

2020 Season Hurdles Report

Hurdle Touchdown Times

Men's 110m Hurdles
Women's 100m Hurdles
Men's 400m Hurdles
Women's 400m Hurdles



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Todd Henson

2020 Season Hurdles Report

Men's 110m Hurdles

Top 10 Times	5
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2020 Season Hurdles Report

Notes:

- The times listed as TV Analysis are taken from [youtube.com](https://www.youtube.com) videos and generally coming from Television broadcasts. These are not always the best angles or coverage for getting times. They are often trying to tell a story by focusing on one athlete, and sometimes while shifting camera angles an extra frame can get added or removed.
- Where times are taken from the first movement, instead of the gun, there is at least a ± 0.12 second difference/error. This will show up from the start to the first hurdle and then from hurdle 10 to the finish. The between hurdle intervals should be fairly consistent, but there is still the usual ± 0.03 second
- Data errors, missing data, spelling mistakes, anything that need correction - please let me know. As always, I try to put together the most complete and accurate report possible.
- I have done the best I could, I hope people find it useful or at least interesting.

Men's 110m Hurdles

Ortega, Orlando (ESP) (1991)		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 Herculis Meeting International d'Athletisme (Monaco, MON) (TV Analysis)												Henson (2020) - Athlete First: 2020 year end hurdle report					
date	14-Aug	time	2.54	3.57	4.60	5.60	6.57	7.57	8.61	9.61	10.67	11.71	13.11	4 / 1			
reaction time	0.125	interval	7 steps	1.03	1.03	1.00	0.97	1.00	1.04	1.00	1.06	1.04	1.40		3.06	3.01	3.10
wind	0.8 m/s	velocity	5.40	8.87	8.87	9.14	9.42	9.14	8.79	9.14	8.62	8.79	10.01	8.39	8.96	9.11	8.85
Pozzi, Andy (GBR) (1992)		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 Herculis Meeting International d'Athletisme (Monaco, MON) (TV Analysis)												Henson (2020) - Athlete First: 2020 year end hurdle report					
date	14-Aug	time	2.52	3.54	4.54	5.54	6.54	7.54	8.57	9.57	10.61	11.68	13.14	5 / 2			
reaction time	0.125	interval	7 steps	1.02	1.00	1.00	1.00	1.00	1.03	1.00	1.04	1.07	1.46	=PB	3.02	3.03	3.11
wind	0.8 m/s	velocity	5.44	8.96	9.14	9.14	9.14	9.14	8.87	9.14	8.79	8.54	9.60	8.37	9.08	9.05	8.82
Ortega, Orlando (ESP) (1991)		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 Meeting Pro Athlé Tour de Marseille (Marseille, FRA) (TV Analysis)												Henson (2020) - Athlete First: 2020 year end hurdle report					
date	3-Sep	time	2.49	3.55	4.61	5.59	6.60	7.57	8.55	9.62	10.67	11.70	13.15	5 / 1			
reaction time	0.214	interval	7 steps	1.06	1.06	0.98	1.01	0.97	0.98	1.07	1.05	1.03	1.45		3.10	2.96	3.15
wind	-0.3 m/s	velocity	5.51	8.62	8.62	9.33	9.05	9.42	9.33	8.54	8.70	8.87	9.67	8.37	8.85	9.26	8.70
Pozzi, Andy (GBR) (1992)		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis)												Henson (2020) - Athlete First: 2020 year end hurdle report					
date	17-Sep	time	2.50	3.54	4.52	5.52	6.52	7.52	8.54	9.58	10.62	11.68	13.15	4 / 1			
reaction time	0.128	interval	7 steps	1.04	0.98	1.00	1.00	1.00	1.02	1.04	1.04	1.06	1.47		3.02	3.02	3.14
wind	0.1 m/s	velocity	5.49	8.79	9.33	9.14	9.14	9.14	8.96	8.79	8.79	8.62	9.54	8.37	9.08	9.08	8.73
Mallett, Aaron (USA) (1994)		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 Doha Diamond League (Doha, QAT) (TV Analysis)												Henson (2020) - Athlete First: 2020 year end hurdle report					
date	25-Sep	time	2.46	3.50	4.52	5.52	6.52	7.54	8.56	9.58	10.60	11.64	13.15	4 / 1			
reaction time	0.149	interval		1.04	1.02	1.00	1.00	1.02	1.02	1.02	1.02	1.04	1.51	PB	3.06	3.04	3.08
wind	0.3 m/s	velocity	5.58	8.79	8.96	9.14	9.14	8.96	8.96	8.96	8.96	8.79	9.28	8.37	8.96	9.02	8.90
Pozzi, Andy (GBR) (1992)		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 Paavo Nurmi Games (Turku, FIN) (TV Analysis)												Henson (2020) - Athlete First: 2020 year end hurdle report					
date	11-Aug	time	2.57	3.57	4.57	5.57	6.57	7.57	8.59	9.61	10.65	11.71	13.17	6 / 1			
reaction time	0.149	interval	7 steps	1.00	1.00	1.00	1.00	1.00	1.02	1.02	1.04	1.06	1.46		3.00	3.02	3.12
wind	1.1 m/s	velocity	5.34	9.14	9.14	9.14	9.14	9.14	8.96	8.96	8.79	8.62	9.60	8.35	9.14	9.08	8.79
Belocian, Wilhem (FRA) (1995)		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place			

2020 Doha Diamond League (Doha, QAT) (TV Analysis)

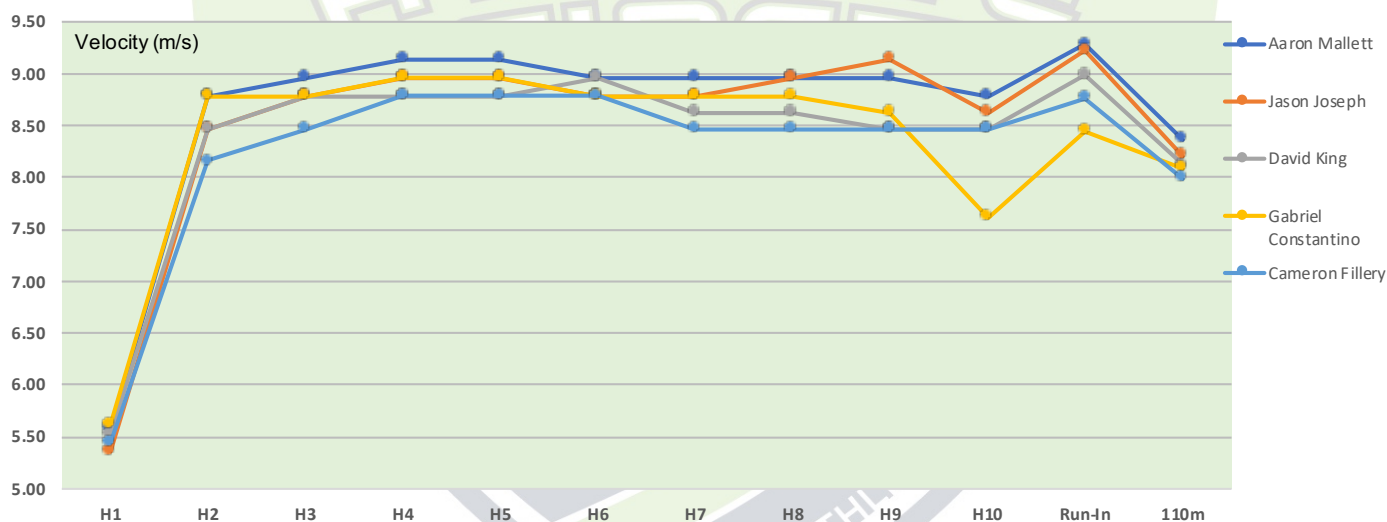
110m Hurdles

Date: 2020.09.25

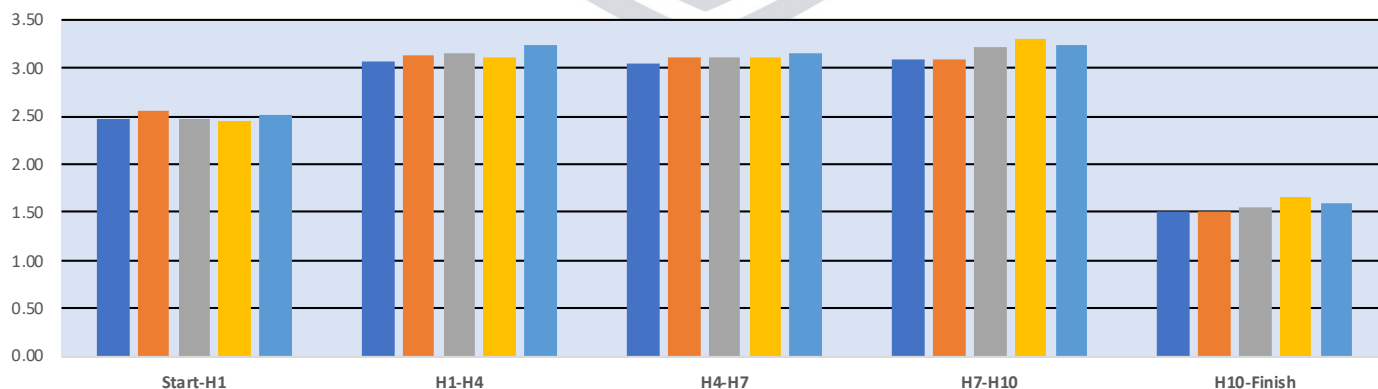
Wind: 0.3 m/s

FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Mallett, Aaron (USA) (1994)	time		2.46	3.50	4.52	5.52	6.52	7.54	8.56	9.58	10.60	11.64		13.15	4 / 1			
	reaction time	0.149																
	interval			1.04	1.02	1.00	1.00	1.02	1.02	1.02	1.02	1.04	1.51	PB		3.06	3.04	3.08
Joseph, Jason (SUI) (1998)	time		2.56	3.64	4.68	5.70	6.72	7.76	8.80	9.82	10.82	11.88		13.40	3 / 2			
	reaction time	0.196																
	interval		7 steps	1.08	1.04	1.02	1.02	1.04	1.04	1.02	1.00	1.06	1.52			3.14	3.10	3.08
King, David (GBR) (1994)	time		2.48	3.56	4.60	5.64	6.68	7.70	8.76	9.82	10.90	11.98		13.54	1 / 3			
	reaction time	0.109																
	interval		7 steps	1.08	1.04	1.04	1.04	1.04	1.06	1.06	1.08	1.08	1.56			3.16	3.12	3.22
Constantino, Gabriel (BRA) (1995)	time		2.44	3.48	4.52	5.54	6.56	7.60	8.64	9.68	10.74	11.94		13.60	7 / 4			
	reaction time	0.122																
	interval		7 steps	1.04	1.04	1.02	1.02	1.04	1.04	1.04	1.06	1.20	1.66			3.10	3.10	3.30
Fillery, Cameron (GBR) (1998)	time		2.52	3.64	4.72	5.76	6.80	7.84	8.92	10.00	11.08	12.16		13.76	6 / 5			
	reaction time	0.128																
	interval		7 steps	1.12	1.08	1.04	1.04	1.04	1.08	1.08	1.08	1.08	1.60			3.24	3.16	3.24
	velocity		5.58	8.79	8.96	9.14	8.96	8.96	8.79	8.96	8.62	8.46	8.99	8.12		8.96	9.02	8.90
			5.36	8.46	8.79	8.96	8.96	8.79	8.79	8.96	9.14	8.62	9.22	8.21		8.73	8.85	8.90
			5.62	8.79	8.79	8.96	8.96	8.79	8.79	8.79	8.62	7.62	8.45	8.09		8.85	8.85	8.31
			5.44	8.16	8.46	8.79	8.79	8.79	8.46	8.46	8.46	8.46	8.76	7.99		8.46	8.68	8.46



Time Intervals (s)



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 25fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=skTijbJdBS4>

2020 Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis)

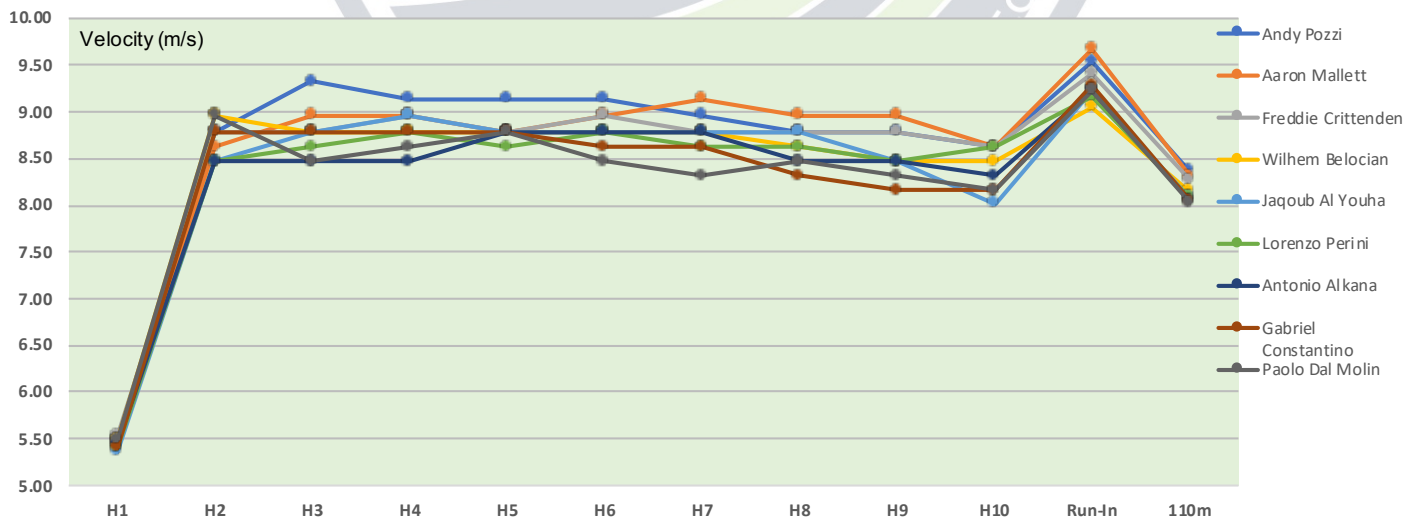
110m Hurdles

Date: 2020.09.17

Wind: 0.1 m/s

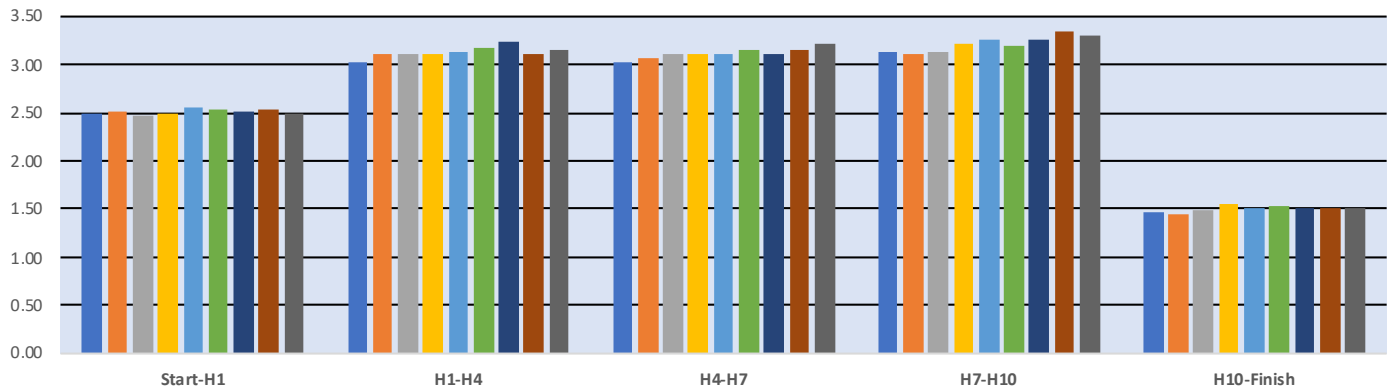
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Pozzi, Andy (GBR) (1992)	time		2.50	3.54	4.52	5.52	6.52	7.52	8.54	9.58	10.62	11.68		13.15	4 / 1			
	reaction time	0.128																
	interval velocity		7 steps	1.04	0.98	1.00	1.00	1.00	1.02	1.04	1.04	1.06	1.47			3.02	3.02	3.14
Mallett, Aaron (USA) (1994)	time		2.52	3.58	4.60	5.62	6.66	7.68	8.68	9.70	10.72	11.78		13.23	3 / 2			
	reaction time	0.149																
	interval velocity			1.06	1.02	1.02	1.04	1.02	1.00	1.02	1.02	1.06	1.45	PB		3.10	3.06	3.10
Crittenden, Freddie (USA) (1994)	time		2.48	3.52	4.56	5.58	6.62	7.64	8.68	9.72	10.76	11.82		13.31	6 / 3			
	reaction time	0.139																
	interval velocity			1.04	1.04	1.02	1.04	1.02	1.04	1.04	1.04	1.06	1.49			3.10	3.10	3.14
Belocian, Wilhem (FRA) (1995)	time		2.50	3.52	4.56	5.60	6.64	7.68	8.72	9.78	10.86	11.94		13.49	5 / 4			
	reaction time	0.134																
	interval velocity			1.02	1.04	1.04	1.04	1.04	1.04	1.06	1.08	1.08	1.55			3.10	3.12	3.22
Al Yoha, Jaqoub (KUW) (1993)	time		2.56	3.64	4.68	5.70	6.74	7.78	8.82	9.86	10.94	12.08		13.60	9 / 5			
	reaction time	0.139																
	interval velocity			1.08	1.04	1.02	1.04	1.04	1.04	1.08	1.14	1.52				3.14	3.12	3.26
Perini, Lorenzo (ITA) (1994)	time		2.54	3.62	4.68	5.72	6.78	7.82	8.88	9.94	11.02	12.08		13.61	7 / 6			
	reaction time	0.132																
	interval velocity			1.08	1.06	1.04	1.06	1.04	1.06	1.06	1.08	1.06	1.53			3.18	3.16	3.20
Alkana, Antonio (RSA) (1990)	time		2.52	3.60	4.68	5.76	6.80	7.84	8.88	9.96	11.04	12.14		13.66	8 / 7			
	reaction time	0.130																
	interval velocity			1.08	1.08	1.08	1.04	1.04	1.04	1.08	1.08	1.10	1.52			3.24	3.12	3.26
Constantino, Gabriel (BRA) (1995)	time		2.54	3.58	4.62	5.66	6.70	7.76	8.82	9.92	11.04	12.16		13.67	2 / 8			
	reaction time	0.161																
	interval velocity			1.04	1.04	1.04	1.04	1.06	1.06	1.10	1.12	1.12	1.51			3.12	3.16	3.34
Dal Molin, Paolo (ITA) (1987)	time		2.50	3.52	4.60	5.66	6.70	7.78	8.88	9.96	11.06	12.18		13.70	1 / 9			
	reaction time	0.134																
	interval velocity			1.02	1.08	1.06	1.04	1.08	1.10	1.08	1.10	1.12	1.52			3.16	3.22	3.30



Time Intervals (s)

