

Improvement of kayak Sibir

For a given hull, small modifications can often be made that will decrease the resistance for a given stability or increase stability for a given resistance.

Kayak characteristics independent of paddler weight and cargo load

	Original kayak	Parameterized kayak	Improved kayak
Max width	0.556	0.57	0.541
One - sided keel angle midship, degrees	0.000503	0.000514	0.00116
Paddler lowest point above keel	0.0075	0.0075	0.0075
Total volume	0.403	0.393	0.394
Cargo capacity	0.253	0.227	0.234

Kayak characteristics dependent on paddler weight and cargo load

	Original kayak	Parameterized kayak	Improved kayak
Paddler weight	79.64	79.64	79.64
Kayak weight	25.	25.	25.
Cargo weight	0.	0.	0.
Ballast weight	0.	0.	0.
Maximum waterline beam	0.502	0.509	0.484
Wetted surface	1.99	1.96	1.95
Total surface including openings	5.77	5.73	5.7
Righting moment at 5 degrees, Nm	7.93	9.63	7.93
Righting moment at 30 degrees, Nm	41.6	49.9	41.6
Waterline in relation to bow	-0.297	-0.291	-0.294

Resistance

The program Flotilla (www.cyberiad.net) has been used to calculate resistance. The difference between the total resistance and the sum of skin and wave resistance is due to form resistance and splash resistance, which are not reported separately. These effects are small, however.

Flotilla takes account of the full geometry of the hull.

	Original kayak	Parameterized kayak	Improved kayak
Paddler weight	79.64	79.64	79.64
Kayak weight	25.	25.	25.
Test speed	2.06	2.06	2.06

	Original kayak	Parameterized kayak	Improved kayak
Frictional resistance	12.53	12.34	12.3
Wave resistance	2.084	1.181	1.488
Total resistance	15.21	14.14	14.4

	Original kayak	Parameterized kayak	Improved kayak
Frictional resistance	19.03	18.74	18.68
Wave resistance	3.243	4.394	3.275
Total resistance	23.18	24.14	22.94

	Original kayak	Parameterized kayak	Improved kayak
Frictional resistance	26.77	26.36	26.28
Wave resistance	9.679	13.15	11.09
Total resistance	37.55	40.67	38.51

Modifications of hull form

The solid lines show fore (left) and aft (right) half sections of the original kayak Sibir, the long dash lines show the half sections at the same positions for the parameterized kayak and the short dash lines show the half sections for the improved kayak.

