STUDY ON THE EFFICIENCY OF THE TEAMS PARTICIPATING IN THE MEN'S HANDBALL EUROPEAN CHAMPIONSHIP

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Abstract

Studying the handball game efficiency is topical, this standig at the basis of an effective sports training that ensures training and competition goals. The aim of the study is to determine the efficiency of teams participating in European Men's Handball Championship in Serbia 2012. In analyzing the efficiency of the handball teams in the 2012 Men's European Championship there were used the observation method (direct observation method by simply watching the matches) and the statistical-mathematical method, having as support statistics provided by the organizers through websites of the competition. Based on these benchmarks I wanted to see the evolution of these parameters during the last continental competition for national teams. In the study I analyzed the following parameters: attack efficiency, shots efficiency and goalkeepers efficiency for teams participating in the competition. As a result of this study we have outlined a few conclusions can be even trends in the evolution of modern handball game: high speed game with a great number of quick actions, increasing number of attacks by the teams, short attack times of the teams.

Keywords: *efficiency, handball, male, European Championship*

INTRODUCTION

Studying the handball game efficiency is topical, this standig at the basis of an effective sports training that ensures training and competition goals.

The aim of the study is to determine the efficiency of teams participating in European Men's Handball Championship in Serbia 2012.

The data obtained can constitute indicators outlining the evolution of the handball game and the minimal criteria for attendance at a tournament or getting a medal position, depending on each team's objective.

The competition was held from 15 to 29 of January 2012 in four cities (Belgrade, Nis, Novi Sad and Vrsac), there were played 47 matches which set the final ranking tournament: Denmark, Serbia, Croatia, Spain, FYR Macedonia, Slovenia, Germany, Hungary, Poland, Iceland, France, Sweden, Norway, Czech Republic, Russia, Slovakia.

MATERIAL METHOD

In analyzing the efficiency of the handball teams in the 2012 Men's European Championship there were used the observation method (direct observation method by simply watching the matches) and the statistical-mathematical method, having as support statistics provided by the organizers through websites of the competition (http://www.ehf-euro.com/) and of the European Handball Federation (www.eurohandball.com).

RESULTS AND DISCUSSIONS

Previous study mentioned in the special literature presents data regarding the minimum shots'efficiency (Taborsky F., 2001):

- Efficiency of the whole team in attack: 60%
- Backcourt: 40 – 45%
- Wing: 55 – 60%
- Central part of 6 m line: 60 – 65%
- Counterattack: 70 – 75%
- 7 m shots: 75 – 80%
- Attacks without shots: 15 – 20%
- Goalkeepers: 35 – 40%

Based on these benchmarks I wanted to see the evolution of these parameters during the last continental competition for national teams.

In the study I analyzed the following parameters: attack efficiency, shots efficiency and goalkeepers efficiency for teams participating in the competition.

Because the competition was attended by 16 teams, the statistical analysis was performed as follows: places 1-4 (Denmark, Serbia, Croatia, Spain), places 5-8 (FYR Macedonia, Slovenia, Germany, Hungary), places 9-16 (Poland, Iceland, France, Sweden, Norway, Czech Republic, Russia, Slovakia), places 1-16.

The analysis of the attack efficiency was made through the following indicators: the efficiency in majority attack, the efficiency in minority attack, the efficiency in positional attack, fastbreak efficiency (individually and collectively), the overall efficiency of the attack.

I mention that the first 4ranked teams played each 8 matches, those ranked on 5^{th} and 6^{th} positions played each 7 matches, teams ranked 7 – 12 played each 6 matches and the last 4 ranked teams played each 3 matches.

The overall effectiveness of the attack for all participating teams is 50% and the variations are minimal, teams ranked 9-16 have an efficiency of

49%. For other categories (places 1-4, places 5-8) the efficiency is 50%.

In the case of the majority attack the average efficiency for all participating teams is 60%. Teams ranked 1-4 had an efficiency of 60%, those on 5-8 places of 56%, while for the places 9-16 the efficiency was of 63% (table 1).