Hurdle Phases

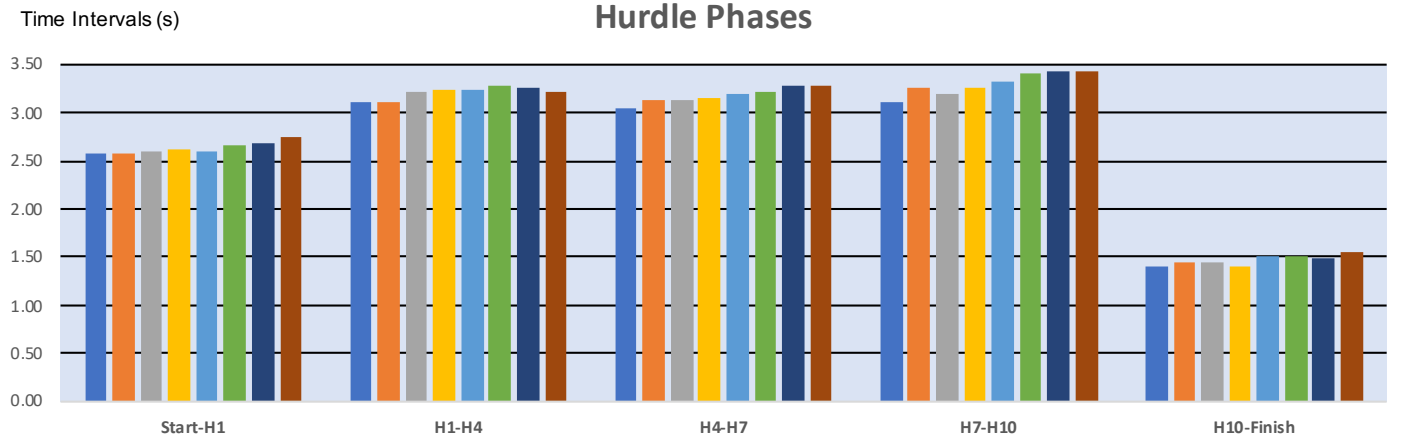
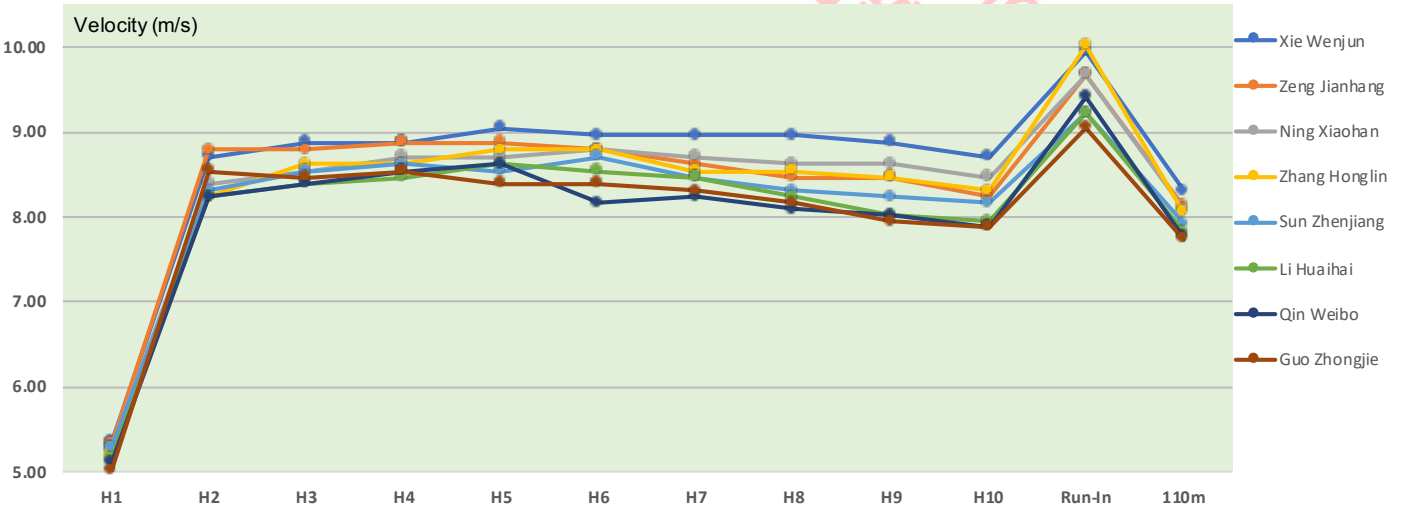


Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 25fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=3PTYZlePoA>

Biomechanical Analysis

2020 Chinese National Championships (Shaoxing, CHN)

110m Hurdles			Date: 2020.09.16			Wind: 0.4 m/s			FINAL									
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Xie Wenjun (CHN) (1990)	time		2.57	3.62	4.65	5.68	6.69	7.71	8.73	9.75	10.78	11.83		13.24	5 / 1	3.11	3.05	3.10
	reaction time	0.162																
	interval		7 steps	1.05	1.03	1.03	1.01	1.02	1.02	1.02	1.03	1.05	1.41	13.24				
	velocity		5.34	8.70	8.87	8.87	9.05	8.96	8.96	8.96	8.87	8.70	9.94	8.31		8.82	8.99	8.85
Zeng Jianhang (CHN) (1998)	time		2.58	3.62	4.66	5.69	6.72	7.76	8.82	9.90	10.98	12.09		13.54	6 / 2	3.11	3.13	3.27
	reaction time	0.156																
	interval		5.32	8.79	8.79	8.87	8.87	8.79	8.62	8.46	8.46	8.23	9.67	8.12				
	velocity		5.32	8.79	8.79	8.87	8.87	8.79	8.62	8.46	8.46	8.23	9.67	8.12		8.82	8.76	8.39
Ning Xiaohan (CHN) (2000)	time		2.60	3.69	4.76	5.81	6.86	7.90	8.95	10.01	11.07	12.15		13.60	7 / 3	3.21	3.14	3.20
	reaction time	0.144																
	interval		7 steps	1.09	1.07	1.05	1.05	1.04	1.05	1.06	1.06	1.08	1.45	PB				
	velocity		5.28	8.39	8.54	8.70	8.70	8.79	8.70	8.62	8.62	8.46	9.67	8.09		8.54	8.73	8.57
Zhang Honglin (CHN) (1994)	time		2.63	3.74	4.80	5.86	6.90	7.94	9.01	10.08	11.16	12.26		13.66	4 / 4	3.23	3.15	3.25
	reaction time	0.167																
	interval		5.22	8.23	8.62	8.62	8.79	8.79	8.54	8.54	8.46	8.31	10.01	8.05				
	velocity		5.22	8.23	8.62	8.62	8.79	8.79	8.54	8.54	8.46	8.31	10.01	8.05		8.49	8.70	8.44
Sun Zhenjiang (CHN) (1999)	time		2.60	3.70	4.77	5.83	6.90	7.95	9.03	10.13	11.24	12.36		13.88	9 / 5	3.23	3.20	3.33
	reaction time	0.176																
	interval		7 steps	1.10	1.07	1.06	1.07	1.05	1.08	1.10	1.11	1.12	1.52					
	velocity		5.28	8.31	8.54	8.62	8.54	8.70	8.46	8.31	8.23	8.16	9.22	7.93		8.49	8.57	8.23
Li Huaihai (CHN) (1999)	time		2.66	3.77	4.86	5.94	7.00	8.07	9.15	10.26	11.40	12.55		14.07	3 / 6	3.28	3.21	3.40
	reaction time	0.171																
	interval		5.16	8.23	8.39	8.46	8.62	8.54	8.46	8.23	8.02	7.95	9.22	7.82				
	velocity		5.16	8.23	8.39	8.46	8.62	8.54	8.46	8.23	8.02	7.95	9.22	7.82		8.36	8.54	8.06
Qin Weibo (CHN) (2002)	time		2.69	3.80	4.89	5.96	7.02	8.14	9.25	10.38	11.52	12.68		14.17	8 / 7	3.27	3.29	3.43
	reaction time	0.169																
	interval		5.10	8.23	8.39	8.54	8.62	8.16	8.23	8.09	8.02	7.88	9.41	7.76				
	velocity		5.10	8.23	8.39	8.54	8.62	8.16	8.23	8.09	8.02	7.88	9.41	7.76		8.39	8.33	7.99
Guo Zhongjie (CHN) (2001)	time		2.74	3.81	4.89	5.96	7.05	8.14	9.24	10.36	11.51	12.67		14.22	2 / 8	3.22	3.28	3.43
	reaction time	0.185																
	interval		5.01	8.54	8.46	8.54	8.39	8.39	8.31	8.16	7.95	7.88	9.05	7.74				
	velocity		5.01	8.54	8.46	8.54	8.39	8.39	8.31	8.16	7.95	7.88	9.05	7.74		8.52	8.36	7.99



Evaluated with: DartFish
Quality & Frame Rate: 25fps
Timing From: Gun Flash
Source: Chinese Hurdle Development (2020)

2020 French National Championships (Albi, FRA) (TV Analysis)

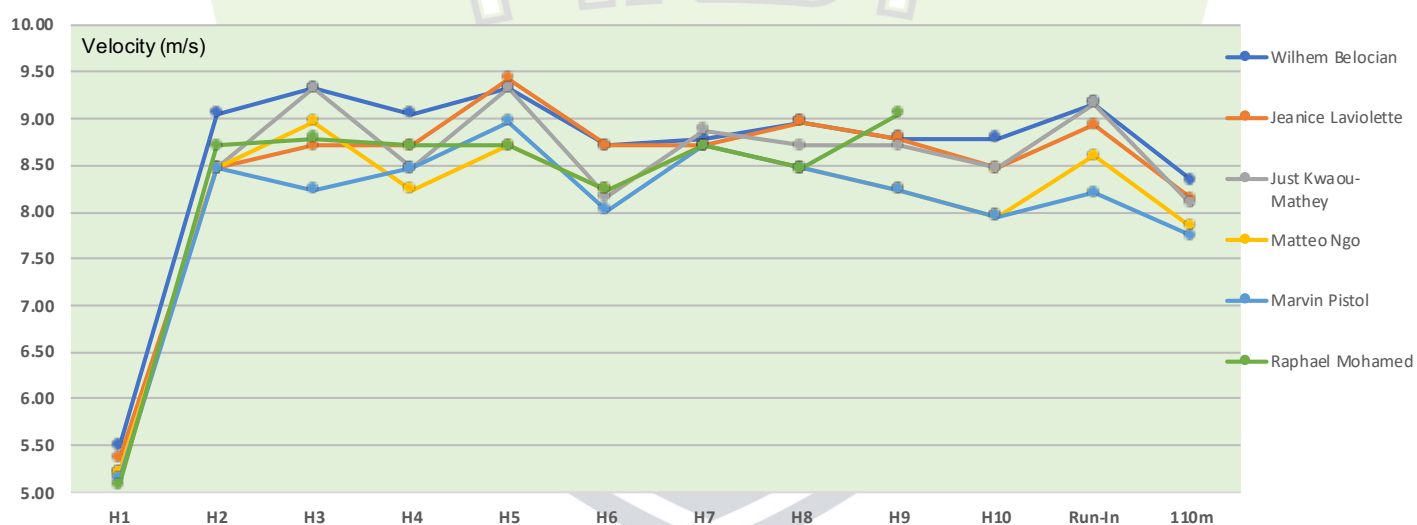
110m Hurdles

Date: 2020.09.13

Wind: 0.0 m/s

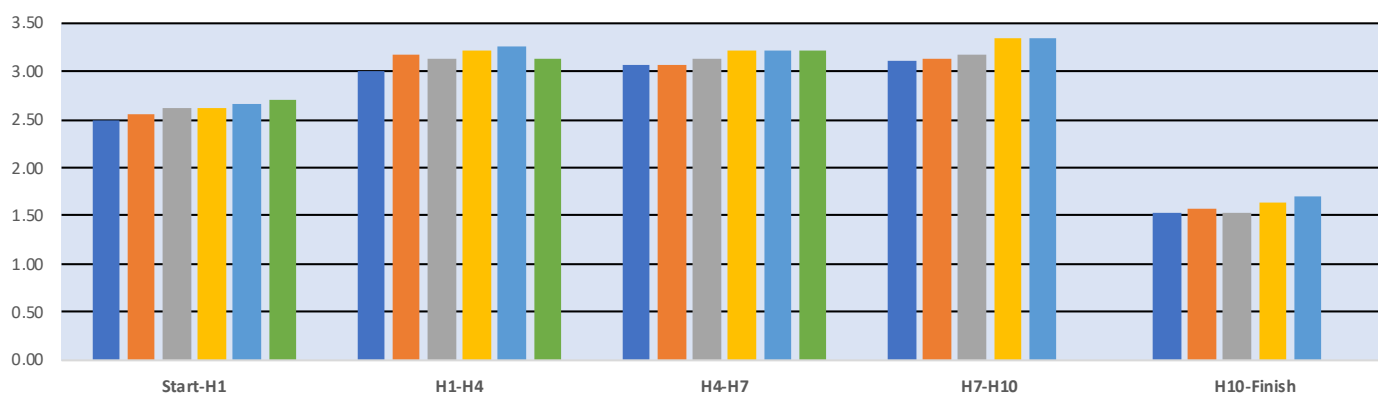
A FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Belocian, Wilhem (FRA) (1995)	time		2.50	3.51	4.49	5.50	6.48	7.53	8.57	9.59	10.63	11.67		13.20	4 / 1			
	reaction time	0.156														3.00	3.07	3.10
	interval velocity		5.49	9.05	9.33	9.05	9.33	8.70	8.79	8.96	8.79	8.79	9.16	8.33		9.14	8.93	8.85
Laviolette, Jeanice (FRA) (2000)	time		2.56	3.64	4.69	5.74	6.71	7.76	8.81	9.83	10.87	11.95		13.52	5 / 2			
	reaction time	0.222														3.18	3.07	3.14
	interval velocity		7 steps 5.36	1.08 8.46	1.05 8.70	1.05 8.70	0.97 9.42	1.05 8.70	1.05 8.70	1.02 8.96	1.04 8.79	1.08 8.46	1.57 8.93	8.14		8.62	8.93	8.73
Kwaou-Mathey, Just (FRA) (1999)	time		2.63	3.71	4.69	5.77	6.75	7.87	8.90	9.95	11.00	12.08		13.61	3 / 3			
	reaction time	0.199														3.14	3.13	3.18
	interval velocity		7 steps 5.22	1.08 8.46	0.98 9.33	1.08 8.46	0.98 9.33	1.12 8.16	1.03 8.87	1.05 8.70	1.05 8.70	1.08 8.46	1.53 9.16	8.08		8.73	8.76	8.62
Ngo, Matteo (FRA) (1998)	time		2.63	3.71	4.73	5.84	6.89	8.00	9.05	10.13	11.24	12.39		14.02	2 / 4			
	reaction time	0.218														3.21	3.21	3.34
	interval velocity		5.22	1.08 8.46	1.02 8.96	1.11 8.23	1.05 8.70	1.11 8.23	1.05 8.70	1.08 8.46	1.11 8.23	1.15 7.95	1.63 8.60	7.85		8.54	8.54	8.21
Pistol, Marvin (FRA) (1996)	time		2.67	3.75	4.86	5.94	6.96	8.10	9.15	10.23	11.34	12.49		14.20	1 / 5			
	reaction time	0.202														3.27	3.21	3.34
	interval velocity		5.14	1.08 8.46	1.11 8.23	1.08 8.46	1.02 8.96	1.14 8.02	1.05 8.70	1.08 8.46	1.11 8.23	1.15 7.95	1.71 8.20	7.75		8.39	8.54	8.21
Mohamed, Raphael (FRA) (1998)	time		2.70	3.75	4.79	5.84	6.89	8.00	9.05	10.13	11.14		dnf		7 / --			
	reaction time	0.270														3.14	3.21	
	interval velocity		7 steps 5.08	1.05 8.70	1.04 8.79	1.05 8.70	1.05 8.70	1.11 8.23	1.05 8.70	1.08 8.46	1.01 9.05					8.73	8.54	



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1280 x 720 @ 30fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=4pR5TWNOfyk>

2020 Meeting Pro Athlé Tour de Marseille (Marseille, FRA) (TV Analysis)

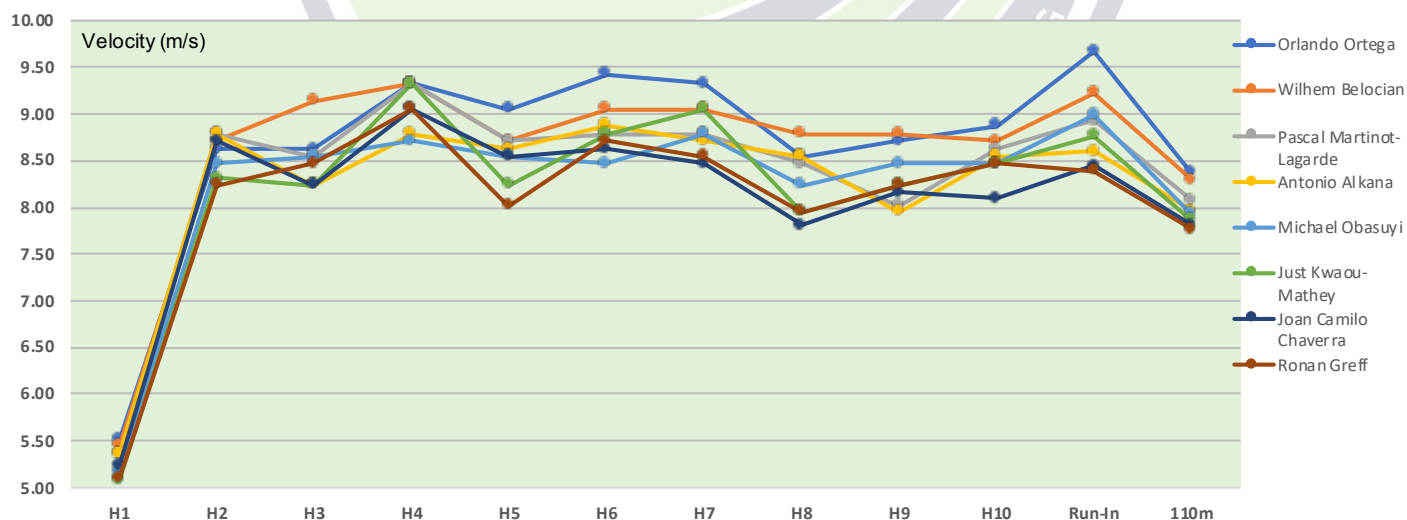
110m Hurdles

Date: 2020.09.03

Wind: -0.3 m/s

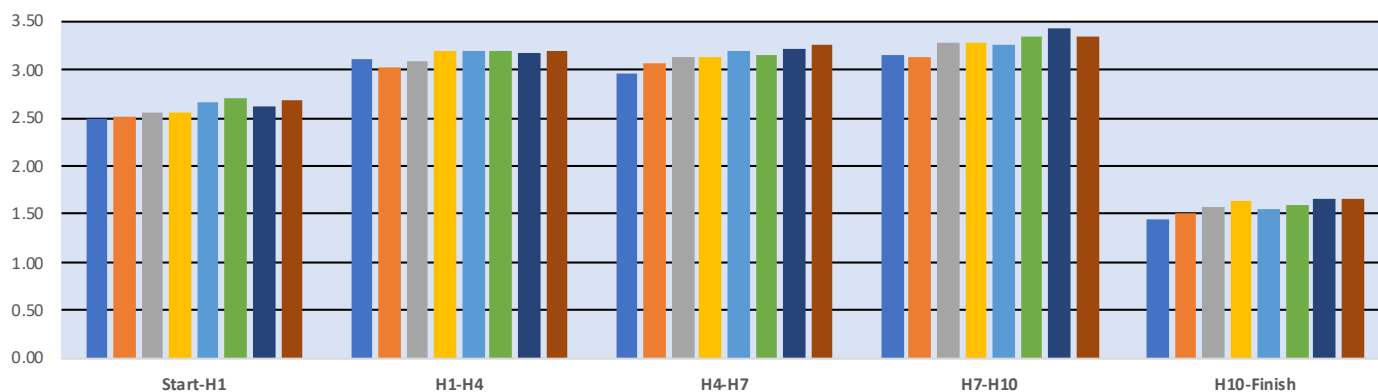
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Ortega, Orlando (ESP) (1991)	time	2.49	3.55	4.61	5.59	6.60	7.57	8.55	9.62	10.67	11.70		13.15	5 / 1	3.10	2.96	3.15
	reaction time	0.214															
	interval	7 steps	1.06	1.06	0.98	1.01	0.97	0.98	1.07	1.05	1.03	1.45					
Belocian, Wilhem (FRA) (1995)	time	2.52	3.57	4.57	5.55	6.60	7.61	8.62	9.66	10.70	11.75		13.27	6 / 2	3.03	3.07	3.13
	reaction time	0.211										1.52					
	interval	7 steps	1.05	1.00	0.98	1.05	1.01	1.01	1.04	1.04	1.05	1.52					
Martinot-Lagarde, Pascal (FRA) (1991)	time	2.56	3.60	4.67	5.65	6.70	7.74	8.78	9.86	11.00	12.06		13.63	4 / 3	3.09	3.13	3.28
	reaction time																
	interval	7 steps	1.04	1.07	0.98	1.05	1.04	1.04	1.08	1.14	1.06	1.57					
Alkana, Antonio (RSA) (1990)	time	2.56	3.60	4.71	5.75	6.81	7.84	8.89	9.96	11.11	12.18		13.81	3 / 4	3.19	3.14	3.29
	reaction time	0.201										1.63					
	interval	7 steps	1.04	1.11	1.04	1.06	1.03	1.05	1.07	1.15	1.07	1.63					
Obasuyi, Michael (BEL) (1999)	time	2.66	3.74	4.81	5.86	6.93	8.01	9.05	10.16	11.24	12.32		13.88	7 / 5	3.20	3.19	3.27
	reaction time	0.208															
	interval	7 steps	1.08	1.07	1.05	1.07	1.08	1.04	1.11	1.08	1.08	1.56					
Kwaou-Mathey, Just (FRA) (1999)	time	2.70	3.80	4.91	5.89	7.00	8.04	9.05	10.20	11.31	12.39		13.99	2 / 6	3.19	3.16	3.34
	reaction time																
	interval	7 steps	1.10	1.11	0.98	1.11	1.04	1.01	1.15	1.11	1.08	1.60					
Chaverra, Joan Camilo (COL) (1995)	time	2.62	3.67	4.78	5.79	6.86	7.92	9.00	10.17	11.29	12.42		14.08	8 / 7	3.17	3.21	3.42
	reaction time																
	interval	7 steps	1.05	1.11	1.01	1.07	1.06	1.08	1.17	1.12	1.13	1.66					
Greff, Ronan (FRA) (1998)	time	2.69	3.80	4.88	5.89	7.03	8.08	9.15	10.30	11.41	12.49		14.16	1 / 8	3.20	3.26	3.34
	reaction time	0.247															
	interval	7 steps	1.11	1.08	1.01	1.14	1.05	1.07	1.15	1.11	1.08	1.67					
	velocity		5.51	8.62	8.62	9.33	9.05	9.42	9.33	8.54	8.70	8.87	8.37		8.85	9.26	8.70
	velocity		5.44	8.70	9.14	9.33	8.70	9.05	9.05	8.79	8.79	8.70	9.22		9.05	8.93	8.76
	velocity		5.36	8.79	8.54	9.33	8.70	8.79	8.79	8.46	8.02	8.62	8.93		8.87	8.76	8.36
	velocity		5.36	8.79	8.23	8.79	8.62	8.87	8.70	8.54	7.95	8.54	8.60		8.60	8.73	8.33
	velocity		5.16	8.46	8.54	8.70	8.54	8.46	8.79	8.23	8.46	8.46	8.99		8.57	8.60	8.39
	velocity		5.08	8.31	8.23	9.33	8.23	8.79	9.05	7.95	8.23	8.46	8.76		8.60	8.68	8.21
	velocity		5.24	8.70	8.23	9.05	8.54	8.62	8.46	7.81	8.16	8.09	8.45		8.65	8.54	8.02
	velocity		5.10	8.23	8.46	9.05	8.02	8.70	8.54	7.95	8.23	8.46	8.40		8.57	8.41	8.21



