ICF Canoe Sprint Committee
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RESEARCH

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Are we able to weight wet boats in Boat Control #2?

Most of stakeholders are frustrated to boat control processes of canoe sprint discipline. Especially the process of Boat Control #2 (later BC#2) is very slow after finals in difficult weather conditions. The idea was to weight wet boats to find somehow faster process of BC #2.

Process of Boat Control #2

This research was done in Brandenburg during Junior World Championships on July 31st, 2011. The boats were turned carefully both sides up and down couple of times to get water out of boats. The boat control officials just had a quick look inside a boat that nothing loosely fit or extra things are there. The boats were weighed immediately. This part of process took only 5-10 seconds per boat in the tent depending on walking speed of volunteers.

Then volunteers dried the boat very carefully inside and outside. The drying was done inside tent and took 1-3 minutes per boat depending on working group per boat (2 volunteers and one ICF Official).

The second measurement (the real BC #2) was done by two calibrated scale unit, which had proofed accuracy of 20g. The weather condition was light rain. The humidity was very high. Drying process was more difficult than average because of poor and very wet drying towels.

Results

The reseach was done during semifinals and finals of 200m. 39 boats were measured in four categories (K1, K2, C1, C2). The boat manufactures were Nelo, Plastex and Vajda who were met in this research. Most of boats were from Nelo. There were no races available in categories of K4 and C4 at this time.

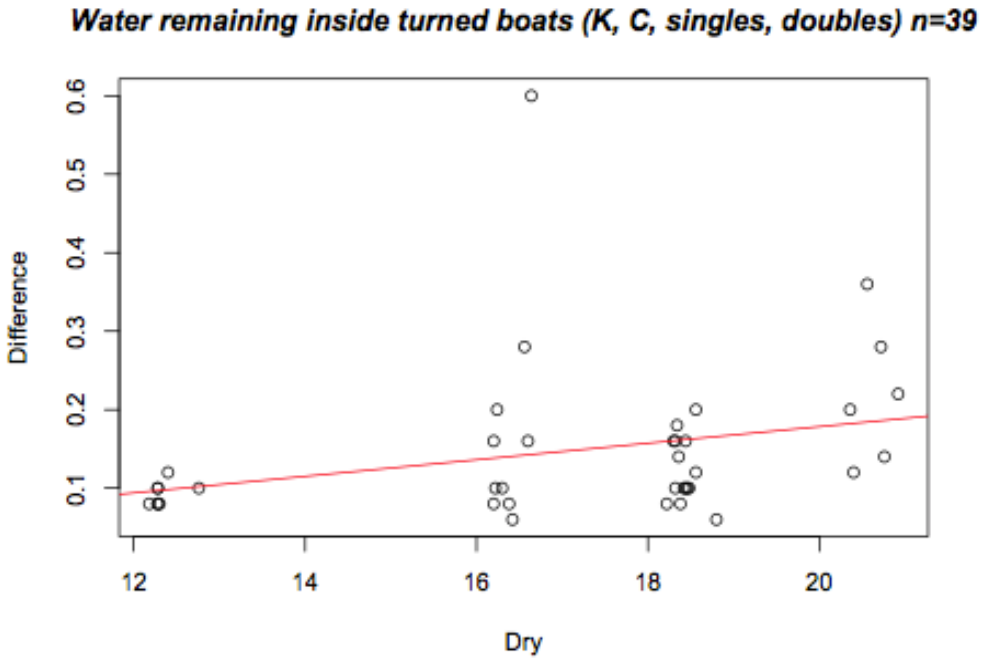
All the boats had extra weights including typical marginal tolerance over the weight required according to Canoe Sprint Racing Rules 2011-2012.

Women and men are using different size of boats. The bigger the boat is the more there will be water inside. Open canoes has more wet surface areas inside, so in this content they should be consider bigger boats.

Average - Difference	Gender		
Class	M	W	**Total Result**
C	0,222	0,087	**0,196**
K	0,123	0,098	**0,112**
Total Result	**0,172**	**0,095**	**0,147**

Table 1. Average amount of remaing water in different models used by different gender.

The following Picture 2 shows how much water we were able to dry in kilograms between two measurements. Normally the boats has secure of 100-200g depending on the culture of national teams. The dried boats near 12 kgs (x-axel) are K1s, near 16 kgs are C1s, near 18kgs K2s and near 20 kgs C2s.



Picture 2. Amount of water remaining after turning the boats (x – Dry weight of boat (kg), y – Dried water (kg)). Pearson's product-moment correlation / t = 1.8551, df = 37, p-value = 0.07156 / Sample estimates: cor 0.2917176 95 percent confidence interval: -0.02621207 0.55605436

The lightest K1 was 0,180 kgs over the minimum weight after drying. Equally the lightest K2 was 0,220 kgs, C1 0,200 kgs and C2 0,400 kgs over the minimum weight set in the rules. The heaviest dried boat was 1,140 kgs over.

Average - Portion	Model			
Category	Nelo	Plastex	Vajda	**Total Result**
C1	0,92%	1,53%		**1,11%**
C2	1,07%			**1,07%**
K1	0,75%			**0,75%**
K2	0,60%	0,98%	0,92%	**0,67%**
Total Result	**0,79%**	**1,39%**	**0,92%**	**0,86%**

Table 2. Average amount of remaing water per dry weight of boat per different manufactures.

Some canoe boat models didn't let water come out without drying. The canoes had much more wet areas. Generally canoes kept over 50% more water drops inside compared to kayaks. There were significant differences among different manufactures and certain boat models.

Discussion

The junior teams were not so professional to re-check the boats before races. The senior teams do much more efforts to optimize risks and extra-weights related to weather conditions.

Certain manufactures have made by purpose kind of constructions to block water inside the

structures; behind the walls, under the floors and inside the seats. This kind of solutions are high risks for officials, teams and athletes who has no complete understanding of the differences of boat models.

All the wet plastics bags and paddings on and besides the seat should be always removed before weighting in BC#2. Sometimes used belts and different soft constructions of footrest immerse water into.

Summary

Some models do block water come out easily. Based on future safety rules, we should create new rules to ban such constructions which made weighting slower.

It's possible to find a secure tolerance or marginal to weight wet for kayaks - but not yet for canoes. Based on this research the acceptable extra wet weight would be about 1,25% of dry kayak weight.

Category	Minimum dry weight (kg)	Minimum wet weight (kg)
K1	12,000	12,150
K2	18,000	18,225
K4	30,000	(30,375)
C1	16,000	(16,200)
C2	20,000	(20,250)
C4	30,000	(30,375)

Table 3. Proposal for minimum wet weight of different categories; "( )" means that more research or construction changes should be done before the change of boat control rules.

One challenge is that the expertize level of ICF Officials is inadequate to start this kind of new process with present boat models. If manufactures would co-operate to create better boat models for this aim, all categories might be acceptable.

The proposed process would be to dry only those boats which had a wet weight under this wet criteria in the Table 3. According to proposed criteria, all the 39 measured boat could be accepted in BC#2 of Brandenburg 2011. The time saving of BC#2 would be 2-4 minutes per race.

Remarks

This kind of new wet BC#2 could be done also at the ID/Polyox Control before the race if all the extra-weights would be taped (marked) permanently with special fragile tape signed by ICF Officials. Then boats could be be called direct to price giving ceremony.

We should add two new extra requirements for ICF Licensed boats in the future:

1. There should not any constructions to block water run out of boat when turned upside down.
2. There should be an extra, air-proof wall behind the last cockpit of kayak. All the boats would be easier and faster to empty and also more floatable to avoid lethal accidents in the situation of capsizing into cold water.