For the minority attack the general efficiency was 40%; for the first 4 ranked teams this was 36%, for places 5-8 - 50%, and for the teams ranked 9-16 - 41%.

In positional attack there were completed with goal 48% of the attacks, the teams ranked 9-16 (46%) having a lower efficiency.

The fastbreak efficiency was 65%; the teams ranked 5-8 - 67% recorded an above – average performance. In the case of the individual counterattacks the efficiency was higher (76%) than the collective ones (63%). About 12% of actions (604 of 5054) were conducted on the fastbreak and there were scored 394 goals of the 2508, almost 16% of the total scored goals (table 1).

Place	Team	MP	Attacks		Majority Att.		Minority Att.		Position Att.		Fastbreak Att.		Individual FB		Team Fastbreak	
			G / Att.	%	G / Att.	%	G / Att.	%	G / Att.	%	G / Att.	%	G / Att.	%	G / Att.	%
1	DEN	8	216/422	51	32/51	63	14/35	40	178/367	49	38/55	69	6/9	67	32/46	70
2	SRB	8	176/388	45	27/47	57	12/33	36	160/360	44	16/28	57	2/3	67	14/25	56
3	CRO	8	216/422	51	30/52	58	14/35	40	178/360	49	38/62	61	7/8	88	31/54	57
4	ESP	8	224/435	51	33/55	60	4/19	21	190/385	49	34/50	68	7/9	78	27/41	66
5	MKD	7	185/356	52	43/70	61	14/33	42	159/317	50	26/39	67	9/13	69	17/26	65
6	SLO	7	207/398	52	28/41	68	28/67	42	176/350	50	31/48	65	5/6	83	26/42	62
7	GER	6	156/323	48	13/30	43	19/46	41	135/295	46	21/28	75	14/16	88	7/12	58
8	HUN	6	156/319	49	23/48	48	15/35	43	135/287	47	21/32	66	6/7	86	15/25	60
9	POL	6	173/336	51	28/49	57	16/36	44	125/268	47	48/68	71	7/9	78	41/59	69
10	ISL	6	177/328	54	28/39	72	15/27	56	145/277	52	32/51	63	4/5	80	28/46	61
11	FRA	6	156/330	47	29/46	63	6/19	32	126/276	46	30/54	56	11/12	92	19/42	45
12	SWE	6	157/339	46	28/42	67	17/42	40	139/313	44	18/26	69	9/11	82	9/15	60
13	NOR	3	80/170	47	11/26	42	12/21	57	72/160	45	8/10	80	1/2	50	7/8	88
14	CZE	3	77/160	48	17/23	74	4/14	29	64/142	45	13/18	72	12/16	75	1/2	50
15	RUS	3	82/165	50	13/17	76	6/20	30	67/144	47	15/21	71	6/9	67	9/12	75
16	SVK	3	70/163	43	14/23	61	5/17	29	65/149	44	5/14	36	0/3	0	5/11	45

Attack efficiency	Attacks		Majority Att.		Minority Att.		Position Att.		Fastbreak Att.		Individual FB		Team Fastbreak	
	G / Att.	%	G / Att.	%	G / Att.	%	G / Att.	%	G / Att.	%	G / Att.	%	G / Att.	%
Places 1-4	832/1667	50	122/205	60	44/122	36	706/1472	48	126/195	65	22/29	76	104/166	63
Places 5-8	704/1396	50	107/190	56	76/181	50	605/1249	48	99/147	67	34/42	81	65/105	62
Places 9-16	972/1991	49	168/265	63	81/196	41	803/1729	46	169/262	65	50/67	75	119/195	61
Places 1-16	2508/5054	50	397/659	60	201/499	40	2114/4450	48	394/604	65	106/138	77	288/466	62

Table 1 Attack efficiency

In shots efficiency analysis, only the attacks completed by shot are accounted, and this underlines the share of the attacks missed by not throwing. Tabels 1 and 2 show that there were 5054 attacks and only 4385 shots, which means that 669 attacks (13%) were lost without throwing to ball towards the gate.