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1280 x 716 @ 30fps
 Timing From: First Movement
 Source: https://www.youtube.com/watch?v=g9_Gx6u7UIY

2020 István Gyulai Memorial (Székesfehérvár, HUN) (TV Analysis)

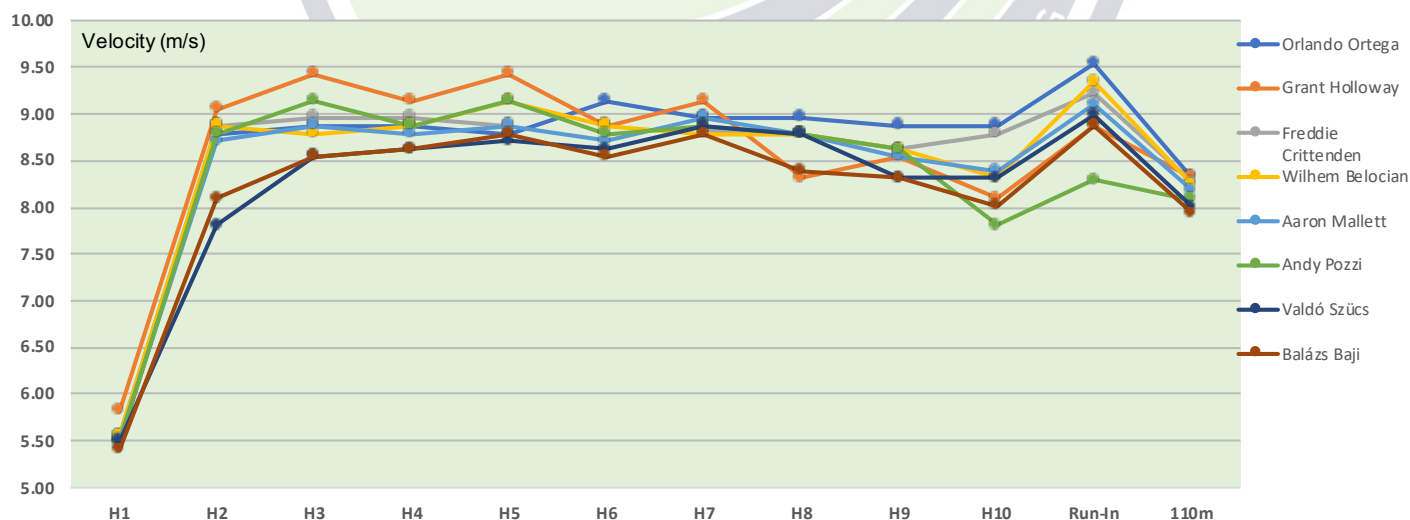
110m Hurdles

Date: 2020.08.19

Wind: 0.3 m/s

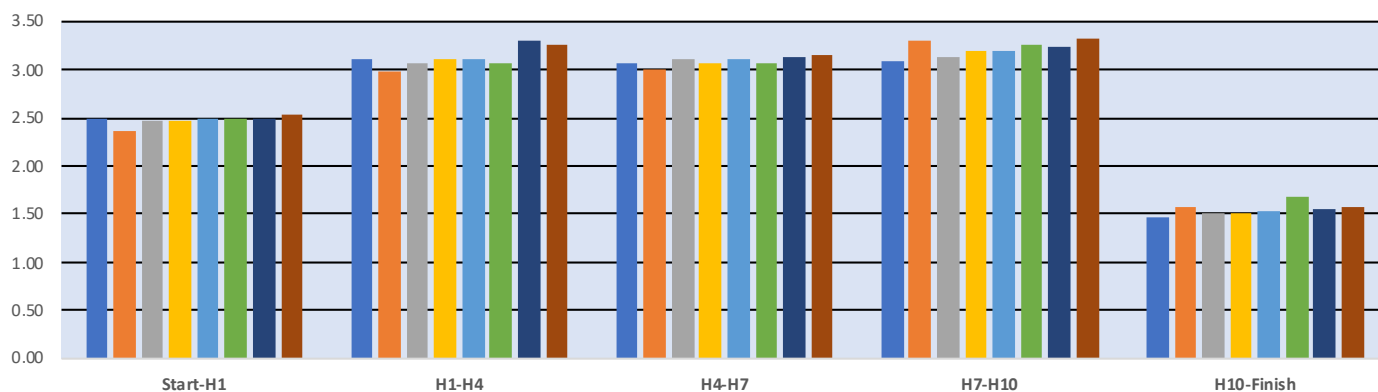
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Ortega, Orlando (ESP) (1991)	time		2.50	3.54	4.57	5.60	6.64	7.64	8.66	9.68	10.71	11.74		13.21	4 / 1			
	reaction time	0.146														3.10	3.06	3.08
	interval		7 steps	1.04	1.03	1.03	1.04	1.00	1.02	1.02	1.03	1.03	1.47			8.85	8.96	8.90
Holloway, Grant (USA) (1997)	time		2.36	3.37	4.34	5.34	6.31	7.34	8.34	9.44	10.51	11.64		13.22	3 / 2			
	reaction time	0.141														2.98	3.00	3.30
	interval		7 steps	1.01	0.97	1.00	0.97	1.03	1.00	1.10	1.07	1.13	1.58			9.20	9.14	8.31
Crittenden, Freddie (USA) (1994)	time		2.47	3.50	4.52	5.54	6.57		8.64	9.68	10.74	11.78		13.30	8 / 3			
	reaction time	0.146							2.07	1.04	1.06	1.04	1.52			3.07	3.10	3.14
	interval			1.03	1.02	1.02	1.03		8.83	8.79	8.62	8.79	9.22			8.93	8.85	8.73
Belocian, Wilhem (FRA) (1995)	time		2.47	3.50	4.54	5.57	6.57	7.60	8.64	9.68	10.74	11.84		13.34	6 / 4			
	reaction time	0.134							1.04	1.04	1.06	1.10	1.50			3.10	3.07	3.20
	interval			1.03	1.04	1.03	1.00	1.03	1.04	1.04	1.06	1.10	9.35			8.85	8.93	8.57
Mallett, Aaron (USA) (1994)	time		2.49	3.54	4.57	5.61	6.64	7.69	8.71	9.75	10.82	11.91		13.45	1 / 5			
	reaction time	0.168							1.02	1.04	1.07	1.09	1.54			3.12	3.10	3.20
	interval			1.05	1.03	1.04	1.03	1.05	1.02	1.04	1.07	1.09	9.10			8.79	8.85	8.57
Pozzi, Andy (GBR) (1992)	time		2.50	3.54	4.54	5.57	6.57	7.61	8.64	9.68	10.74	11.91		13.60	5 / 6			
	reaction time	0.127							1.03	1.04	1.06	1.17	1.69			3.07	3.07	3.27
	interval		7 steps	1.04	1.00	1.03	1.00	1.04	1.03	1.04	1.06	1.17	8.30			8.93	8.93	8.39
Szűcs, Valdó (HUN) (1995)	time		2.50	3.67	4.74	5.80	6.85	7.91	8.94	9.98	11.08	12.18		13.74	7 / 7			
	reaction time	0.141							1.03	1.04	1.10	1.10	1.56			3.30	3.14	3.24
	interval		7 steps	1.17	1.07	1.06	1.05	1.06	1.03	1.04	1.10	1.10	8.99			8.31	8.73	8.46
Baji, Balázs (HUN) (1989)	time		2.54	3.67	4.74	5.80	6.84	7.91	8.95	10.04	11.14	12.28		13.86	2 / 8			
	reaction time	0.137							1.04	1.09	1.10	1.14	1.58			3.26	3.15	3.33
	interval		7 steps	1.13	1.07	1.06	1.04	1.07	1.04	1.09	1.10	1.14	8.87			8.41	8.70	8.23



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1280 x 720 @ 30fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=3kegm8ycjiU>

2020 Herculis Meeting International d'Athletisme (Monaco, MON) (TV Analysis)

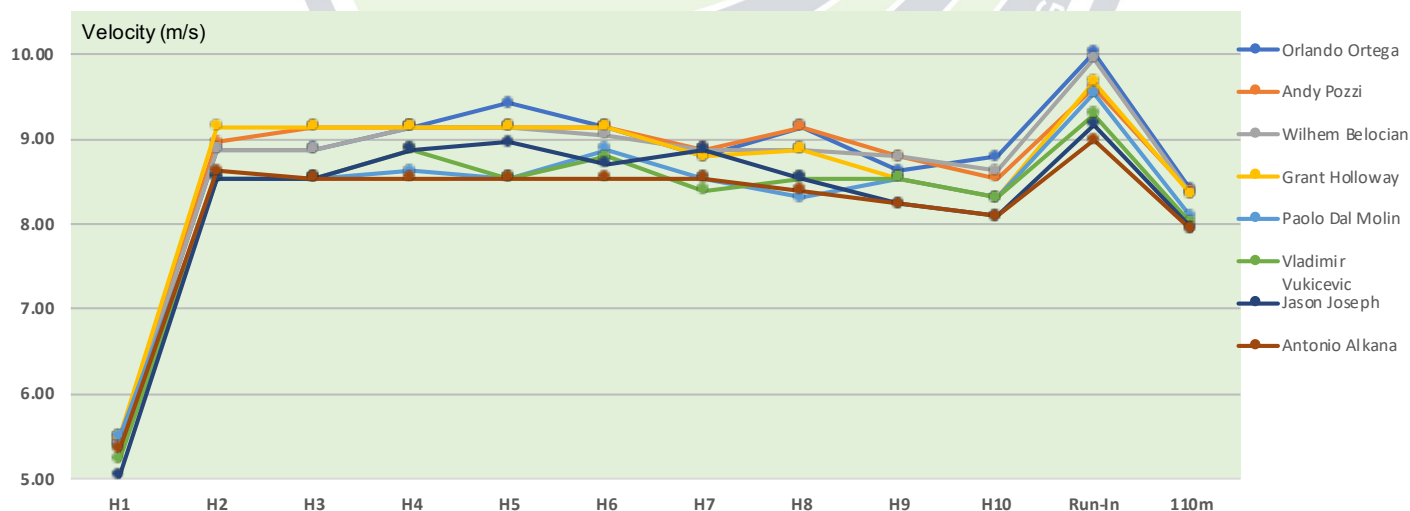
110m Hurdles

Date: 2020.08.14

Wind: 0.8 m/s

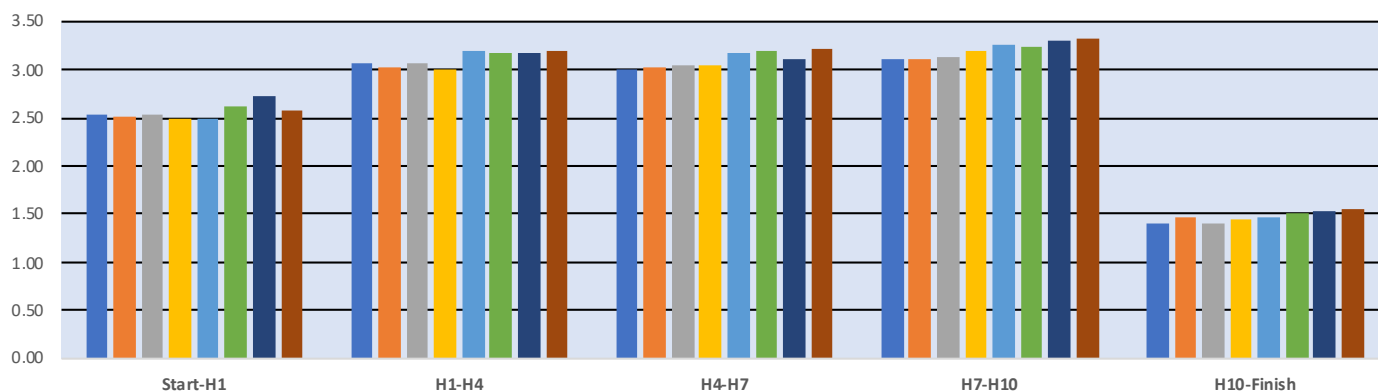
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Ortega, Orlando (ESP) (1991)	time		2.54	3.57	4.60	5.60	6.57	7.57	8.61	9.61	10.67	11.71		13.11	4 / 1	3.06	3.01	3.10
	reaction time	0.125																
	interval		7 steps	1.03	1.03	1.00	0.97	1.00	1.04	1.00	1.06	1.04	1.40	8.39				
Pozzi, Andy (GBR) (1992)	time		2.52	3.54	4.54	5.54	6.54	7.54	8.57	9.57	10.61	11.68		13.14	5 / 2	3.02	3.03	3.11
	reaction time	0.125																
	interval		7 steps	1.02	1.00	1.00	1.00	1.00	1.03	1.00	1.04	1.07	1.46	8.37				
Belocian, Wilhem (FRA) (1995)	time		2.54	3.57	4.60	5.60	6.60	7.61	8.64	9.67	10.71	11.77		13.18	6 / 3	3.06	3.04	3.13
	reaction time	0.134																
	interval		7 steps	1.03	1.03	1.00	1.00	1.01	1.03	1.03	1.04	1.06	1.41	8.35				
Holloway, Grant (USA) (1997)	time		2.50	3.50	4.50	5.50	6.50	7.50	8.54	9.57	10.64	11.74		13.19	3 / 4	3.00	3.04	3.20
	reaction time	0.163																
	interval		7 steps	1.00	1.00	1.00	1.00	1.00	1.04	1.03	1.07	1.10	1.45	8.34				
Dal Molin, Paolo (ITA) (1987)	time		2.50	3.57	4.64	5.70	6.77	7.80	8.87	9.97	11.04	12.14		13.61	8 / 5	3.20	3.17	3.27
	reaction time	0.123																
	interval		7 steps	1.07	1.07	1.06	1.07	1.03	1.07	1.10	1.07	1.10	1.47	8.08				
Vukicevic, Vladimir (NOR) (1991)	time		2.63	3.70	4.77	5.80	6.87	7.91	9.00	10.07	11.14	12.24		13.75	1 / 6	3.17	3.20	3.24
	reaction time	0.130																
	interval		7 steps	1.07	1.07	1.03	1.07	1.04	1.09	1.07	1.10	1.10	1.51	8.00				
Joseph, Jason (SUI) (1998)	time		2.73	3.80	4.87	5.90	6.92	7.97	9.00	10.07	11.18	12.31		13.84	2 / 7	3.17	3.10	3.31
	reaction time	0.233																
	interval		7 steps	1.07	1.07	1.03	1.02	1.05	1.03	1.07	1.11	1.13	1.53	7.95				
Alkana, Antonio (RSA) (1990)	time		2.57	3.63	4.70	5.77	6.84	7.91	8.98	10.07	11.18	12.31		13.87	7 / 8	3.20	3.21	3.33
	reaction time	0.134																
	interval		7 steps	1.06	1.07	1.07	1.07	1.07	1.07	1.09	1.11	1.13	1.56	7.93				
	velocity		5.40	8.87	8.87	9.14	9.42	9.14	8.79	9.14	8.62	8.79	10.01	8.39		8.96	9.11	8.85



