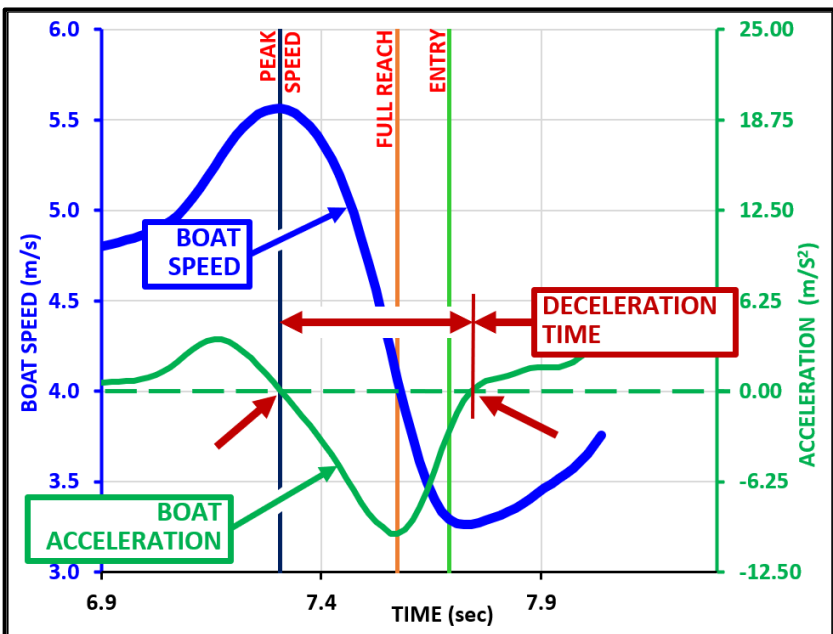


## 2.9.7 Deceleration Time

The deceleration time technique factor is the length of time the boat experiences negative acceleration following the boat's peak speed on the recovery. When racing, the boat achieves peak speed at half to two-thirds through the recovery and then decelerates rapidly as the crew slows its movement toward full reach. Figure 2.9.7a Deceleration Time shows the green boat acceleration curve rapidly dropping below the horizontal green dashed line representing zero acceleration on the graph. When the green acceleration curve is below the horizontal green dashed line, the boat decelerates, and the red arrows highlight the deceleration time.

Figure 2.9.7a Deceleration Time



Deceleration time extends through the late recovery and the blade entry phases and ends when the boat achieves positive acceleration near the blade entry. The following formula is used to calculate deceleration time.

$$\text{DECELERATION TIME} = Vt_{ps} - Vt_{pac2}$$

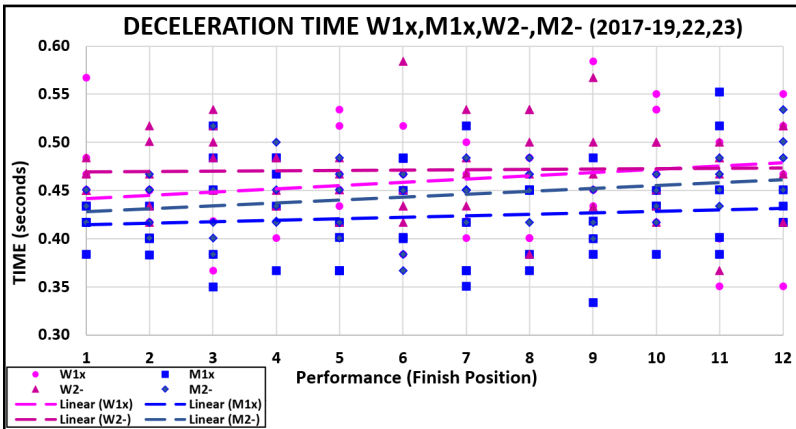
where:  $Vt_{ps}$  - video time peak boat speed

$Vt_{pac2}$  - video time positive acceleration catch2

The deceleration time factor value represents the crew's ability to transition quickly from accelerating the boat on the recovery to accelerating the boat on the drive.

Figure 2.9.7b Deceleration Time Singles Pairs shows data from the World Championships, including trendlines for each category.

*Figure 2.9.7b. Deceleration Time Singles Pairs*



Minimizing the time the boat decelerates is key to maximizing average boat speed, making deceleration time a performance factor. Crews can minimize deceleration time by extending the boat's peak speed later into the recovery, as discussed in Section 2.9.6 Recovery Peak Speed. Additionally, reducing entry time (Section 2.9.1) will allow the boat to accelerate sooner in the drive, reducing deceleration time. The crew must develop the skill to reverse direction quickly and minimize deceleration time.

Extending peak speed and reducing entry time must be practiced and improved together to minimize deceleration time effectively. Practices at low rates can double the time the crew is on the recovery, and athletes can extend

recovery peak speed as they accelerate toward the full reach position. At the same time, entry drills must improve the blade approach, entry, and connection. Not developing the two skills together may lead to other technical errors.

Figure 2.9.7c Deceleration Time Data shows the values for various boat classes at the World Championships. The data on the chart includes the average deceleration time values for crews in each boat class. The chart also includes the standard deviation, minimum and maximum values for each category, the percentage of stroke cycle time, and the number of crews in the sample.

*Figure 2.9.7c      Deceleration Time Data*

Boat Class	<b>Decel. Time</b>	Standard Deviation	Min.	Max	% of Cycle	Data Ref. (# of crews)
<b>W1x</b>	<b>0.46</b>	0.06	0.35	0.62	25.8%	(59) WC '17,'18,'19,'22,'23
<b>W2x</b>	<b>0.47</b>	0.04	0.40	0.55	28.4%	(16) WC '19,'22,'23
<b>W4x</b>	<b>0.48</b>	0.03	0.42	0.53	29.1%	(18) WC '17,'23
<b>W2-</b>	<b>0.47</b>	0.04	0.37	0.58	28.4%	(59) WC '17,'18,'19,'22,'23
<b>W4-</b>	<b>0.48</b>	0.04	0.40	0.57	29.4%	(18) WC '19,'23
<b>W8+</b>	<b>0.51</b>	0.04	0.42	0.60	31.9%	(40) WC '17,'18,'19,'22,'23
<b>M1x</b>	<b>0.42</b>	0.05	0.33	0.55	25.3%	(59) WC '17,'18,'19,'22,'23
<b>M2x</b>	<b>0.42</b>	0.04	0.37	0.52	26.7%	(17) WC '19,'22,'23
<b>M4x</b>	<b>0.49</b>	0.06	0.42	0.62	30.4%	(14) WC '17,'23
<b>M2-</b>	<b>0.44</b>	0.03	0.37	0.53	28.3%	(60) WC '17,'18,'19,'22,'23
<b>M4-</b>	<b>0.46</b>	0.04	0.38	0.53	29.6%	(18) WC '17,'19,'23
<b>M8+</b>	<b>0.49</b>	0.04	0.38	0.57	31.7%	(51) WC '17,'18,'19,'22,'23

The data in Figure 2.9.7c show that the deceleration time is less than half of a second at the highest levels of rowing. Minimizing this time is a factor of performance and requires advanced technical skills. In crew boats, all athletes must accelerate towards the catch together to transfer their body momentum to increase boat speed. The further on the recovery the crew accelerates, and the quicker the entry time, the lower the deceleration time.