In achieving the shots efficiency analysis, the procedure was as it follows: 6m centre shots, wing shots, 9m shots, 7m penalty shots, fastbreaks and overall efficiency.

The efficiency of 6m centre shots for all teams was 67%, with significant differences: the first 4 ranked teams had a shots efficiency of 61%, those of places 5-8 - 67% and the 9 -16 places - 73%.

For wing shots the overall efficiency was 59% and the teams ranked 1-4 and 5-8 had a successful percentage of 60%, the teams placed 9-16 - 58%.

For 9m shots the overall average was 39%, the best percentage taken by teams ranked 9-16, and the worst taken by places 1-4.

In the case of the 7m shots the efficiency was 74%, ranging from 63% (positions 5-8) and 76% (positions 1-4).

On the fastbreak there were scored 394 goals of 529 throws, the successful rate is 79%, the

best percentage taken by teams ranked 5-8 (80%), while the worst taken by teams on positions 1-4 (72%).

The overall efficiency of the shots was 57%, being marked 2508 goals of 4385 shots, the percentage values obtained from the competition hierarchy are close: places 1-4 - 56%, places 5-8 - 59%, places 9-16 - 57% (table 2).

The performed analysis shows the low efficiency of the 9 m line with a percentage below 40%.

Place	Team	MP	6m Centre Shots		Wing Shots		9m Shots		7m Penalty Shots		Fast Breaks		Break throughs		Total	
			G / S	%	G / S	%	G / S	%	G / S	%	G / S	%	G / S	%	G / S	%
1	DEN	8	44/72	61	39/75	52	54/138	39	20/27	74	38/52	73	21/34	62	216/398	54
2	SRB	8	43/79	54	35/55	64	43/147	29	17/22	77	16/21	76	22/30	73	176/354	50
3	CRO	8	26/41	63	40/64	63	48/125	38	26/29	90	38/58	66	38/42	90	216/359	60
4	ESP	8	39/57	68	53/85	62	46/111	41	34/49	69	34/44	77	18/23	78	224/369	61
5	MKD	7	49/68	72	30/46	65	45/120	38	24/29	83	26/33	79	11/15	73	185/311	59
6	SLO	7	35/46	76	40/65	62	27/70	39	27/41	66	31/39	79	47/51	92	207/312	66
7	GER	6	33/54	61	30/55	55	46/123	37	15/20	75	21/25	84	11/15	73	156/292	53
8	HUN	6	17/32	53	24/41	59	59/136	43	18/23	78	21/27	78	17/23	74	156/282	55
9	POL	6	40/56	71	21/36	58	44/108	41	9/15	60	48/63	76	11/17	65	173/295	59
10	ISL	6	28/39	72	28/47	60	50/113	44	19/24	79	32/46	70	20/23	87	177/292	61
11	FRA	6	21/30	70	26/52	50	49/132	37	19/24	79	30/39	77	11/14	79	156/291	54
12	SWE	6	32/44	73	30/46	65	55/126	44	10/18	56	18/23	78	12/19	63	157/276	57
13	NOR	3	19/25	76	10/22	45	30/77	39	5/6	83	8/10	80	8/8	100	80/148	54
14	CZE	3	10/13	77	20/26	77	25/68	37	4/8	50	13/18	72	5/5	100	77/138	56
15	RUS	3	13/14	93	22/38	58	19/52	37	4/4	100	15/22	68	9/9	100	82/139	59
16	SVK	3	22/31	71	15/28	54	15/42	36	7/10	70	5/9	56	6/9	67	70/129	54
Shots efficiency			6m Centre Shots		Wing Shots		9m Shots		7m Penalty Shots		Fast Breaks		Break throughs		Total	
			G / S	%	G / S	%	G / S	%	G / S	%	G / S	%	G / S	%	G / S	%
Places 1-4			152/249	61	167/279	60	191/521	37	97/127	76	126/175	72	99/129	77	832/1480	56
Places 5-8			134/200	67	124/207	60	177/449	39	84/133	63	99/124	80	86/104	83	704/1194	59
Places 9-16			185/252	73	172/295	58	287/718	40	77/109	71	169/230	73	79/104	76	972/1708	57
Places 1-16			471/701	67	463/781	59	655/1688	39	258/349	74	394/529	74	267/337	79	2508/4385	57

Table 2 Shots efficiency

In terms of defensive efficiency I analyzed the performance of goalkeepers as it follows: 6m centre shots, wing shots, 9m shots, 7m penalty shots, fastbreaks and overall efficiency.