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: Gun Flash

Source: <https://www.youtube.com/watch?v=065EPGDwo0o>

2020 Paavo Nurmi Games (Turku, FIN) (TV Analysis)

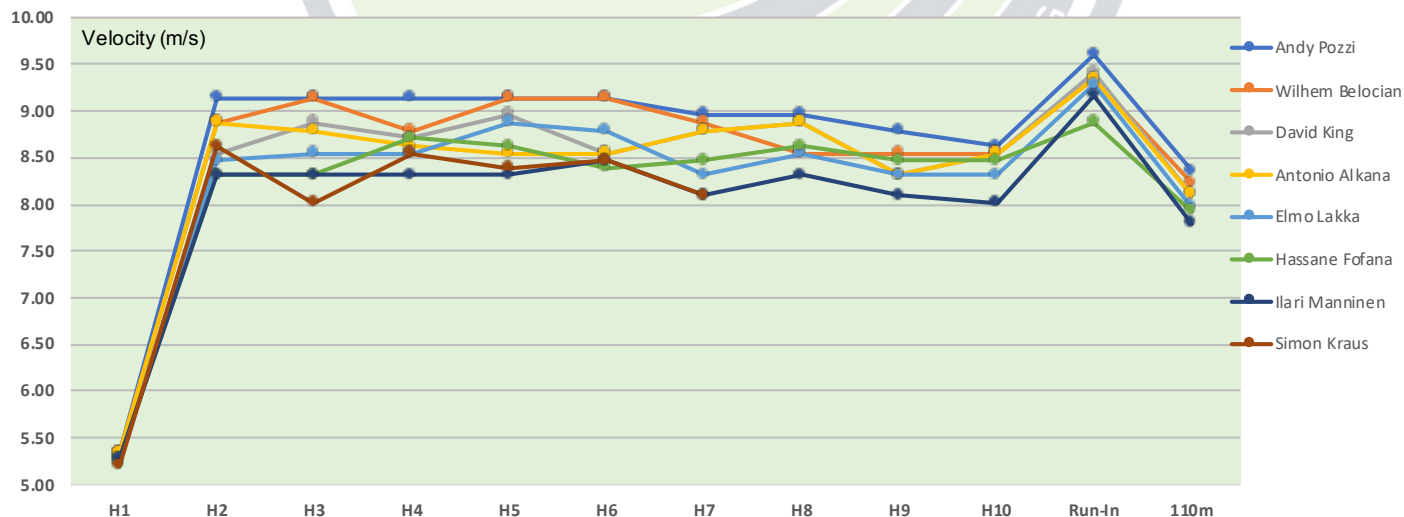
110m Hurdles

Date: 2020.08.11

Wind: 1.1 m/s

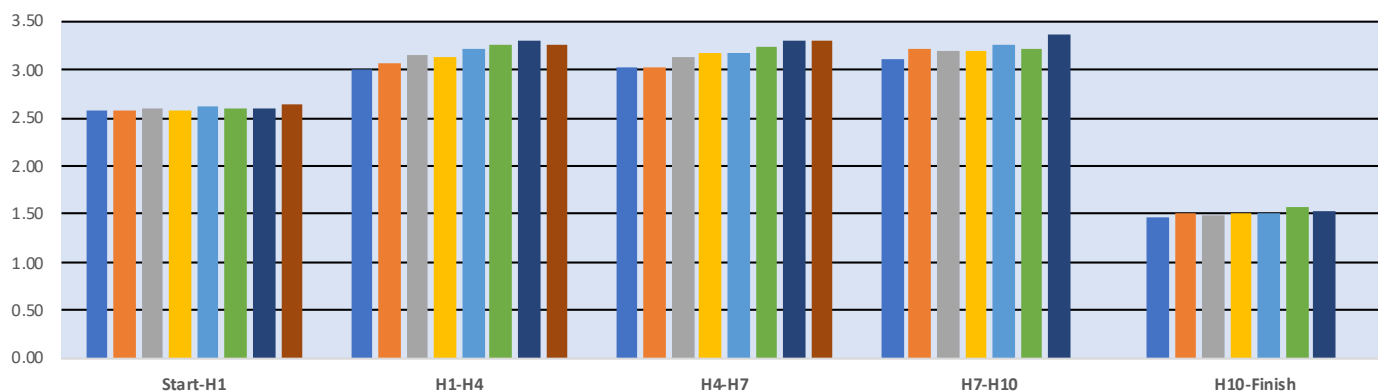
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Pozzi, Andy (GBR) (1992)	time		2.57	3.57	4.57	5.57	6.57	7.57	8.59	9.61	10.65	11.71		13.17	6 / 1			
	reaction time	0.149														3.00	3.02	3.12
	interval		7 steps	1.00	1.00	1.00	1.00	1.00	1.02	1.02	1.04	1.06	1.46			9.14	9.08	8.79
	velocity		5.34	9.14	9.14	9.14	9.14	9.14	8.96	8.96	8.79	8.62	9.60	8.35				
Belocian, Wilhem (FRA) (1995)	time		2.57	3.60	4.60	5.64	6.64	7.64	8.67	9.74	10.81	11.88		13.38	3 / 2			
	reaction time	0.147														3.07	3.03	3.21
	interval		1.03	1.00	1.04	1.00	1.00	1.00	1.03	1.07	1.07	1.07	1.50			8.93	9.05	8.54
	velocity		5.34	8.87	9.14	8.79	9.14	9.14	8.87	8.54	8.54	8.54	9.35	8.22				
King, David (GBR) (1994)	time		2.60	3.67	4.70	5.75	6.77	7.84	8.88	9.91	11.01	12.08		13.57	5 / 3			
	reaction time	0.148														3.15	3.13	3.20
	interval		7 steps	1.07	1.03	1.05	1.02	1.07	1.04	1.03	1.10	1.07	1.49			8.70	8.76	8.57
	velocity		5.28	8.54	8.87	8.70	8.96	8.54	8.79	8.87	8.31	8.54	9.41	8.11				
Alkana, Antonio (RSA) (1990)	time		2.57	3.60	4.64	5.70	6.77	7.84	8.88	9.91	11.01	12.08		13.58	8 / 4			
	reaction time	0.158														3.13	3.18	3.20
	interval		1.03	1.04	1.06	1.07	1.07	1.04	1.03	1.10	1.07	1.50				8.76	8.62	8.57
	velocity		5.34	8.87	8.79	8.62	8.54	8.54	8.79	8.87	8.31	8.54	9.35	8.10				
Lakka, Elmo (FIN) (1993)	time		2.62	3.70	4.77	5.84	6.87	7.91	9.01	10.08	11.18	12.28		13.79	4 / 5			
	reaction time	0.186														3.22	3.17	3.27
	interval		1.08	1.07	1.07	1.03	1.04	1.10	1.10	1.07	1.10	1.10	1.51			8.52	8.65	8.39
	velocity		5.24	8.46	8.54	8.54	8.87	8.79	8.31	8.54	8.31	8.31	9.28	7.98				
Fofana, Hassane (ITA) (1992)	time		2.60	3.70	4.80	5.85	6.91	8.00	9.08	10.14	11.22	12.30		13.88	7 / 6			
	reaction time	0.170														3.25	3.23	3.22
	interval		7 steps	1.10	1.10	1.05	1.06	1.09	1.08	1.06	1.08	1.08	1.58			8.44	8.49	8.52
	velocity		5.28	8.31	8.31	8.70	8.62	8.39	8.46	8.62	8.46	8.46	8.87	7.93				
Manninen, Ilari (FIN) (1997)	time		2.60	3.70	4.80	5.90	7.00	8.08	9.21	10.31	11.44	12.58		14.11	1 / 7			
	reaction time	0.201														3.30	3.31	3.37
	interval		7 steps	1.10	1.10	1.10	1.10	1.08	1.13	1.10	1.13	1.14	1.53			8.31	8.28	8.14
	velocity		5.28	8.31	8.31	8.31	8.31	8.46	8.09	8.31	8.09	8.02	9.16	7.80				
Kraus, Simon (FRA) (1992)	time		2.64	3.70	4.84	5.91	7.00	8.08	9.21					dnf	2 / --			
	reaction time	0.154														3.27	3.30	
	interval		7 steps	1.06	1.14	1.07	1.09	1.08	1.13							8.39	8.31	
	velocity		5.20	8.62	8.02	8.54	8.39	8.46	8.09									



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1280 x 720 @ 30fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=ygC2b8H9dWU>

Biomechanical Analysis

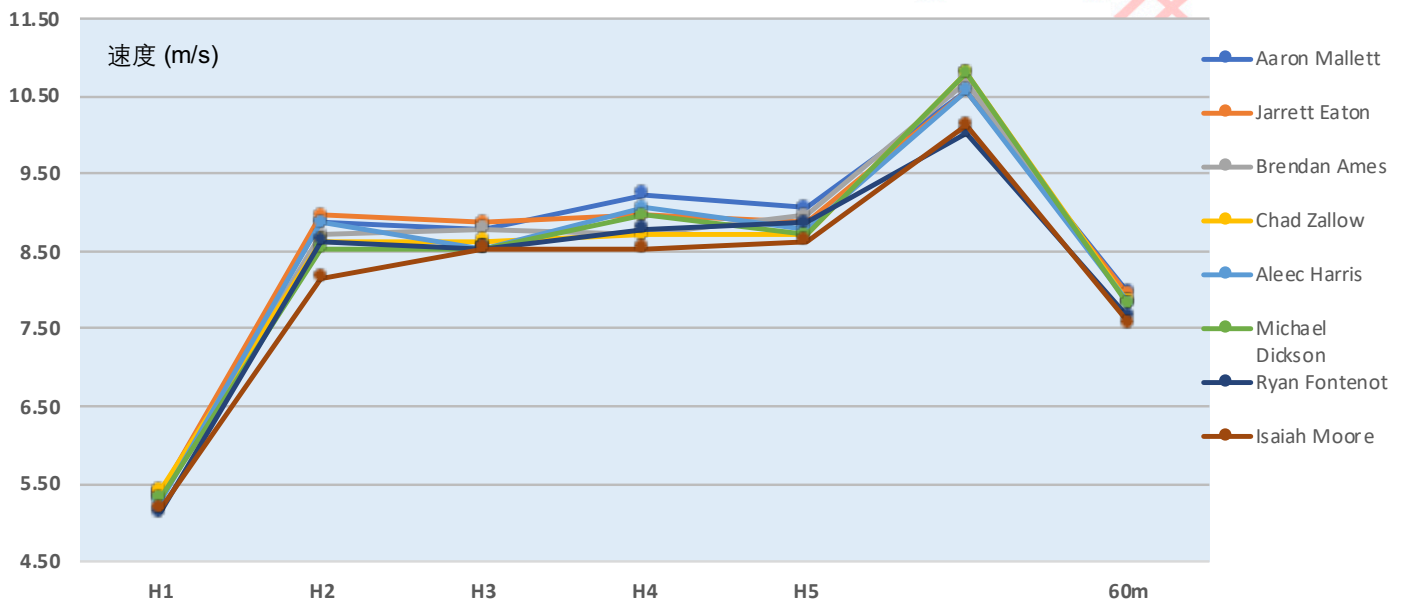
USATF National Indoor Championships, Albuquerque, NM, USA (Altitude)

Men's 60m Hurdles

Date: 2020.02.15

FINAL

			H1	H2	H3	H4	H5		60m	Lane / Place
Mallett, Aaron (USA) (1994)	time		2.55	3.58	4.62	5.61	6.62		7.54	3 / 1
reaction time	0.160	interval		1.03	1.04	0.99	1.01	0.92	PB	
		velocity	5.38	8.87	8.79	9.23	9.05	10.57	7.96	
Eaton, Jarrett (USA) (1989)	time		2.55	3.57	4.60	5.62	6.65		7.57	4 / 2
reaction time	0.155	interval	7 steps	1.02	1.03	1.02	1.03	0.92		
		velocity	5.38	8.96	8.87	8.96	8.87	10.57	7.93	
Ames, Brendan (USA) (1988)	time		2.58	3.63	4.67	5.72	6.74		7.65	5 / 3
reaction time	0.145	interval	7 steps	1.05	1.04	1.05	1.02	0.91		
		velocity	5.32	8.70	8.79	8.70	8.96	10.68	7.84	
Zallow, Chad (USA) (1997)	time		2.53	3.59	4.65	5.70	6.75		7.65	2 / 4
reaction time	0.151	interval		1.06	1.06	1.05	1.05	0.90		
		velocity	5.42	8.62	8.62	8.70	8.70	10.80	7.84	
Harris, Aleec (USA) (1990)	time		2.60	3.63	4.70	5.71	6.75		7.67	7 / 5
reaction time	0.128	interval		1.03	1.07	1.01	1.04	0.92		
		velocity	5.28	8.87	8.54	9.05	8.79	10.57	7.82	
Dickson, Michael (USA) (1997)	time		2.58	3.65	4.72	5.74	6.79		7.69	6 / 6
reaction time	0.171	interval		1.07	1.07	1.02	1.05	0.90		
		velocity	5.32	8.54	8.54	8.96	8.70	10.80	7.80	
Fontenot, Ryan (USA) (1986)	time		2.67	3.73	4.80	5.84	6.87		7.84	8 / 7
reaction time	0.170	interval		1.06	1.07	1.04	1.03	0.97		
		velocity	5.14	8.62	8.54	8.79	8.87	10.02	7.65	
Moore, Isaiah (USA) (1996)	time		2.65	3.77	4.84	5.91	6.97		7.93	1 / 8
reaction time	0.139	interval		1.12	1.07	1.07	1.06	0.96		
		velocity	5.18	8.16	8.54	8.54	8.62	10.13	7.57	



Biomechanical Analysis

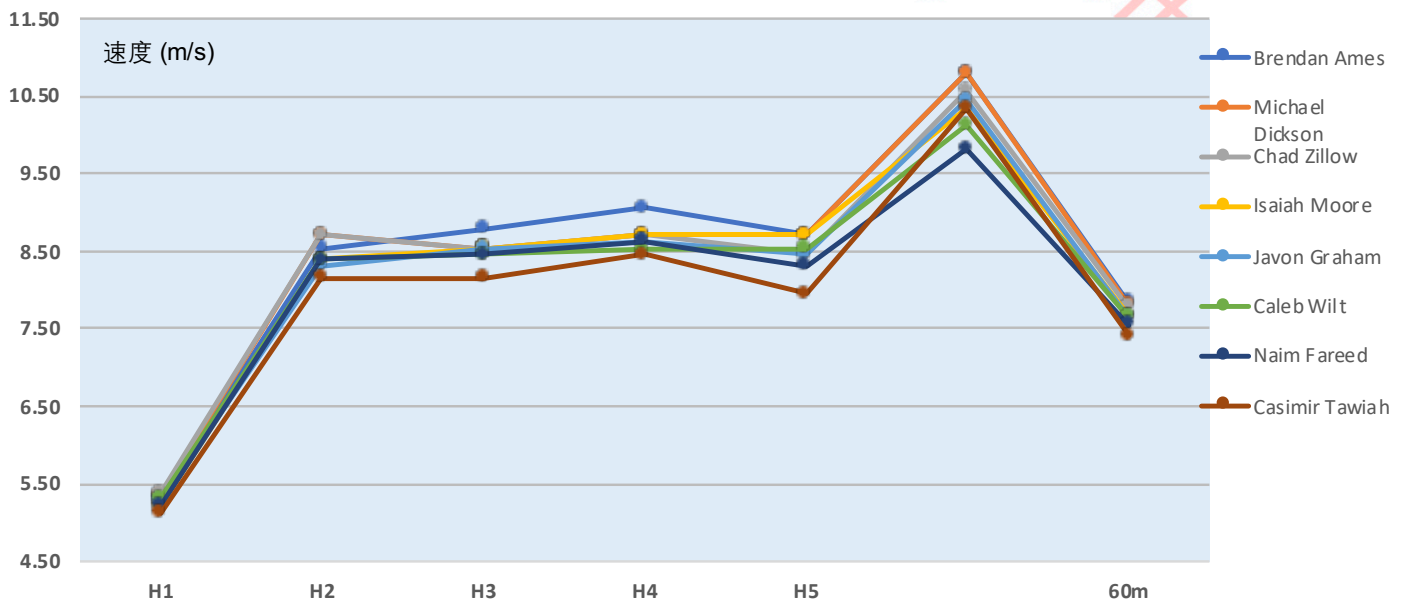
USATF National Indoor Championships, Albuquerque, NM, USA (Altitude)

Men's 60m Hurdles

Date: 2020.02.15

Semi-Final 2

			H1	H2	H3	H4	H5		60m	Lane / Place
Ames, Brendan (USA) (1988)	time		2.58	3.65	4.69	5.70	6.75		7.65	3 / 1
	reaction time	0.174	7 steps	1.07	1.04	1.01	1.05	0.90		
	interval velocity		5.32	8.54	8.79	9.05	8.70	10.80	7.84	
Dickson, Michael (USA) (1997)	time		2.57	3.62	4.69	5.74	6.79		7.69	5 / 2
	reaction time	0.126		1.05	1.07	1.05	1.05	0.90		
	interval velocity		5.34	8.70	8.54	8.70	8.70	10.80	7.80	
Zallow, Chad (USA) (1997)	time		2.55	3.60	4.67	5.72	6.80		7.72	4 / 3
	reaction time	0.156		1.05	1.07	1.05	1.08	0.92		
	interval velocity		5.38	8.70	8.54	8.70	8.46	10.57	7.77	
Moore, Isaiah (USA) (1996)	time		2.63	3.72	4.79	5.84	6.89		7.83	6 / 4
	reaction time	0.161		1.09	1.07	1.05	1.05	0.94		
	interval velocity		5.22	8.39	8.54	8.70	8.70	10.34	7.66	
Graham, Javon (USA)	time		2.60	3.70	4.77	5.83	6.91		7.84	2 / 5
	reaction time	0.158		1.10	1.07	1.06	1.08	0.93	PB	
	interval velocity		5.28	8.31	8.54	8.62	8.46	10.45	7.65	
Wilt, Caleb (USA) (1997)	time		2.58	3.67	4.75	5.82	6.89		7.85	7 / 6
	reaction time	0.112	7 steps	1.09	1.08	1.07	1.07	0.96		
	interval velocity		5.32	8.39	8.46	8.54	8.54	10.13	7.64	
Fareed, Naim (USA) (1996)	time		2.63	3.72	4.80	5.86	6.96		7.95	1 / 7
	reaction time	0.136		1.09	1.08	1.06	1.10	0.99		
	interval velocity		5.22	8.39	8.46	8.62	8.31	9.82	7.55	
Tawiah, Casimir (USA) (1997)	time		2.68	3.80	4.92	6.00	7.15		8.09	8 / 8
	reaction time	0.162	7 steps	1.12	1.12	1.08	1.15	0.94		
	interval velocity		5.12	8.16	8.16	8.46	7.95	10.34	7.42	



Biomechanical Analysis

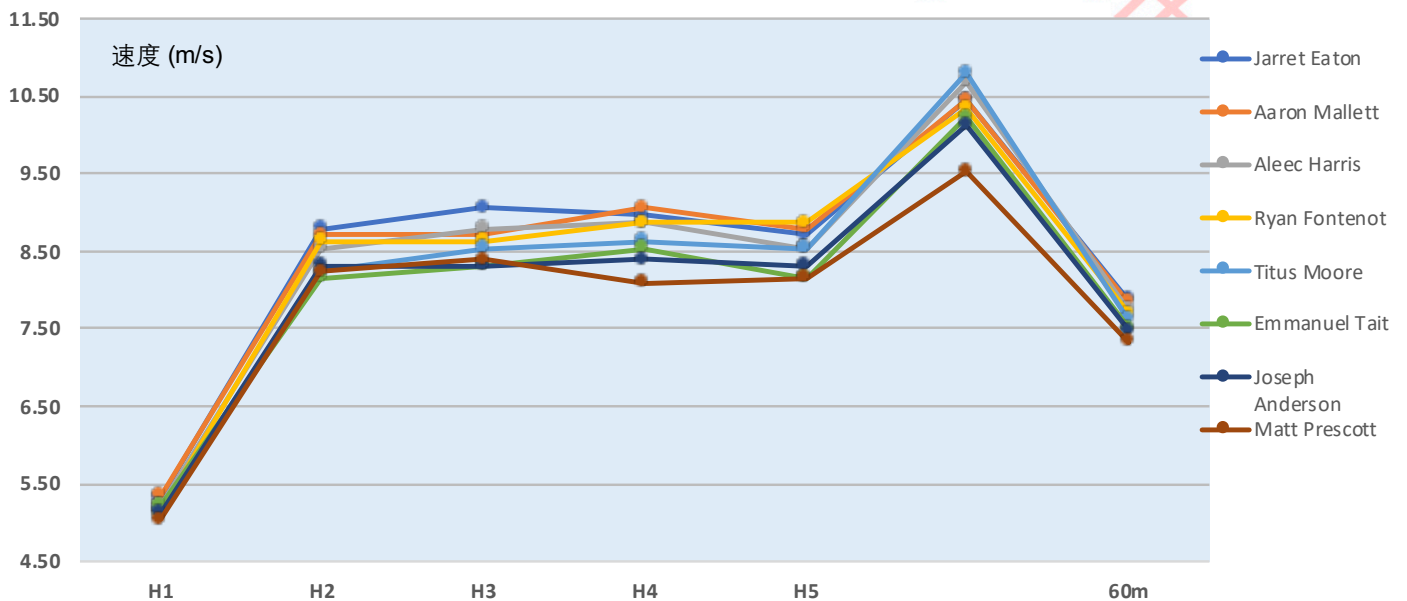
USATF National Indoor Championships, Albuquerque, NM, USA (Altitude)

Men's 60m Hurdles

Date: 2020.02.15

Semi-Final 1

			H1	H2	H3	H4	H5		60m	Lane / Place
Eaton, Jarret (USA) (1989)	time		2.58	3.62	4.63	5.65	6.70		7.63	4 / 1
reaction time	0.148	interval	7 steps	1.04	1.01	1.02	1.05	0.93		
		velocity	5.32	8.79	9.05	8.96	8.70	10.45	7.86	
Mallett, Aaron (USA) (1994)	time		2.57	3.62	4.67	5.68	6.72		7.65	5 / 2
reaction time	0.149	interval		1.05	1.05	1.01	1.04	0.93		
		velocity	5.34	8.70	8.70	9.05	8.79	10.45	7.84	
Harris, Aleec (USA) (1990)	time		2.63	3.70	4.74	5.77	6.84		7.75	6 / 3
reaction time	0.145	interval		1.07	1.04	1.03	1.07	0.91		
		velocity	5.22	8.54	8.79	8.87	8.54	10.68	7.74	
Fontenot, Ryan (USA) (1986)	time		2.67	3.73	4.79	5.82	6.85		7.79	3 / 4
reaction time	0.151	interval		1.06	1.06	1.03	1.03	0.94		
		velocity	5.14	8.62	8.62	8.87	8.87	10.34	7.70	
Moore, Titus (USA) (1999)	time		2.66	3.77	4.84	5.90	6.97		7.87	7 / 5
reaction time	0.179	interval		1.11	1.07	1.06	1.07	0.90		
		velocity	5.16	8.23	8.54	8.62	8.54	10.80	7.62	
Tait, Emmanuel (USA)	time		2.63	3.75	4.85	5.92	7.04		7.99	2 / 6
reaction time	0.158	interval		1.12	1.10	1.07	1.12	0.95		
		velocity	5.22	8.16	8.31	8.54	8.16	10.23	7.51	
Anderson, Joseph (USA) (1999)	time		2.68	3.78	4.88	5.97	7.07		8.03	1 / 7
reaction time	0.171	interval		1.10	1.10	1.09	1.10	0.96		
		velocity	5.12	8.31	8.31	8.39	8.31	10.13	7.47	
Prescott, Matt (USA) (19840)	time		2.72	3.83	4.92	6.05	7.17		8.19	8 / 8
reaction time	0.159	interval		1.11	1.09	1.13	1.12	1.02		
		velocity	5.04	8.23	8.39	8.09	8.16	9.53	7.33	



