippets of the selected parts of the workout.

Check the quantitative values to be consistent and flat. When analyzing this table with the graph below.



Analysis example

- **Pre-peak R2:** Remains almost constant
- **Post-peak R2:** Improves significantly, from 93.63%, with a dip at 18 minutes to 92.27%, then rises to 96.79%
- **Overall quality of the stroke:** Increases throughout the workout.
- **Most notable change among the four qualitative values:** Stroke length decreases from 148 cm to 141 cm.
- **Peak force Position:** Shifts slightly forward, from 48.9% to 46.6%.

Conclusion

You could conclude that the best quality stroke is achieved when the length is not too high and the peak force is slightly forward. Therefore, the coaching instructions for the next session are:

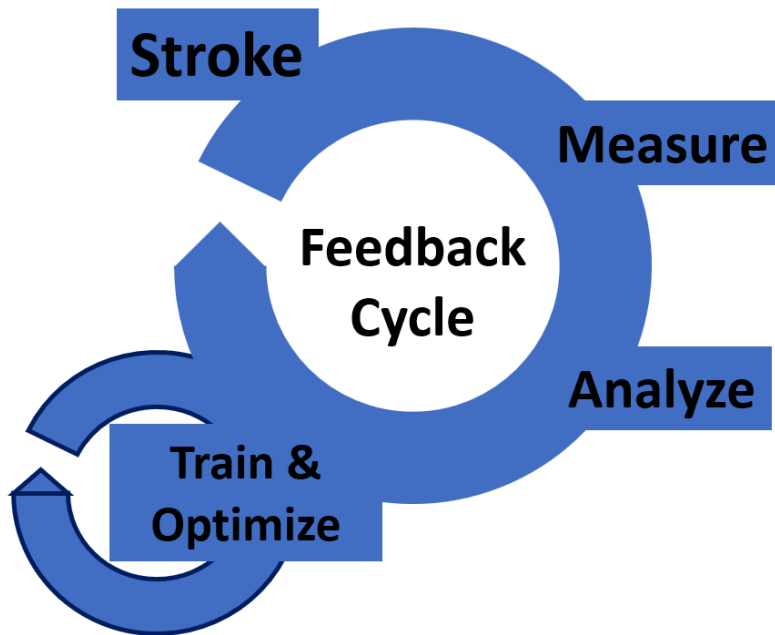
- Maintain stroke length at 142 cm and relative peak force at 46-47%. This can also be set using the reference mode in the RP3 App. Then observe what happens and see if the progression is less significant.
- Avoid aiming for too long a stroke.
- A slight forward shift in the peak force results in a better second half of the stroke.

This way, the rower can work on achieving the ideal, most consistent stroke and understand where compromises occur, so the focus can be on those areas. By frequently training this stroke, it will also be applied in the boat with the same emphasis.

Training & Learning Cycle

The combination of the two rowing feedback cycles is to be optimized when using Force Curve data, reports and analysis to improve rower and crew capability.

Take the analysis along in the boat, by making the trained stroke and the accents. Check the on water performance and discover the effect of the RP3 Workouts. Repeat the training & learning cycle like this.



Double feedback cycle: Boat - Measure & Analyze - Train & Optimize (“close the loop”) with direct feedback on the curve - by using a dynamic indoor rower which best / closest simulates rowing.⁴

Benefits

- RP3 Rowing provides an accessible way to train the boat rowing movement on land
- Direct feedback via the visualization of the force curve, with associated metrics, offer the rower the opportunity to improve his curve
- Direct feedback provides a great learning effect when simulating conditions and helps the rower train feeling and adaptability

- Different forms of training are offered (precisely to) train deviations and flexibility of the rower: eg. via own target curve and desired optimal crew curve calculations and setting

⁴ Elliott BC, Lyttle A, Birkett O. The RowPerfect ergometer: a training aid for on-water single scull rowing. Sports Biomech 2002; 1 (2): 123-34.

Also mentioned by Clara Soper and Patria Hume. Towards an Ideal Rowing Technique for Performance. The Contributions from Biomechanics in Sports Med 2004; 34 (12) paragraph 2.2

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- RP3 Rowing thus offers a palette of coach options to optimize the individual and team curve (including the connection system for synchronization)
- Coach functions available to watch directly during the training on RP3 and to support visual coaching with the measured values, and the possibility to check the session afterwards via RP3 Portal
- Figures and numbers correspond to the force curve in the boat because the rowing movement (with a dynamic character) is almost identical to rowing in the boat
- Measurement, analysis data, outcome from the boat (via additional measurement systems) can be actively trained on the RP3 and then tested again in the boat to measure the improvement - combination of the double measurement and feedback loop

Summary

To improve the rower's rowing skills, actively using the force curve, with direct feedback per stroke, has a major impact on the improvement and the ability to cope with changing conditions.

The role of the coach, with insight into the rowers Force curve, is to hold a mirror up to the rower and give tips to improve his stroke in the situation in question, individually and in his crew. While most coaches mainly coach visually, external (like speed and stroke rate) and internal (like power application, stroke length and slip) data can play a major role in improving the performance of the rower and the team.

By applying the "close the loop" principle between boat and land training, the improvement and learning potential of the rower is even further increased.

Call to Action

If you want to know more or experience the added value of using RP3 (full proposition) yourself, please send a mail to: info@rp3rowing.com , go to your local RP3 dealer, or go to the website: www.rp3rowing.com/contact