On average, goalkeepers were able to defend 27% of the shots from 6m centre (170 defended ball of 641 shots); the best goalkeepers efficiency had the teams ranked in the first 4 places (29%), and the lowest the goalkeepers of the teams ranked 5-8 (23%).

On wing shots the average efficiency was of 33%, the goalkeepers of teams ranked 1-4 had a successful percentage of 38%, those of the teams in places 5-8 - 35% and the efficiency for places 9-16 was 27%.

In the case of 9 m shots the average efficiency was 45% and the goalkeepers of the teams ranked in the first 4 places, and places 5-8 had an efficiency of 46%, and those of the teams ranked 9-16 defended 45% of the total shots.

23% was the average efficiency of goalkeepers for the 7 m shots, those of teams ranked 1-4 defended 24% of shots, for places 5-8 the goalkeepers efficiency was 20% and 9-16 places - 23%.

On the fastbreak, the goalkeepers managed to defend 20% of shots, the lowest efficiency was for goalkeepers of the teams ranked 1-4 (15%) and 9-16 (16%) and the best goalkeepers were those of the teams ranked on 5-8 places (22%).

The overall average efficiency of goalkeepers of the teams participating in the European Men's Handball Championship in Serbia 2012 was 32%: places 1-4 - 34%, places 5-8 - 33%, places 9-16 - 30% (table 3).

The data presented in goalkeepers efficiency analysis indicate their important role in

obtaining performance in competitions. This is evident in Serbian team where goalkeepers managed to defend 39% of shots, while the attack efficiency of the team was well below average (45%), but the best goalkeepers evolutions were decisive in getting the 2nd place at the end of the competition.

Place	Team	MP	6m Centre Shots		Wing Shots		9m Shots		7m Penalty Shots		Fast Breaks		Break throughs		Total	
			S / S	%	S / S	%	S / S	%	S / S	%	S / S	%	S / S	%	S / S	%
1	DEN	8	24/94	26	13/39	33	51/97	53	7/26	27	9/31	29	5/23	22	109/310	35
2	SRB	8	21/54	39	21/48	44	45/96	47	7/26	27	7/32	22	5/18	28	106/274	39
3	CRO	8	16/46	35	17/50	34	41/99	41	11/42	26	6/29	21	1/27	4	92/293	31
4	ESP	8	13/60	22	23/56	41	33/80	41	3/25	12	13/47	28	4/34	12	89/302	29
5	MKD	7	14/55	25	17/43	40	38/88	43	6/19	32	11/31	35	8/33	24	94/269	35
6	SLO	7	6/40	15	32/83	39	50/106	47	3/23	13	6/40	15	2/19	11	99/311	32
7	GER	6	14/51	27	8/34	24	40/90	44	3/15	20	5/29	17	4/11	36	74/230	32
8	HUN	6	6/29	21	13/40	33	38/80	48	3/19	16	8/41	20	6/26	23	74/235	31
9	POL	6	7/47	15	15/55	27	37/73	51	5/17	29	1/23	4	3/13	23	68/228	30
10	ISL	6	10/34	29	10/50	20	33/89	37	9/28	32	3/20	15	1/23	4	66/244	27
11	FRA	6	12/35	34	13/44	30	31/65	48	2/16	13	9/41	22	5/34	15	72/235	31
12	SWE	6	11/32	34	15/54	28	40/87	46	6/23	26	7/40	18	5/16	31	84/252	33
13	NOR	3	3/13	23	10/25	40	24/37	65	3/18	17	5/23	22	1/17	6	46/133	35
14	CZE	3	1/11	9	4/21	19	13/38	34	3/11	27	4/17	24	3/14	21	28/112	25
15	RUS	3	6/18	33	7/25	28	12/38	32	2/15	13	3/19	16	0/4	0	30/119	25
16	SVK	3	6/22	27	6/20	30	20/38	53	2/10	20	4/32	13	3/11	27	41/133	31
Goalkeepers efficiency			6m Centre Shots		Wing Shots		9m Shots		7m Penalty Shots		Fast Breaks		Breakthroughs		Total	
			S / S	%	S / S	%	S / S	%	S / S	%	S / S	%	S / S	%	S / S	%
Places 1-4			74/254	29	74/193	38	170/372	46	28/119	24	35/139	25	15/102	15	396/1179	34
Places 5-8			40/175	23	70/200	35	166/364	46	15/76	20	30/141	21	20/89	22	341/1045	33
Places 9-16			56/212	26	80/294	27	210/465	45	32/138	23	36/215	17	21/132	16	435/1456	30
Places 1-16			170/641	27	224/687	33	546/1201	45	75/333	23	101/495	20	56/323	17	1172/3680	32