Women's 100m Hurdles

2020 Top 10 Times - Women's 100m Hurdles

Visser, Nadine (NED) (1995)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10		
FINAL - 2020 Paavo Nurmi Games (Turku, FIN) (TV Analysis)			Henson (2020) - Athlete First: 2020 year end hurdle report																	
date	11-Aug	time	2.50	3.52	4.54	5.54	6.50	7.48	8.48	9.46	10.48	11.50		12.68	4 / 1		3.04	2.94	3.02	
reaction time	0.137	interval		1.02	1.02	1.00	0.96	0.98	1.00	0.98	1.02	1.02	1.18				8.39	8.67	8.44	
wind	1.2 m/s	velocity	5.20	8.33	8.33	8.50	8.85	8.67	8.50	8.67	8.33	8.33	8.90	7.89						
Visser, Nadine (NED) (1995)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10		
FINAL - 2020 István Gyulai Memorial (Székesfehérvár, HUN) (TV Analysis)			Henson (2020) - Athlete First: 2020 year end hurdle report																	
date	19-Aug	time	2.49	3.50	4.50	5.47	6.44	7.41	8.41	9.41	10.42	11.44		12.68	5 / 1		2.98	2.94	3.03	
reaction time	0.145	interval		1.01	1.00	0.97	0.97	0.97	1.00	1.00	1.01	1.02	1.24				8.56	8.67	8.42	
wind	-0.2 m/s	velocity	5.22	8.42	8.50	8.76	8.76	8.76	8.50	8.50	8.42	8.33	8.47	7.89						
Kozák, Luca (HUN) (1996)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10		
FINAL - 2020 István Gyulai Memorial (Székesfehérvár, HUN) (TV Analysis)			Henson (2020) - Athlete First: 2020 year end hurdle report																	
date	19-Aug	time	2.47	3.50	4.50	5.47	6.44	7.44	8.44	9.44	10.44	11.44		12.71	6 / 2		3.00	2.97	3.00	
reaction time	0.168	interval		1.03	1.00	0.97	0.97	1.00	1.00	1.00	1.00	1.00	1.27	NR PB			8.50	8.59	8.50	
wind	-0.2 m/s	velocity	5.26	8.25	8.50	8.76	8.76	8.50	8.50	8.50	8.50	8.50	8.27	7.87						
Visser, Nadine (NED) (1995)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10		
FINAL - 2020 Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis)			Henson (2020) - Athlete First: 2020 year end hurdle report																	
date	17-Sep	time	2.52	3.56	4.56	5.52	6.50	7.48	8.48	9.48	10.52	11.56		12.72	6 / 1		3.00	2.96	3.08	
reaction time	0.156	interval		1.04	1.00	0.96	0.98	0.98	1.00	1.00	1.04	1.04	1.16				8.50	8.61	8.28	
wind	0.1 m/s	velocity	5.16	8.17	8.50	8.85	8.67	8.67	8.50	8.50	8.17	8.17	9.05	7.86						
Herman, Elvira (BLR) (1997)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10		
FINAL - 2020 Minsk Athletics Meeting (Minsk, BLR)																				
date	25-Jun	time												12.73	4 / 1					
reaction time		interval	No Information Available																	
wind	0.5 m/s	velocity																		
Samba-Mayela, Cyrena (FRA) (2000)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10		
FINAL - 2020 French National Championships (Albi, FRA) (TV Analysis)			Henson (2020) - Athlete First: 2020 year end hurdle report																	
date	12-Sep	time	2.46	3.49	4.46	5.47	6.48	7.50	8.49	9.46	10.48	11.48		12.73	4 / 1		3.01	3.02	2.99	
reaction time	0.297	interval		1.03	0.97	1.01	1.01	1.02	0.99	0.97	1.02	1.00	1.25	PB			8.47	8.44	8.53	
wind	1.5 m/s	velocity	5.28	8.25	8.76	8.42	8.42	8.33	8.59	8.76	8.33	8.50	8.40	7.86						
Korte, Annimari (FIN) (1988)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10		
FINAL - 2020 Motonet GP (Jyväskylä, FIN) (TV Analysis)			Henson (2020) - Athlete First: 2020 year end hurdle report																	
date	8-Jul	time	2.60	3.63	4.66	5.66	6.63	7.60	8.60	9.60	10.60	11.63		12.76	4 / 1		3.06	2.94	3.03	
reaction time		interval		1.03	1.03	1.00	0.97	0.97	1.00	1.00	1.00	1.03	1.13				8.33	8.67	8.42	
wind	0.7 m/s	velocity	5.00	8.25	8.25	8.50	8.76	8.76	8.50	8.50	8.50	8.25	9.29	7.84						
Chadwick, Payton (USA) (1995)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10		
FINAL - 2020 Doha Diamond League (Doha, QAT) (TV Analysis)			Henson (2020) - Athlete First: 2020 year end hurdle report																	
date	25-Sep	time	2.53	3.56	4.56	5.56	6.56	7.56	8.53	9.53	10.56	11.60		12.78	5 / 1		3.03	2.97	3.07	
reaction time	0.137	interval		1.03	1.00	1.00	1.00	1.00	0.97	1.00	1.03	1.04	1.18				8.42	8.59	8.31	
wind	1.1 m/s	velocity	5.14	8.25	8.50	8.50	8.50	8.50	8.76	8.50	8.25	8.17	8.90	7.82						
Bogliolo, Luminosa (ITA) (1995)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10		
FINAL - 2020 Paavo Nurmi Games (Turku, FIN) (TV Analysis)			Henson (2020) - Athlete First: 2020 year end hurdle report																	
date	11-Aug	time	2.56	3.58	4.60	5.58	6.58	7.56	8.56	9.54	10.56	11.60		12.79	6 / 2		3.02	2.98	3.04	
reaction time	0.180	interval		1.02	1.02	0.98	1.00	0.98	1.00	0.98	1.02	1.04	1.19				8.44	8.56	8.39	
wind	1.2 m/s	velocity	5.08	8.33	8.33	8.67	8.50	8.67	8.50	8.67	8.33	8.17	8.82	7.82						
Korte, Annimari (FIN) (1988)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10		
FINAL - 2020 Finnish National Championships (Turku, FIN) (TV Analysis)																				
date	14-Aug	time	2.60	3.66	4.66	5.63	6.60	7.60	8.60	9.57	10.57	11.60		12.79	4 / 1		3.03	2.97	3.00	
reaction time	0.197	interval		1.06	1.00	0.97	0.97	1.00	1.00	0.97	1.00	1.03	1.19				8.42	8.59	8.50	
wind	1.0 m/s	velocity	5.00	8.02	8.50	8.76	8.76	8.50	8.50	8.76	8.50	8.25	8.82	7.82						
Visser, Nadine (NED) (1995)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10		
FINAL - 2020 Galà dei Castelli (Bellinzona, SUI) (TV Analysis)			Henson (2020) - Athlete First: 2020 year end hurdle report																	
date	3-Jul	time	2.52	3.56	4.56	5.56	6.56	7.54	8.52	9.52	10.56	11.62		12.79	5 / 1		3.04	2.96	3.10	
reaction time		interval		1.04	1.00	1.00	1.00	0.98	0.98	1.00	1.04	1.06	1.17				8.39	8.61	8.23	
wind	0.0 m/s	velocity	5.16	8.17	8.50	8.50	8.50	8.67	8.67	8.50	8.17	8.02	8.97	7.82						

2020 Doha Diamond League (Doha, QAT) (TV Analysis)

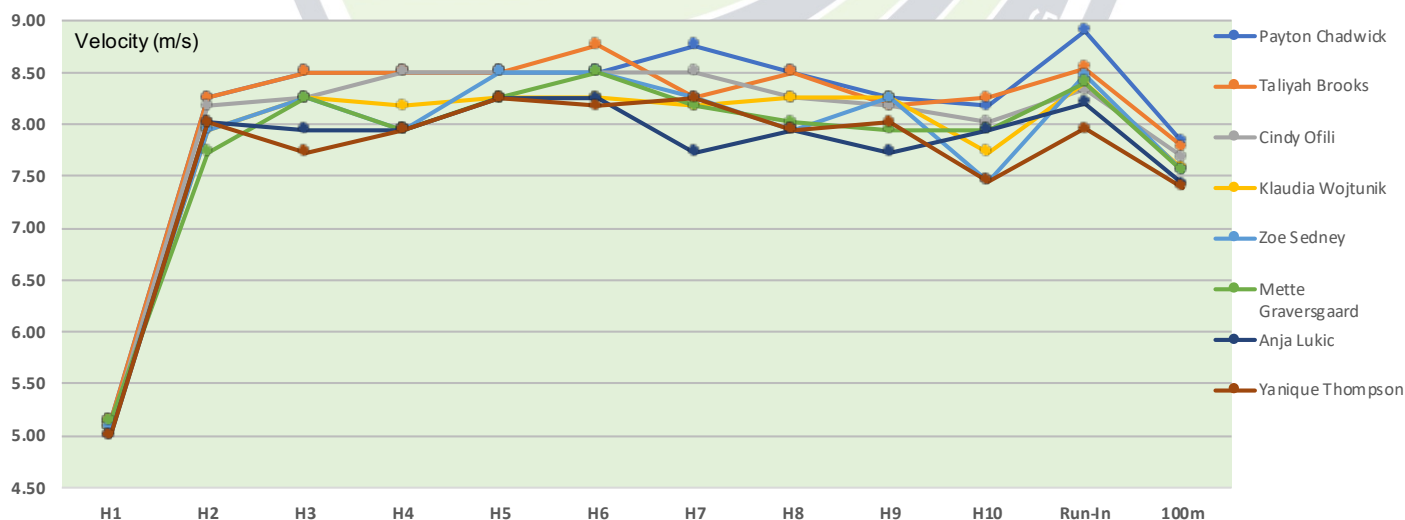
100m Hurdles

Date: 2020.09.25

Wind: 1.1 m/s

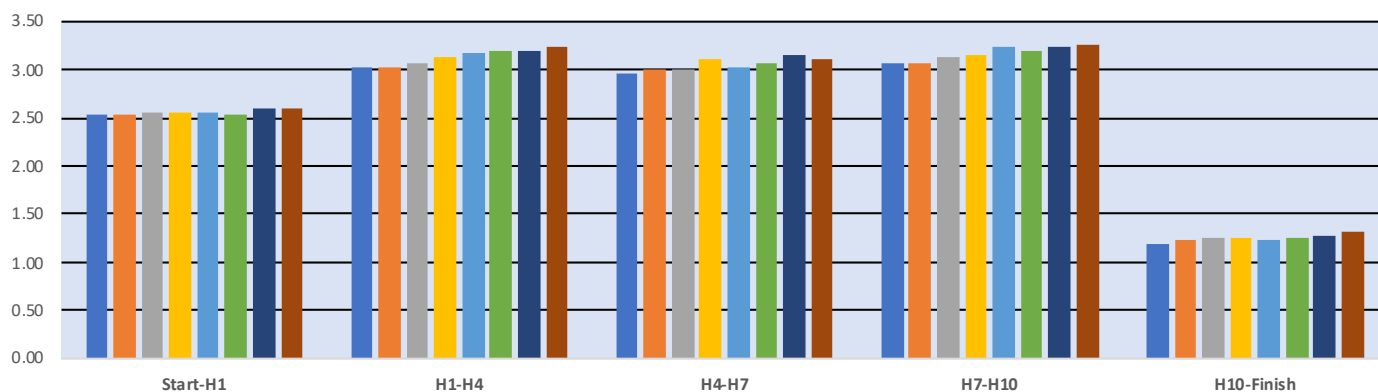
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Chadwick, Payton (USA) (1995)	time	2.53	3.56	4.56	5.56	6.56	7.56	8.53	9.53	10.56	11.60		12.78	5 / 1	3.03	2.97	3.07
	reaction time	0.137										1.18					
	interval		1.03	1.00	1.00	1.00	1.00	0.97	1.00	1.03	1.04	1.18					
Brooks, Taliyah (USA) (1995)	time	2.53	3.56	4.56	5.56	6.56	7.53	8.56	9.56	10.60	11.63		12.86	7 / 2	3.03	3.00	3.07
	reaction time	0.139										1.23					
	interval		1.03	1.00	1.00	1.00	0.97	1.03	1.00	1.04	1.03	1.23					
Ofili, Cindy (GBR) (1994)	time	2.56	3.60	4.63	5.63	6.63	7.63	8.63	9.66	10.70	11.76		13.02	4 / 3	3.07	3.00	3.13
	reaction time	0.180										1.26					
	interval		1.04	1.03	1.00	1.00	1.00	1.00	1.03	1.04	1.06	1.26					
Wojtunik, Klaudia (POL) (1999)	time	2.56	3.63	4.66	5.70	6.73	7.76	8.80	9.83	10.86	11.96		13.21	8 / 4	3.14	3.10	3.16
	reaction time	0.137										1.25					
	interval		1.07	1.03	1.04	1.03	1.03	1.04	1.03	1.03	1.10	1.25					
Sedney, Zoë (NED) (2001)	time	2.56	3.63	4.66	5.73	6.73	7.73	8.76	9.83	10.86	12.00		13.24	2 / 5	3.17	3.03	3.24
	reaction time	0.168										1.24					
	interval		1.07	1.03	1.07	1.00	1.00	1.03	1.07	1.03	1.14	1.24					
Graversgaard, Mette (DEN) (1995)	time	2.53	3.63	4.66	5.73	6.76	7.76	8.80	9.86	10.93	12.00		13.25	3 / 6	3.20	3.07	3.20
	reaction time	0.140										1.25					
	interval		1.10	1.03	1.07	1.03	1.00	1.04	1.06	1.07	1.07	1.25					
Lukic, Anja (SRB) (1999)	time	2.60	3.66	4.73	5.80	6.83	7.86	8.96	10.03	11.13	12.20		13.48	1 / 7	3.20	3.16	3.24
	reaction time	0.163										1.28					
	interval		1.06	1.07	1.07	1.03	1.03	1.10	1.07	1.10	1.07	1.28					
Thompson, Yanique (JAM) (1996)	time	2.60	3.66	4.76	5.83	6.86	7.90	8.93	10.00	11.06	12.20		13.52	6 / 8	3.23	3.10	3.27
	reaction time	0.144										1.32					
	interval		1.06	1.10	1.07	1.03	1.04	1.03	1.07	1.06	1.14	1.32					
	velocity	5.14	8.25	8.50	8.50	8.50	8.50	8.76	8.50	8.25	8.17	8.90	7.82		8.42	8.59	8.31
	velocity	5.14	8.25	8.50	8.50	8.50	8.76	8.25	8.50	8.17	8.25	8.54	7.78		8.42	8.50	8.31
	velocity	5.08	8.17	8.25	8.50	8.50	8.50	8.50	8.25	8.17	8.02	8.33	7.68		8.31	8.50	8.15
	velocity	5.08	7.94	8.25	8.17	8.25	8.25	8.17	8.25	8.25	7.73	8.40	7.57		8.12	8.23	8.07
	velocity	5.08	7.94	8.25	7.94	8.50	8.50	8.25	7.94	8.25	7.46	8.47	7.55		8.04	8.42	7.87
	velocity	5.14	7.73	8.25	7.94	8.25	8.50	8.17	8.02	7.94	7.94	8.40	7.55		7.97	8.31	7.97
	velocity	5.00	8.02	7.94	7.94	8.25	8.25	7.73	7.94	7.73	7.94	8.20	7.42		7.97	8.07	7.87
	velocity	5.00	8.02	7.73	7.94	8.25	8.17	8.25	7.94	8.02	7.46	7.95	7.40		7.89	8.23	7.80



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1280 x 720 @ 30fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=m3gnpvo75m4>

2020 Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis)

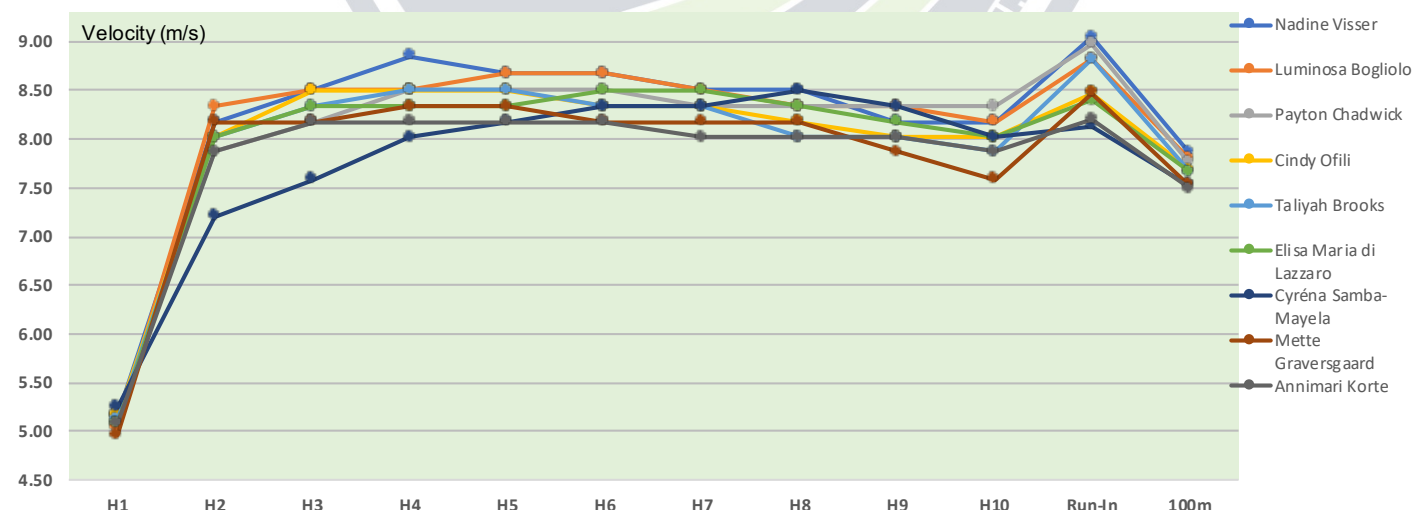
100m Hurdles

Date: 2020.09.17

Wind: 0.1 m/s

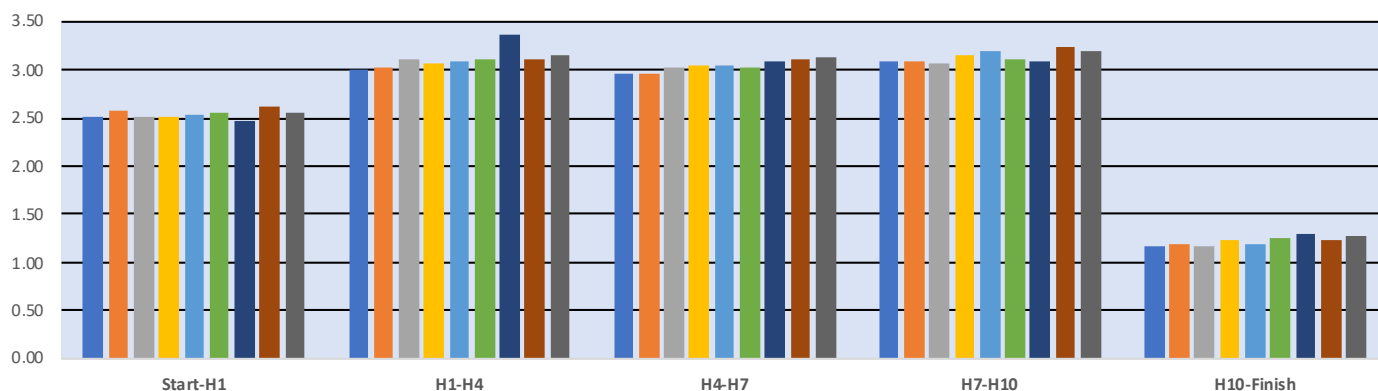
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Visser, Nadine (NED) (1995)	time	2.52	3.56	4.56	5.52	6.50	7.48	8.48	9.48	10.52	11.56		12.72	6 / 1			
	reaction time	0.156										1.16			3.00	2.96	3.08
	interval velocity		1.04	1.00	0.96	0.98	0.98	1.00	1.00	1.04	1.04	1.16			8.50	8.61	8.28
Bogliolo, Luminosa (ITA) (1995)	time	2.58	3.60	4.60	5.60	6.58	7.56	8.56	9.58	10.60	11.64		12.83	5 / 2			
	reaction time	0.161										1.19			3.02	2.96	3.08
	interval velocity		1.02	1.00	1.00	0.98	0.98	1.00	1.02	1.02	1.04	1.19			8.44	8.61	8.28
Chadwick, Payton (USA) (1995)	time	2.52	3.60	4.64	5.64	6.64	7.64	8.66	9.68	10.70	11.72		12.89	2 / 3			
	reaction time	0.126										1.17			3.12	3.02	3.06
	interval velocity		1.08	1.04	1.00	1.00	1.00	1.02	1.02	1.02	1.02	1.17			8.17	8.44	8.33
Ofili, Cindy (GBR) (1994)	time	2.52	3.58	4.58	5.58	6.58	7.60	8.62	9.66	10.72	11.78		13.02	3 / 4			
	reaction time	0.136										1.24			3.06	3.04	3.16
	interval velocity		1.06	1.00	1.00	1.00	1.02	1.02	1.04	1.06	1.06	1.24			8.33	8.39	8.07
Brooks, Taliyah (USA) (1995)	time	2.54	3.60	4.62	5.62	6.62	7.64	8.66	9.72	10.78	11.86		13.05	9 / 5			
	reaction time	0.138										1.19			3.08	3.04	3.20
	interval velocity		1.06	1.02	1.00	1.00	1.02	1.02	1.06	1.06	1.08	1.19			8.28	8.39	7.97
di Lazzaro, Elisa Maria (ITA) (1998)	time	2.56	3.62	4.64	5.66	6.68	7.68	8.68	9.70	10.74	11.80		13.05	8 / 6			
	reaction time	0.135										1.25			3.10	3.02	3.12
	interval velocity		1.06	1.02	1.02	1.02	1.00	1.00	1.02	1.04	1.06	1.25			8.23	8.44	8.17
Samba-Mayela, Cyréna (FRA) (2000)	time	2.48	3.66	4.78	5.84	6.88	7.90	8.92	9.92	10.94	12.00		13.29	7 / 7			
	reaction time	0.131										1.29			3.36	3.08	3.08
	interval velocity		1.18	1.12	1.06	1.04	1.02	1.02	1.00	1.02	1.06	1.29			7.59	8.28	8.28
Graversgaard, Mette (DEN) (1995)	time	2.62	3.66	4.70	5.72	6.74	7.78	8.82	9.86	10.94	12.06		13.30	1 / 8			
	reaction time	0.160										1.24			3.10	3.10	3.24
	interval velocity		1.04	1.04	1.02	1.02	1.04	1.04	1.04	1.08	1.12	1.24			8.23	8.23	7.87
Korte, Annimari (FIN) (1988)	time	2.56	3.64	4.68	5.72	6.76	7.80	8.86	9.92	10.98	12.06		13.34	4 / 9			
	reaction time	0.143										1.28			3.16	3.14	3.20
	interval velocity		1.08	1.04	1.04	1.04	1.04	1.06	1.06	1.06	1.08	1.28			8.07	8.12	7.97



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 25fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=LjIMaymRKtM>

2020 Galà dei Castelli (Bellinzona, SUI) (TV Analysis)

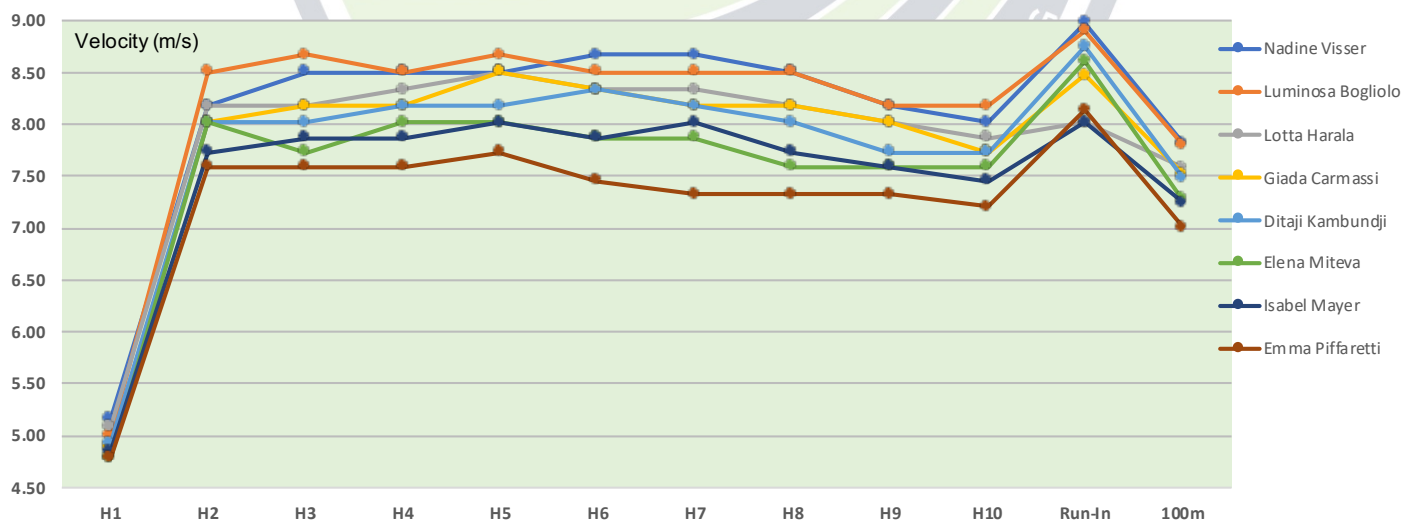
100m Hurdles

Date: 2020.09.15

Wind: 0.0 m/s

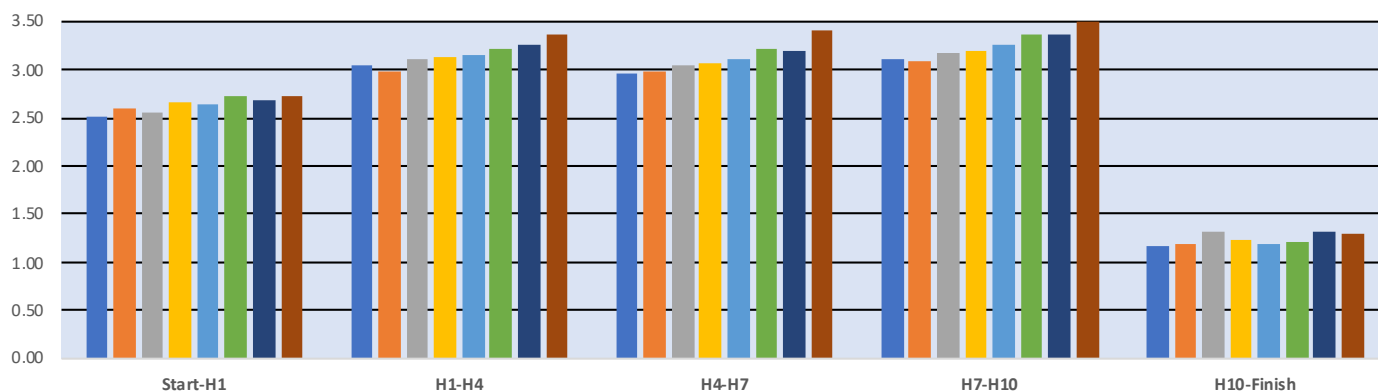
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Visser, Nadine (NED) (1995)	time	2.52	3.56	4.56	5.56	6.56	7.54	8.52	9.52	10.56	11.62		12.79	5 / 1			
	reaction time														3.04	2.96	3.10
	interval		1.04	1.00	1.00	1.00	0.98	0.98	1.00	1.04	1.06	1.17			8.39	8.61	8.23
	velocity	5.16	8.17	8.50	8.50	8.50	8.67	8.67	8.50	8.17	8.02	8.97	7.82				
Bogliolo, Luminosa (ITA) (1995)	time	2.60	3.60	4.58	5.58	6.56	7.56	8.56	9.56	10.60	11.64		12.82	4 / 2			
	reaction time														2.98	2.98	3.08
	interval		1.00	0.98	1.00	0.98	1.00	1.00	1.00	1.04	1.04	1.18			8.56	8.56	8.28
	velocity	5.00	8.50	8.67	8.50	8.67	8.50	8.50	8.50	8.17	8.17	8.90	7.80				
Harala, Lotta (FIN) (1992)	time	2.56	3.60	4.64	5.66	6.66	7.68	8.70	9.74	10.80	11.88		13.19	6 / 3			
	reaction time														3.10	3.04	3.18
	interval		1.04	1.04	1.02	1.00	1.02	1.02	1.04	1.06	1.08	1.31			8.23	8.39	8.02
	velocity	5.08	8.17	8.17	8.33	8.50	8.33	8.33	8.17	8.02	7.87	8.02	7.58				
Carmassi, Giada (ITA) (1994)	time	2.66	3.72	4.76	5.80	6.80	7.82	8.86	9.90	10.96	12.06		13.30	2 / 4			
	reaction time														3.14	3.06	3.20
	interval		1.06	1.04	1.04	1.00	1.02	1.04	1.04	1.06	1.10	1.24			8.12	8.33	7.97
	velocity	4.89	8.02	8.17	8.17	8.50	8.33	8.17	8.17	8.02	7.73	8.47	7.52				
Kambundji, Ditaji (SUI) (2002)	time	2.64	3.70	4.76	5.80	6.84	7.86	8.90	9.96	11.06	12.16		13.36	3 / 5			
	reaction time														3.16	3.10	3.26
	interval		1.06	1.06	1.04	1.04	1.02	1.04	1.06	1.10	1.10	1.20			8.07	8.23	7.82
	velocity	4.92	8.02	8.02	8.17	8.17	8.33	8.17	8.02	7.73	7.73	8.75	7.49				
Miteva, Elena (BUL) (1992)	time	2.72	3.78	4.88	5.94	7.00	8.08	9.16	10.28	11.40	12.52		13.74	7 / 6			
	reaction time														3.22	3.22	3.36
	interval		1.06	1.10	1.06	1.06	1.08	1.08	1.12	1.12	1.12	1.22			7.92	7.92	7.59
	velocity	4.78	8.02	7.73	8.02	8.02	7.87	7.87	7.59	7.59	7.59	8.61	7.28				
Mayer, Isabel (GER) (1993)	time	2.68	3.78	4.86	5.94	7.00	8.08	9.14	10.24	11.36	12.50		13.81	8 / 7			
	reaction time														3.26	3.20	3.36
	interval		1.10	1.08	1.08	1.06	1.08	1.06	1.10	1.12	1.14	1.31			7.82	7.97	7.59
	velocity	4.85	7.73	7.87	7.87	8.02	7.87	8.02	7.73	7.59	7.46	8.02	7.24				
Piffaretti, Emma (SUI) (2002)	time	2.72	3.84	4.96	6.08	7.18	8.32	9.48	10.64	11.80	12.98		14.27	1 / 8			
	reaction time														3.36	3.40	3.50
	interval		1.12	1.12	1.12	1.10	1.14	1.16	1.16	1.16	1.18	1.29			7.59	7.50	7.29
	velocity	4.78	7.59	7.59	7.59	7.73	7.46	7.33	7.33	7.33	7.20	8.14	7.01				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 25fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=amzqjWuIrmg>

2020 French National Championships (Albi, FRA) (TV Analysis)

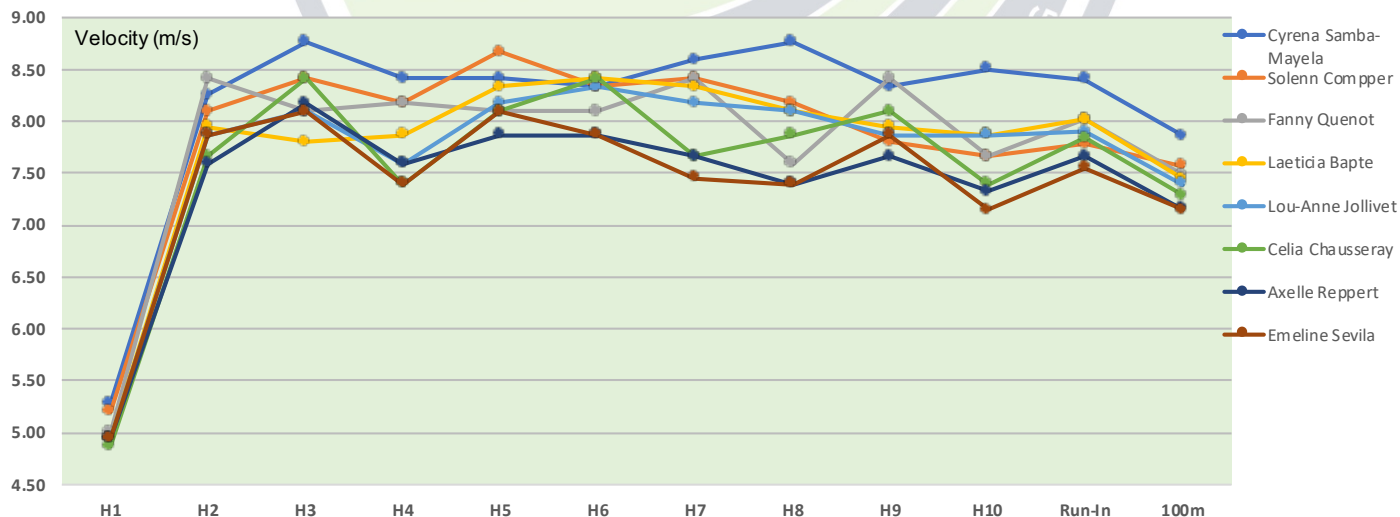
100m Hurdles

Date: 2020.09.12

Wind: 1.5 m/s

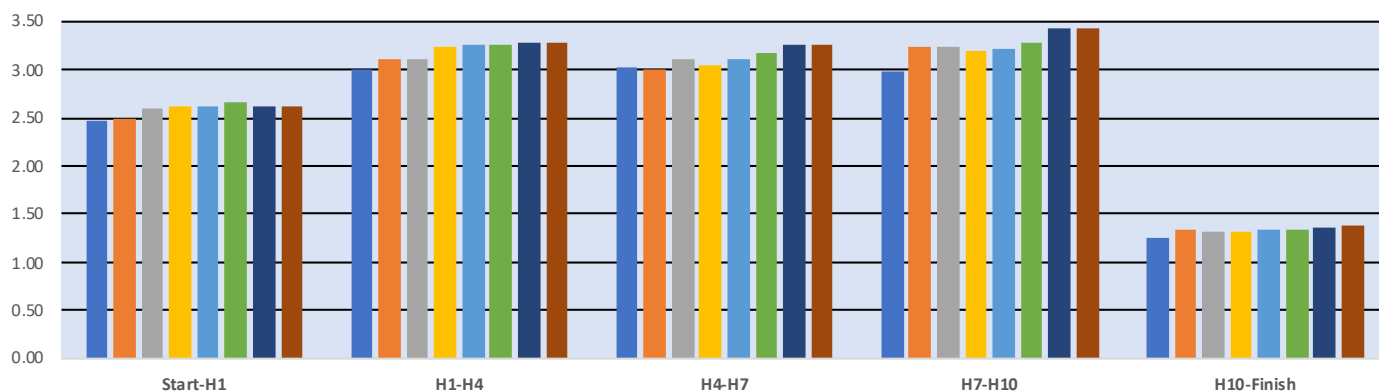
A FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Samba-Mayela, Cyrena (FRA) (2000)	time		2.46	3.49	4.46	5.47	6.48	7.50	8.49	9.46	10.48	11.48		12.73	4 / 1	3.01	3.02	2.99
	reaction time	0.297											1.25	PB				
	interval velocity		5.28	8.25	8.76	8.42	8.42	8.33	8.59	8.76	8.33	8.50	8.40	7.86				8.47
Compper, Solenn (FRA) (1995)	time		2.50	3.55	4.56	5.60	6.58	7.60	8.61	9.65	10.74	11.85		13.20	5 / 2	3.10	3.01	3.24
	reaction time	0.212											1.35					
	interval velocity		5.20	8.10	8.42	8.17	8.67	8.33	8.42	8.17	7.80	7.66	7.78	7.58				8.23
Quenot, Fanny (FRA) (1990)	time		2.60	3.61	4.66	5.70	6.75	7.80	8.81	9.93	10.94	12.05		13.36	6 / 3	3.10	3.11	3.24
	reaction time	0.483											1.31					
	interval velocity		5.00	8.42	8.10	8.17	8.10	8.10	8.42	7.59	8.42	7.66	8.02	7.49				8.23
Bapte, Laetitia (FRA) (1999)	time		2.63	3.70	4.79	5.87	6.89	7.90	8.92	9.97	11.04	12.12		13.43	3 / 4	3.24	3.05	3.20
	reaction time	0.215											1.31					
	interval velocity		4.94	7.94	7.80	7.87	8.33	8.42	8.33	8.10	7.94	7.87	8.02	7.45				7.87
Jollivet, Lou-Anne (FRA) (2001)	time		2.63	3.71	4.76	5.88	6.92	7.94	8.98	10.03	11.11	12.19		13.52	7 / 5	3.25	3.10	3.21
	reaction time	0.204											1.33	PB				
	interval velocity		4.94	7.87	8.10	7.59	8.17	8.33	8.17	8.10	7.87	7.87	7.89	7.40				7.85
Chausseray, Celia (FRA) (2000)	time		2.67	3.78	4.79	5.94	6.99	8.00	9.11	10.19	11.24	12.39		13.73	2 / 6	3.27	3.17	3.28
	reaction time	0.208											1.34	PB				
	interval velocity		4.87	7.66	8.42	7.39	8.10	8.42	7.66	7.87	8.10	7.39	7.84	7.28				7.80
Reppert, Axelle (FRA) (2001)	time		2.63	3.75	4.79	5.91	6.99	8.07	9.18	10.33	11.44	12.60		13.97	8 / 7	3.28	3.27	3.42
	reaction time	0.223											1.37	PB				
	interval velocity		4.94	7.59	8.17	7.59	7.87	7.87	7.66	7.39	7.66	7.33	7.66	7.16				7.77
Sevila, Emeline (FRA) (1994)	time		2.63	3.71	4.76	5.91	6.96	8.04	9.18	10.33	11.41	12.60		13.99	1 / 8	3.28	3.27	3.42
	reaction time	0.208											1.39					
	interval velocity		4.94	7.87	8.10	7.39	8.10	7.87	7.46	7.39	7.87	7.14	7.55	7.15				7.77



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1280 x 720 @ 30fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=5AQSIQIHuuc>