Table 3 Goalkeepers efficiency

Analysing the data, it can be built (shape) a model of efficiency that a team must perform to attend the European Championship, respectively one for teams competing for the title.

In the case of teams which aim at attending the European Championship, they must perform the following efficiency indicators (table 4):

Attack efficiency	Attacks	Majority Att.	Minority Att.	Position Att.	Fastbreak Att.	Individual FB	Team Fastbreak
	48%	56%	37%	46%	62%	75%	60%
Shots efficiency	6m Centre Shots	Wing Shots	9m Shots	7m Penalty Shots	Fast Breaks	Break throughs	Total
	67%	59%	39%	74%	74%	79	57%
Goalkeepers efficiency	6m Centre Shots	Wing Shots	9m Shots	7m Penalty Shots	Fast Breaks	Break throughs	Total
	27%	33%	45%	23%	20%	17%	32%
Attacks without shots	13%						

Table 4 Minimum efficiency indicators for participation at European Championship

For teams that aim at winning the competition the efficiency must be more effective to meet the settled objective (table 5):

Attack efficiency	Attacks	Majority Att.	Minority Att.	Position Att.	Fastbreak Att.	Individual FB	Team Fastbreak
	52%	60%	40%	48%	65%	80%	62%
Shots efficiency	6m Centre Shots	Wing Shots	9m Shots	7m Penalty Shots	Fast Breaks	Break throughs	Total
	70%	60%	42%	78%	80%	81%	60%
Goalkeepers efficiency	6m Centre Shots	Wing Shots	9m Shots	7m Penalty Shots	Fast Breaks	Break throughs	Total
	30%	37%	47%	25%	25%	20%	35%
Attacks without shots	11%						

Table 5 Minimum efficiency indicators for winning the European Championship

The positive aspect resulting from this study are that goalkeepers have an important contribution to achieve the victory and there is a decrease in the number of attacks that do not end with shot towards the gate.

CONCLUSIONS

As a result of this study we have outlined a few conclusions can be even trends in the evolution of modern handball game:

- Increased individual techniques of the players.
- Advanced individual defense abilities enabling flexible play and defense strategies.
- High speed game with a great number of quick actions.
- Increasing number of attacks by the teams (55 to 60 attacks per game for each team).
- Short attack times of the teams (less than 20 seconds).
- Small number of passes before an attempt at goal.
- Simple fast breaks with a single (long) pass have a great efficiency (around 80%).
- Improved tactics to prevent a fast break with immediate return to defense to prevent fast breaks.
- Attack oriented to distract as many defense players as possible by using the 1 to 1 relation.
- After an unfinished fast break, teams tried to play by using tactical combinations without stopping the attack.
- Effective saves in 1 to 1 situations for goalkeepers.
- Increased cooperation goalkeepers-defense.
- Goalkeeper's efficiency had an effect on the team performance.
- Decreasing number of attacks without shot.

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