2020 Memorial Van Damme (Brussels, BEL) (TV Analysis)

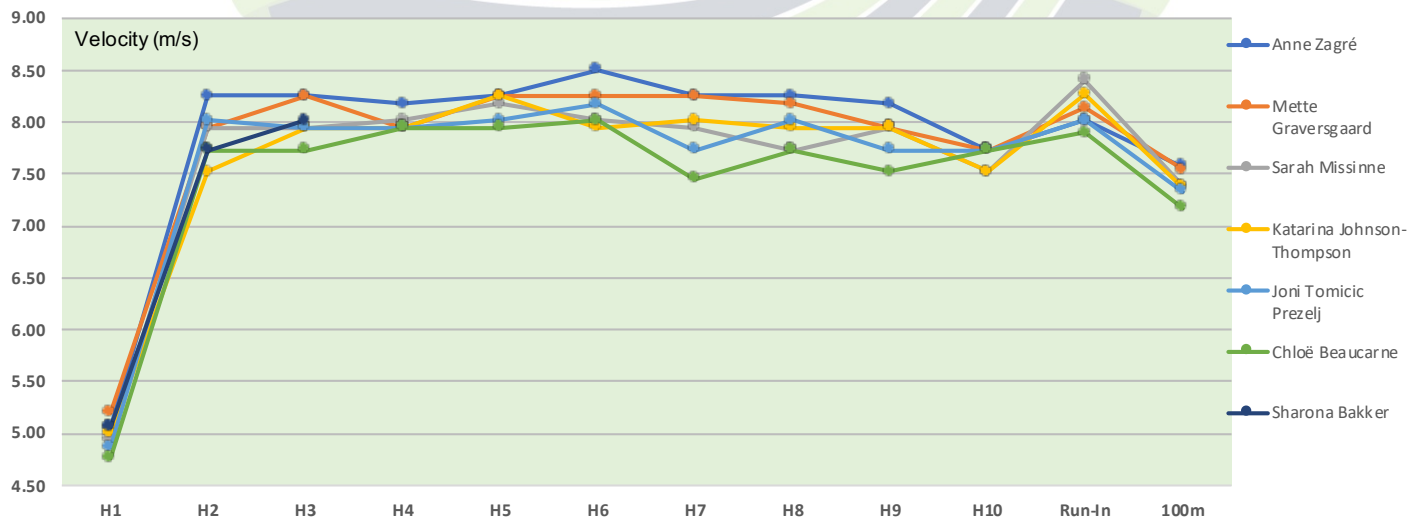
100m Hurdles

Date: 2020.09.04

Wind: -0.2 m/s

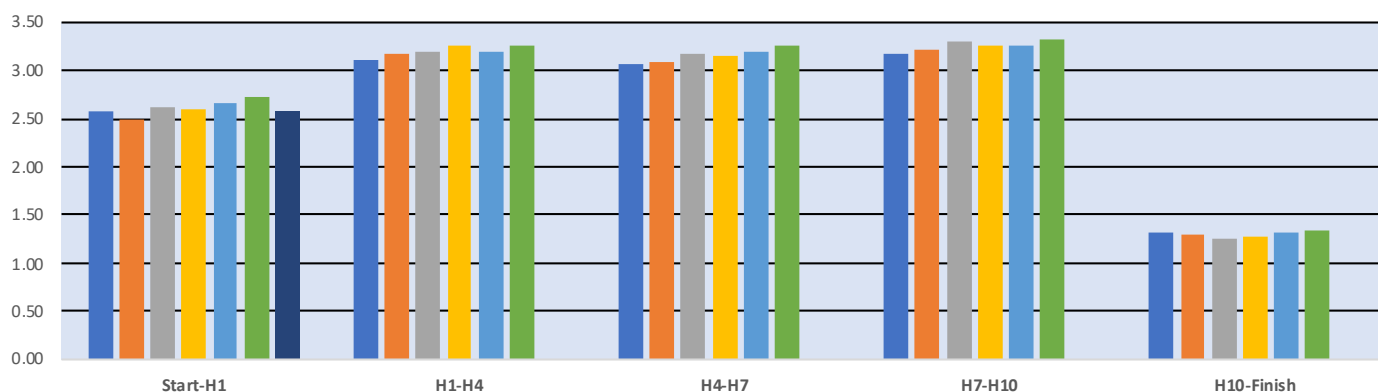
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Zagré, Anne (BEL) (1990)	time		2.57	3.60	4.63	5.67	6.70	7.70	8.73	9.76	10.80	11.90		13.21	4 / 1			
	reaction time	0.136														3.10	3.06	3.17
	interval			1.03	1.03	1.04	1.03	1.00	1.03	1.03	1.04	1.10	1.31			8.23	8.33	8.04
Graversgaard, Mette (DEN) (1995)	time		2.50	3.57	4.60	5.67	6.70	7.73	8.76	9.80	10.87	11.97		13.26	6 / 2			
	reaction time	0.145														3.17	3.09	3.21
	interval			1.07	1.03	1.07	1.03	1.03	1.03	1.04	1.07	1.10	1.29			8.04	8.25	7.94
Missinne, Sarah (BEL) (1995)	time		2.63	3.70	4.77	5.83	6.87	7.93	9.00	10.10	11.17	12.30		13.55	7 / 3			
	reaction time	0.133														3.20	3.17	3.30
	interval			1.07	1.07	1.06	1.04	1.06	1.07	1.10	1.07	1.13	1.25			7.97	8.04	7.73
Johnson-Thompson, Katarina (GBR) (1993)	time		2.60	3.73	4.80	5.87	6.90	7.97	9.03	10.10	11.17	12.30		13.57	5 / 4			
	reaction time	0.170														3.27	3.16	3.27
	interval			1.13	1.07	1.07	1.03	1.07	1.06	1.07	1.07	1.13	1.27			7.80	8.07	7.80
Tomicic Prezelj, Joni (SLO) (1993)	time		2.67	3.73	4.80	5.87	6.93	7.97	9.07	10.13	11.23	12.33		13.64	8 / 5			
	reaction time	0.147														3.20	3.20	3.26
	interval			1.06	1.07	1.07	1.06	1.04	1.10	1.06	1.10	1.10	1.31			7.97	7.97	7.82
Beaucarne, Chloë (BEL) (1997)	time		2.73	3.83	4.93	6.00	7.07	8.13	9.27	10.37	11.50	12.60		13.93	2 / 6			
	reaction time	0.179														3.27	3.27	3.33
	interval			1.10	1.10	1.07	1.07	1.06	1.14	1.10	1.13	1.10	1.33			7.80	7.80	7.66
Bakker, Sharona (NED) (1990)	time		2.57	3.67	4.73									dnf	3 / --			
	reaction time	0.130																
	interval			1.10	1.06													
	time		2.57	3.67	4.73									dnf	3 / --			
	reaction time	0.130																
	interval			1.10	1.06													
	time		2.57	3.67	4.73									dnf	3 / --			
	reaction time	0.130																
	interval			1.10	1.06													



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1280 x 720 @ 30fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=6jA-z-8R-PI>

2020 Bauhaus Galan (Stockholm, SWE) (TV Analysis)

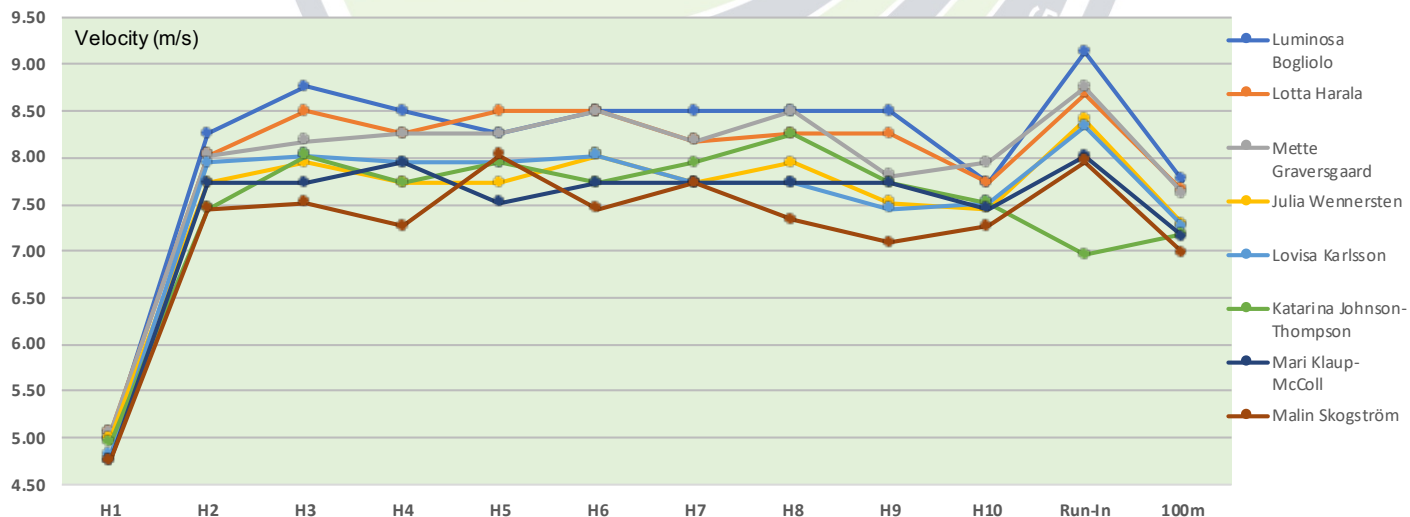
100m Hurdles

Date: 2020.08.23

Wind: 1.4 m/s

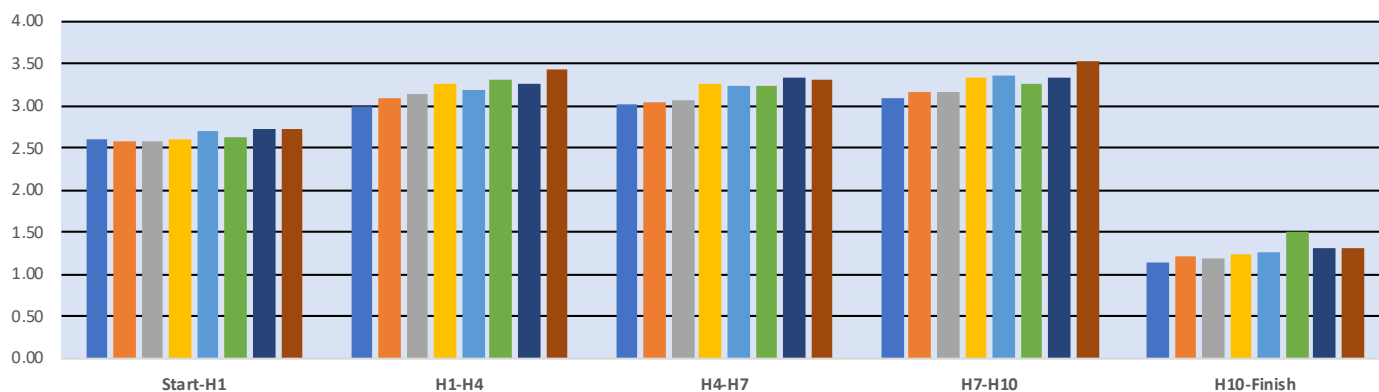
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Bogliolo, Luminosa (ITA) (1995)	time	2.60	3.63	4.60	5.60	6.63	7.63	8.63	9.63	10.63	11.73		12.88	4 / 1			
	reaction time	0.170										1.15			3.00	3.03	3.10
	interval		1.03	0.97	1.00	1.03	1.00	1.00	1.00	1.00	1.10	9.13	7.76		8.50	8.42	8.23
Harala, Lotta (FIN) (1992)	time	2.57	3.63	4.63	5.66	6.66	7.66	8.70	9.73	10.76	11.86		13.07	2 / 2			
	reaction time	0.154										1.21	=PB		3.09	3.04	3.16
	interval		1.06	1.00	1.03	1.00	1.00	1.04	1.03	1.03	1.10	8.68	7.65		8.25	8.39	8.07
Graversgaard, Mette (DEN) (1995)	time	2.57	3.63	4.67	5.70	6.73	7.73	8.77	9.77	10.86	11.93		13.13	3 / 3			
	reaction time	0.145										1.20	NR PB		3.13	3.07	3.16
	interval		1.06	1.04	1.03	1.03	1.00	1.04	1.00	1.09	1.07	8.75	7.62		8.15	8.31	8.07
Wennersten, Julia (SWE) (2001)	time	2.60	3.70	4.77	5.87	6.97	8.03	9.13	10.20	11.33	12.47		13.72	7 / 4			
	reaction time	0.144										1.25			3.27	3.26	3.34
	interval		1.10	1.07	1.10	1.10	1.06	1.10	1.07	1.13	1.14	8.40	7.29		7.80	7.82	7.63
Karlsson, Lovisa (SWE) (2000)	time	2.70	3.77	4.83	5.90	6.97	8.03	9.13	10.23	11.37	12.50		13.76	5 / 5			
	reaction time	0.152										1.26			3.20	3.23	3.37
	interval		1.07	1.06	1.07	1.07	1.06	1.10	1.10	1.14	1.13	8.33	7.27		7.97	7.89	7.57
Johnson-Thompson, Katarina (GBR)	time	2.63	3.77	4.83	5.93	7.00	8.10	9.17	10.20	11.30	12.43		13.94	6 / 6			
	reaction time	0.155										1.51			3.30	3.24	3.26
	interval		1.14	1.06	1.10	1.07	1.10	1.07	1.03	1.10	1.13	6.95	7.17		7.73	7.87	7.82
Klaup-McColl, Mari (EST) (1990)	time	2.73	3.83	4.93	6.00	7.13	8.23	9.33	10.43	11.53	12.67		13.98	8 / 7			
	reaction time	0.185										1.31			3.27	3.33	3.34
	interval		1.10	1.10	1.07	1.13	1.10	1.10	1.10	1.10	1.14	8.02	7.15		7.80	7.66	7.63
Skogström, Malin (SWE) (1995)	time	2.73	3.87	5.00	6.17	7.23	8.37	9.47	10.63	11.83	13.00		14.32	1 / 8			
	reaction time	0.144										1.32			3.44	3.30	3.53
	interval		1.14	1.13	1.17	1.06	1.14	1.10	1.16	1.20	1.17	7.95	6.98		7.41	7.73	7.22



Time Intervals (s)

Hurdle Phases

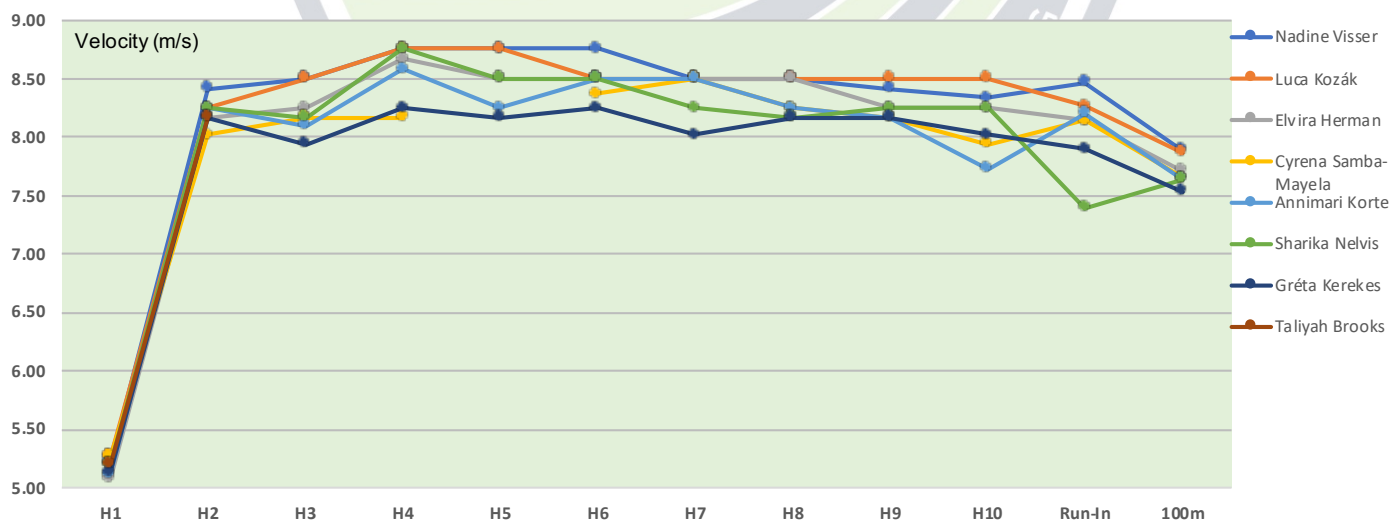


Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1280 x 720 @ 30fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=cCaIDC4IHfo>

100m Hurdles

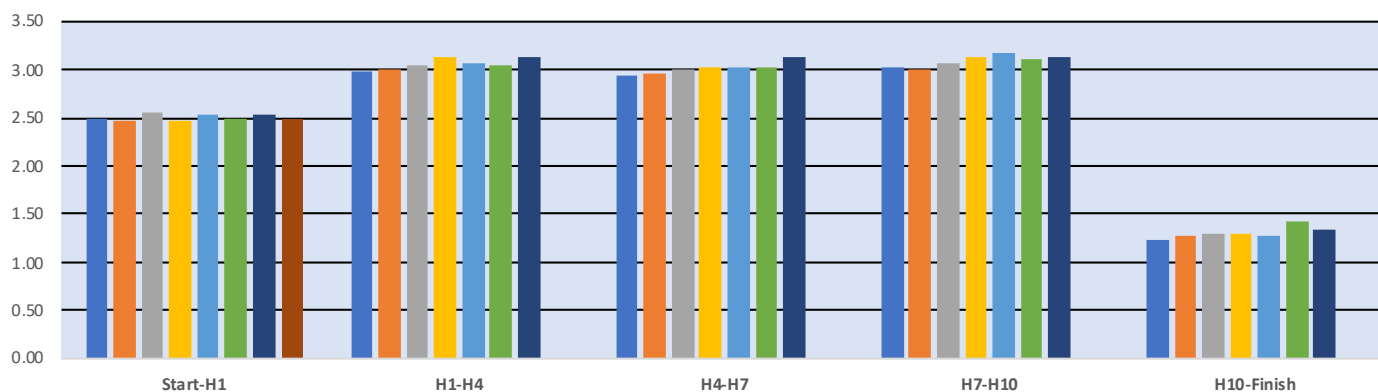
Date: 2020.08.19

Wind: -0.2 m/s

FINAL[illegible]

Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1280 x 720 @ 30fps
Timing From: First Movement
Source: <https://www.youtube.com/watch?v=laES1hxT3Uc>

2020 Finnish National Championships (Turku, FIN) (TV Analysis)

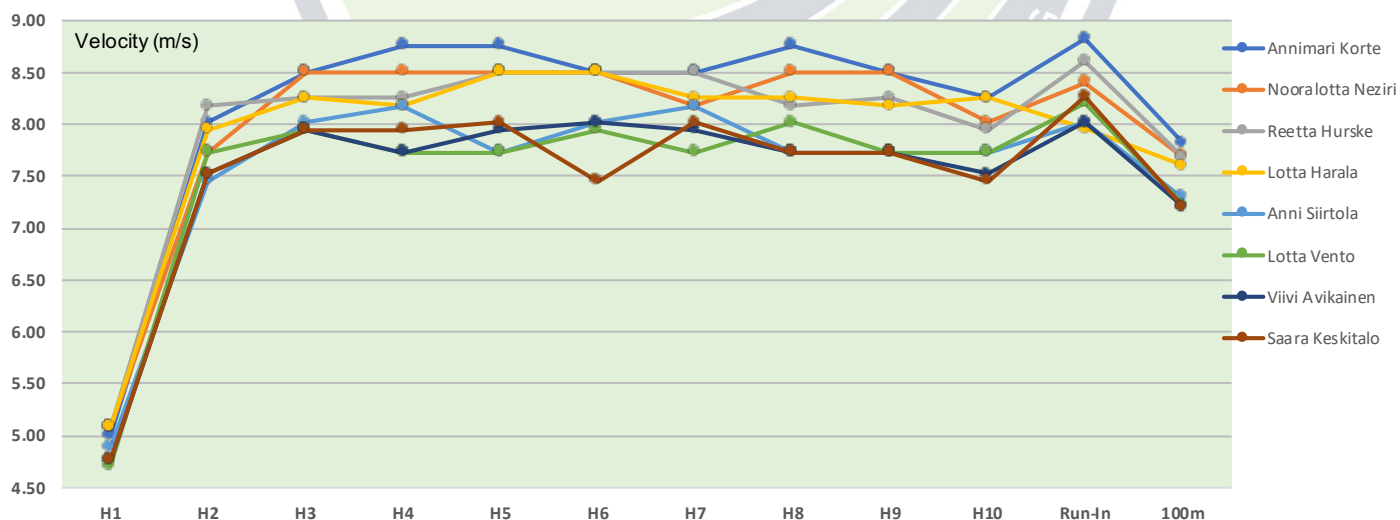
100m Hurdles

Date: 2020.08.14

Wind: 1.0 m/s

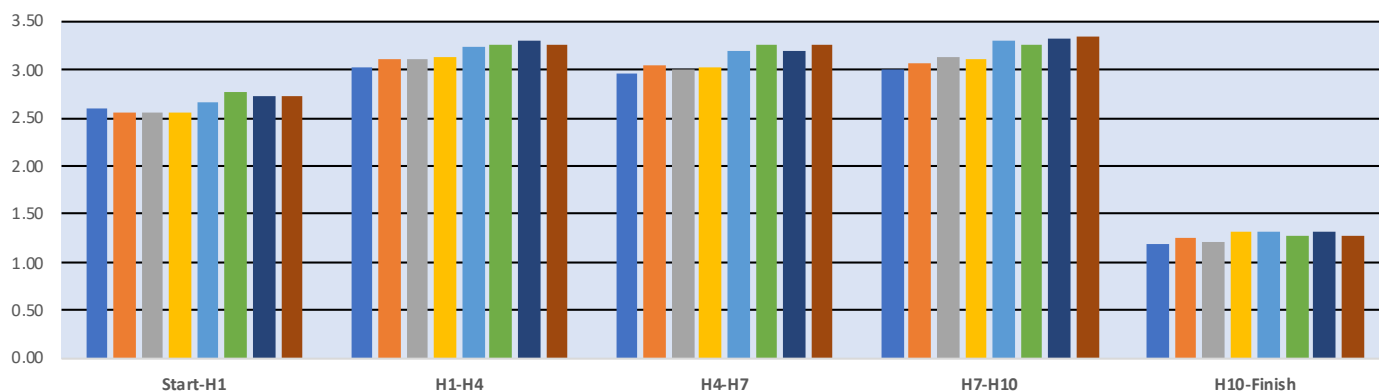
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Korte, Annimari (FIN) (1988)	time		2.60	3.66	4.66	5.63	6.60	7.60	8.60	9.57	10.57	11.60		12.79	4 / 1			
	reaction time	0.197											1.19			3.03	2.97	3.00
	interval velocity		5.00	8.02	8.50	8.76	8.76	8.50	8.50	8.76	8.50	8.25	8.82	7.82		8.42	8.59	8.50
Neziri, Nooralotta (FIN) (1992)	time		2.56	3.66	4.66	5.66	6.66	7.66	8.70	9.70	10.70	11.76		13.01	6 / 2			
	reaction time	0.177											1.25			3.10	3.04	3.06
	interval velocity		5.08	7.73	8.50	8.50	8.50	8.50	8.17	8.50	8.50	8.02	8.40	7.69		8.23	8.39	8.33
Hurske, Reetta (FIN) (1995)	time		2.56	3.60	4.63	5.66	6.66	7.66	8.66	9.70	10.73	11.80		13.02	3 / 3			
	reaction time	0.175											1.22			3.10	3.00	3.14
	interval velocity		5.08	8.17	8.25	8.25	8.50	8.50	8.50	8.17	8.25	7.94	8.61	7.68		8.23	8.50	8.12
Harala, Lotta (FIN) (1992)	time		2.56	3.63	4.66	5.70	6.70	7.70	8.73	9.76	10.80	11.83		13.15	5 / 4			
	reaction time	0.131											1.32			3.14	3.03	3.10
	interval velocity		5.08	7.94	8.25	8.17	8.50	8.50	8.25	8.25	8.17	8.25	7.95	7.60		8.12	8.42	8.23
Siirtola, Anni (FIN) (1998)	time		2.66	3.80	4.86	5.90	7.00	8.06	9.10	10.20	11.30	12.40		13.71	8 / 5			
	reaction time	0.193											1.31			3.24	3.20	3.30
	interval velocity		4.89	7.46	8.02	8.17	7.73	8.02	8.17	7.73	7.73	7.73	8.02	7.29		7.87	7.97	7.73
Vento, Lotta (FIN) (1997)	time		2.76	3.86	4.93	6.03	7.13	8.20	9.30	10.36	11.46	12.56		13.84	1 / 6			
	reaction time	0.154											1.28			3.27	3.27	3.26
	interval velocity		4.71	7.73	7.94	7.73	7.73	7.94	7.73	8.02	7.73	7.73	8.20	7.23		7.80	7.80	7.82
Avikainen, Viivi (FIN) (1987)	time		2.73	3.86	4.93	6.03	7.10	8.16	9.23	10.33	11.43	12.56		13.87	2 / 7			
	reaction time	0.163											1.31			3.30	3.20	3.33
	interval velocity		4.76	7.52	7.94	7.73	7.94	8.02	7.94	7.73	7.73	7.52	8.02	7.21		7.73	7.97	7.66
Keskitalo, Saara (FIN) (2000)	time		2.73	3.86	4.93	6.00	7.06	8.20	9.26	10.36	11.46	12.60		13.87	7 / 8			
	reaction time	0.171											1.27			3.27	3.26	3.34
	interval velocity		4.76	7.52	7.94	7.94	8.02	7.46	8.02	7.73	7.73	7.46	8.27	7.21		7.80	7.82	7.63



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1280 x 720 @ 30fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=oNsmXk14aZA>

2020 Paavo Nurmi Games (Turku, FIN) (TV Analysis)

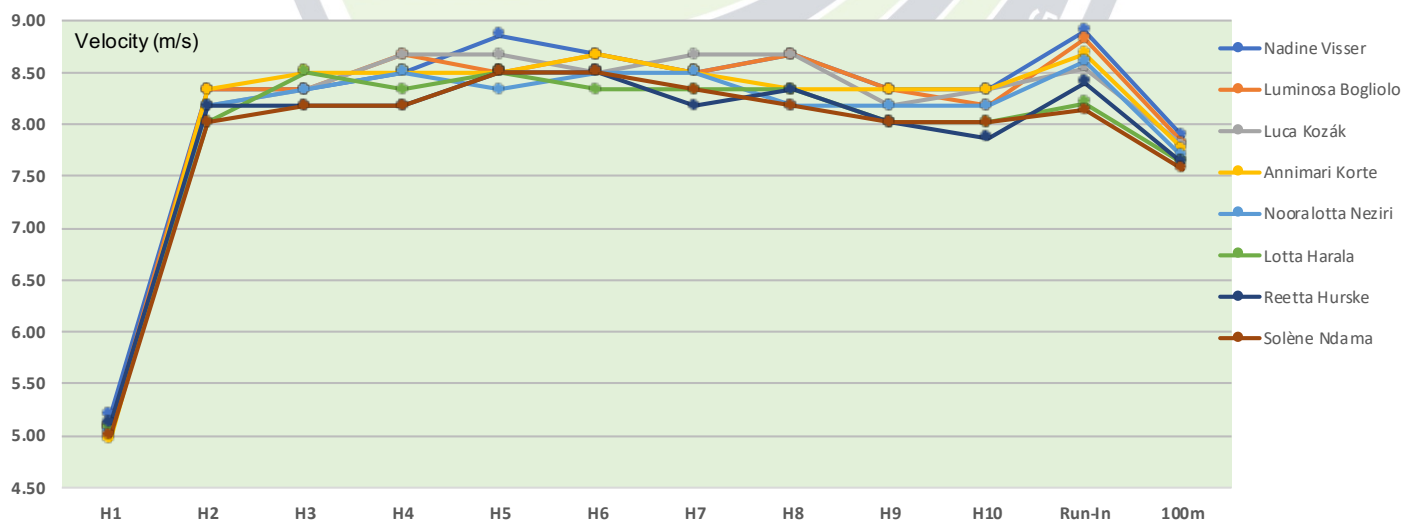
100m Hurdles

Date: 2020.08.11

Wind: 1.2 m/s

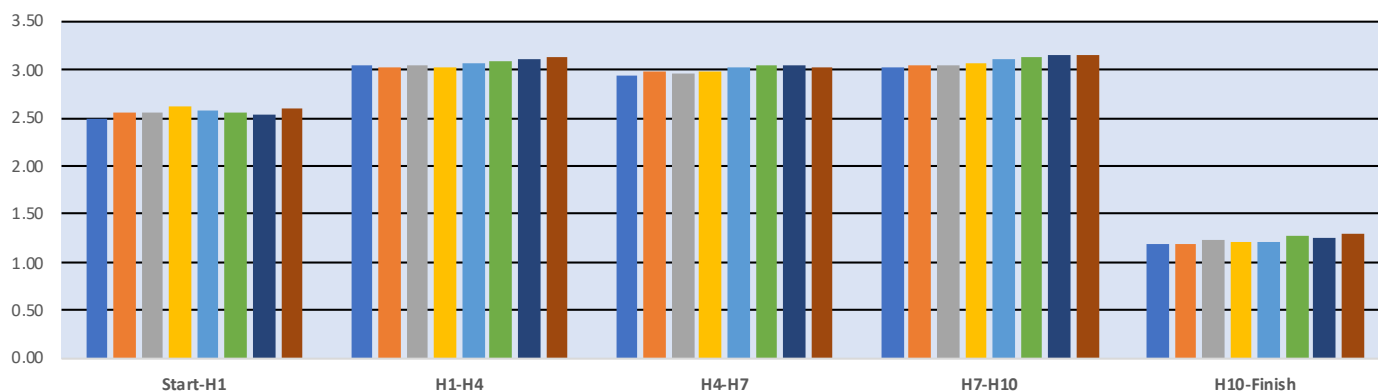
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Visser, Nadine (NED) (1995)	time	2.50	3.52	4.54	5.54	6.50	7.48	8.48	9.46	10.48	11.50		12.68	4 / 1			
	reaction time	0.137													3.04	2.94	3.02
	interval		1.02	1.02	1.00	0.96	0.98	1.00	0.98	1.02	1.02	1.18			8.39	8.67	8.44
Bogliolo, Luminosa (ITA) (1995)	time	2.56	3.58	4.60	5.58	6.58	7.56	8.56	9.54	10.56	11.60		12.79	6 / 2			
	reaction time	0.180													3.02	2.98	3.04
	interval		1.02	1.02	0.98	1.00	0.98	1.00	0.98	1.02	1.04	1.19			8.44	8.56	8.39
Kozák, Luca (HUN) (1996)	time	2.56	3.60	4.62	5.60	6.58	7.58	8.56	9.54	10.58	11.60		12.83	8 / 3			
	reaction time	0.174													3.04	2.96	3.04
	interval		1.04	1.02	0.98	0.98	1.00	0.98	0.98	1.04	1.02	1.23	PB		8.39	8.61	8.39
Korte, Annimari (FIN) (1988)	time	2.62	3.64	4.64	5.64	6.64	7.62	8.62	9.64	10.66	11.68		12.89	3 / 4			
	reaction time	0.225													3.02	2.98	3.06
	interval		1.02	1.00	1.00	1.00	0.98	1.00	1.02	1.02	1.02	1.21			8.44	8.56	8.33
Neziri, Nooralotta (FIN) (1992)	time	2.58	3.62	4.64	5.64	6.66	7.66	8.66	9.70	10.74	11.78		13.00	5 / 5			
	reaction time	0.171													3.06	3.02	3.12
	interval		1.04	1.02	1.00	1.02	1.00	1.00	1.04	1.04	1.04	1.22			8.33	8.44	8.17
Harala, Lotta (FIN) (1992)	time	2.56	3.62	4.62	5.64	6.64	7.66	8.68	9.70	10.76	11.82		13.10	7 / 6			
	reaction time	0.190													3.08	3.04	3.14
	interval		1.06	1.00	1.02	1.00	1.02	1.02	1.02	1.06	1.06	1.28	PB		8.28	8.39	8.12
Hurske, Reetta (FIN) (1995)	time	2.54	3.58	4.62	5.66	6.66	7.66	8.70	9.72	10.78	11.86		13.11	2 / 7			
	reaction time	0.168													3.12	3.04	3.16
	interval		1.04	1.04	1.04	1.00	1.00	1.04	1.02	1.06	1.08	1.25			8.17	8.39	8.07
Ndama, Solène (FRA) (1998)	time	2.60	3.66	4.70	5.74	6.74	7.74	8.76	9.80	10.86	11.92		13.21	1 / 8			
	reaction time	0.161													3.14	3.02	3.16
	interval		1.06	1.04	1.04	1.00	1.00	1.02	1.04	1.06	1.06	1.29			8.12	8.44	8.07
	velocity	5.00	8.02	8.17	8.17	8.50	8.50	8.33	8.17	8.02	8.02	8.14	7.57				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=5ELzWVMm3M>

2020 Motonet GP (Jyväskylä, FIN) (TV Analysis)

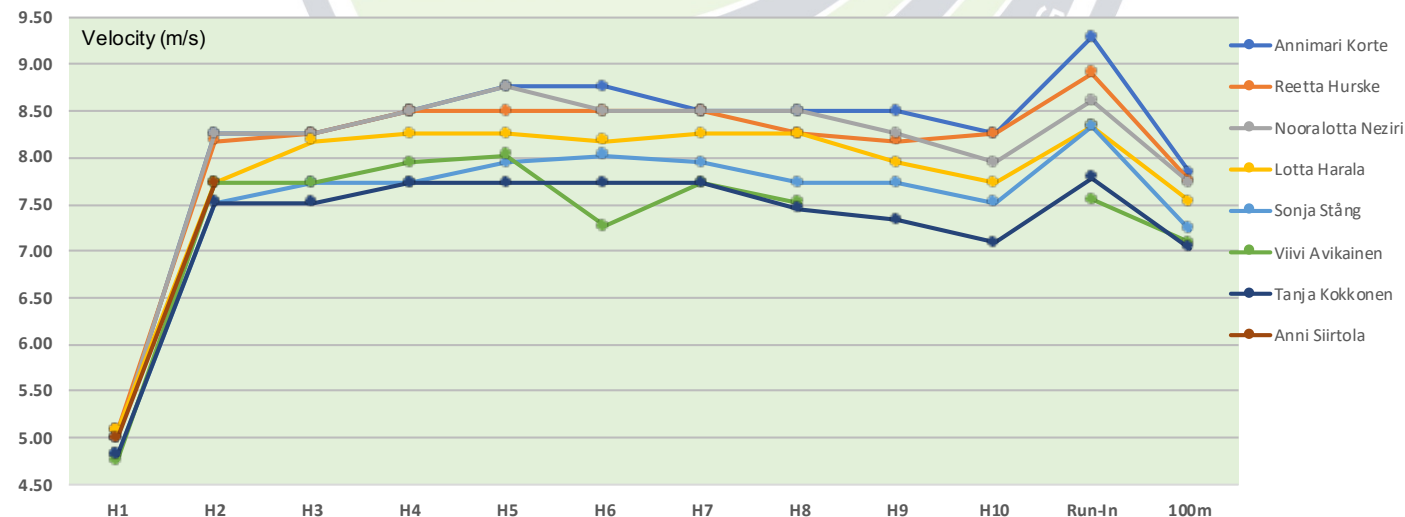
100m Hurdles

Date: 2020.07.08

Wind: 0.7 m/s

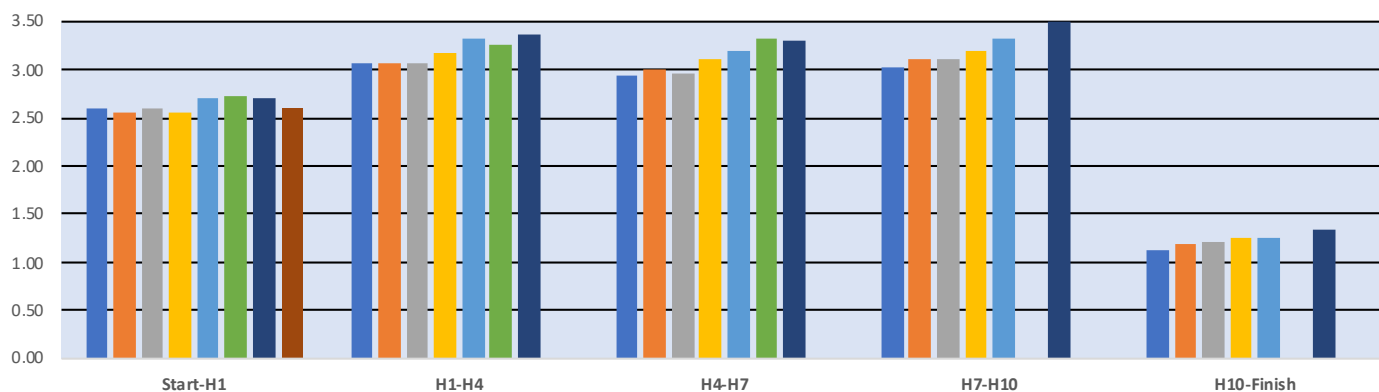
A FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Korte, Annimari (FIN) (1988)	time	2.60	3.63	4.66	5.66	6.63	7.60	8.60	9.60	10.60	11.63		12.76	4 / 1			
	reaction time											1.13			3.06	2.94	3.03
	interval		1.03	1.03	1.00	0.97	0.97	1.00	1.00	1.00	1.03	1.13			8.33	8.67	8.42
Hurske, Reetta (FIN) (1995)	time	2.56	3.60	4.63	5.63	6.63	7.63	8.63	9.66	10.70	11.73		12.91	6 / 2			
	reaction time											1.18			3.07	3.00	3.10
	interval		1.04	1.03	1.00	1.00	1.00	1.03	1.04	1.03	1.03	1.18			8.31	8.50	8.23
Neziri, Nooralotta (FIN) (1992)	time	2.60	3.63	4.66	5.66	6.63	7.63	8.63	9.63	10.66	11.73		12.95	5 / 3			
	reaction time											1.22			3.06	2.97	3.10
	interval		1.03	1.03	1.00	0.97	1.00	1.00	1.00	1.03	1.07	1.22			8.33	8.59	8.23
Harala, Lotta (FIN) (1992)	time	2.56	3.66	4.70	5.73	6.76	7.80	8.83	9.86	10.93	12.03		13.29	3 / 4			
	reaction time											1.26			3.17	3.10	3.20
	interval		1.10	1.04	1.03	1.03	1.04	1.03	1.03	1.07	1.10	1.26			8.04	8.23	7.97
Stång, Sonja (FIN) (2002)	time	2.70	3.83	4.93	6.03	7.10	8.16	9.23	10.33	11.43	12.56		13.82	2 / 5			
	reaction time											1.26	PB		3.33	3.20	3.33
	interval		1.13	1.10	1.10	1.07	1.06	1.07	1.10	1.10	1.13	1.26			7.66	7.97	7.66
Avikainen, Viivi (FIN) (1987)	time	2.73	3.83	4.93	6.00	7.06	8.23	9.33	10.46				14.10	8 / 6			
	reaction time											3.64			3.27	3.33	-9.33
	interval		1.10	1.10	1.07	1.06	1.17	1.10	1.13			3.64			7.80	7.66	-2.73
Kokkonen, Tanja (FIN) (2002)	time	2.70	3.83	4.96	6.06	7.16	8.26	9.36	10.50	11.66	12.86		14.21	1 / 7			
	reaction time											1.35			3.36	3.30	3.50
	interval		1.13	1.13	1.10	1.10	1.10	1.10	1.14	1.16	1.20	1.35			7.59	7.73	7.29
Siirtola, Anni (FIN) (1998)	time	2.60	3.70										dnf	7 / --			
	reaction time																
	interval		1.10														



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1280 x 720 @ 30fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=vZ3U10ja8xc>

Biomechanical Analysis

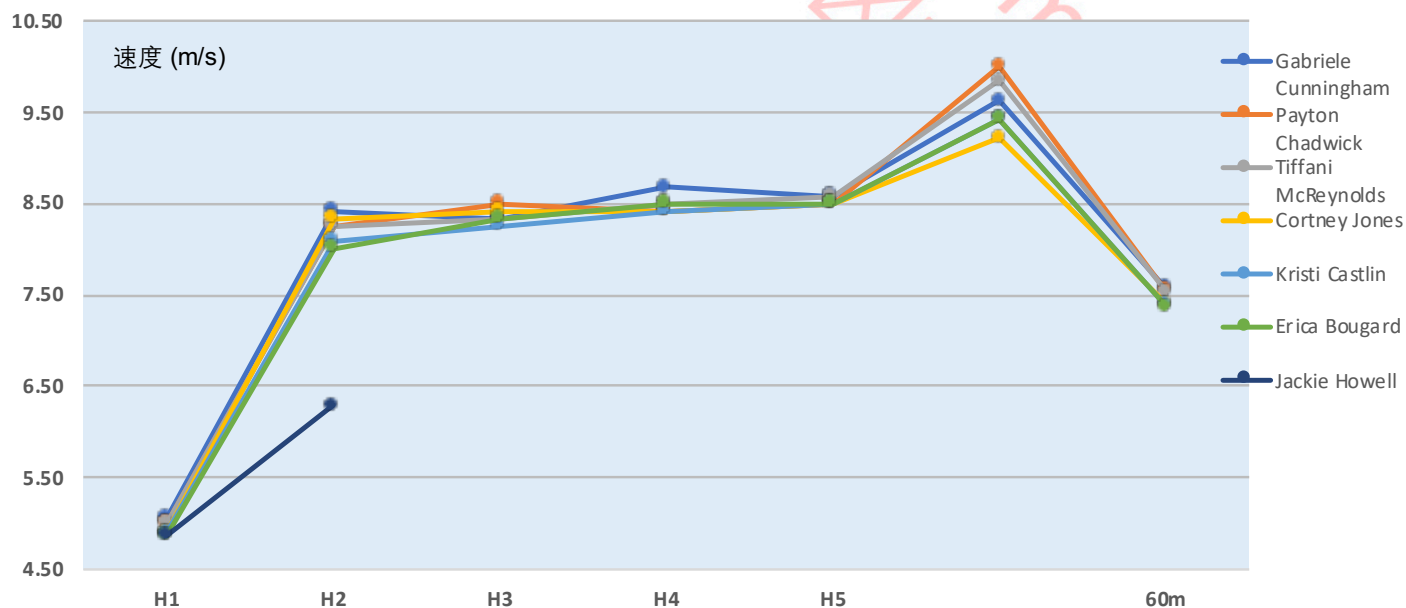
USATF National Indoor Championships, Albuquerque, NM, USA (Altitude)

Women's 60m Hurdles

Date: 2020.02.15

FINAL

		H1	H2	H3	H4	H5	60m	Lane / Place
Cunningham, Gabriele (USA) (1998)	time	2.57	3.58	4.60	5.58	6.57	7.92	6 / 1
	reaction time	0.170					PB	
	interval		1.01	1.02	0.98	0.99	1.35	
	velocity	5.06	8.42	8.33	8.67	8.59	9.63	7.58
Chadwick, Payton (USA) (1995)	time	2.60	3.63	4.63	5.64	6.64	7.94	3 / 2
	reaction time	0.160						
	interval		1.03	1.00	1.01	1.00	1.30	
	velocity	5.00	8.25	8.50	8.42	8.50	10.00	7.56
McReynolds, Tiffani (USA) (1991)	time	2.60	3.63	4.65	5.65	6.64	7.96	4 / 3
	reaction time	0.181						
	interval		1.03	1.02	1.00	0.99	1.32	
	velocity	5.00	8.25	8.33	8.50	8.59	9.85	7.54
Jones, Cortney (USA) (1999)	time	2.65	3.67	4.68	5.69	6.69	8.10	7 / 4
	reaction time	0.171						
	interval		1.02	1.01	1.01	1.00	1.41	
	velocity	4.91	8.33	8.42	8.42	8.50	9.22	7.41
Castlin, Kristi (USA) (1988)	time	2.65	3.70	4.73	5.74	6.74	8.12	1 / 5
	reaction time	0.166						
	interval		1.05	1.03	1.01	1.00	1.38	
	velocity	4.91	8.10	8.25	8.42	8.50	9.42	7.39
Bougard, Erica (USA) (1993)	time	2.67	3.73	4.75	5.75	6.75	8.13	8 / 6
	reaction time	0.143						
	interval		1.06	1.02	1.00	1.00	1.38	
	velocity	4.87	8.02	8.33	8.50	8.50	9.42	7.38
Howell, Jackie (USA) (2000)	time	2.67	4.02				dnf	2 / --
	reaction time	0.141						
	interval		1.35					
	velocity	4.87	6.30					



Biomechanical Analysis

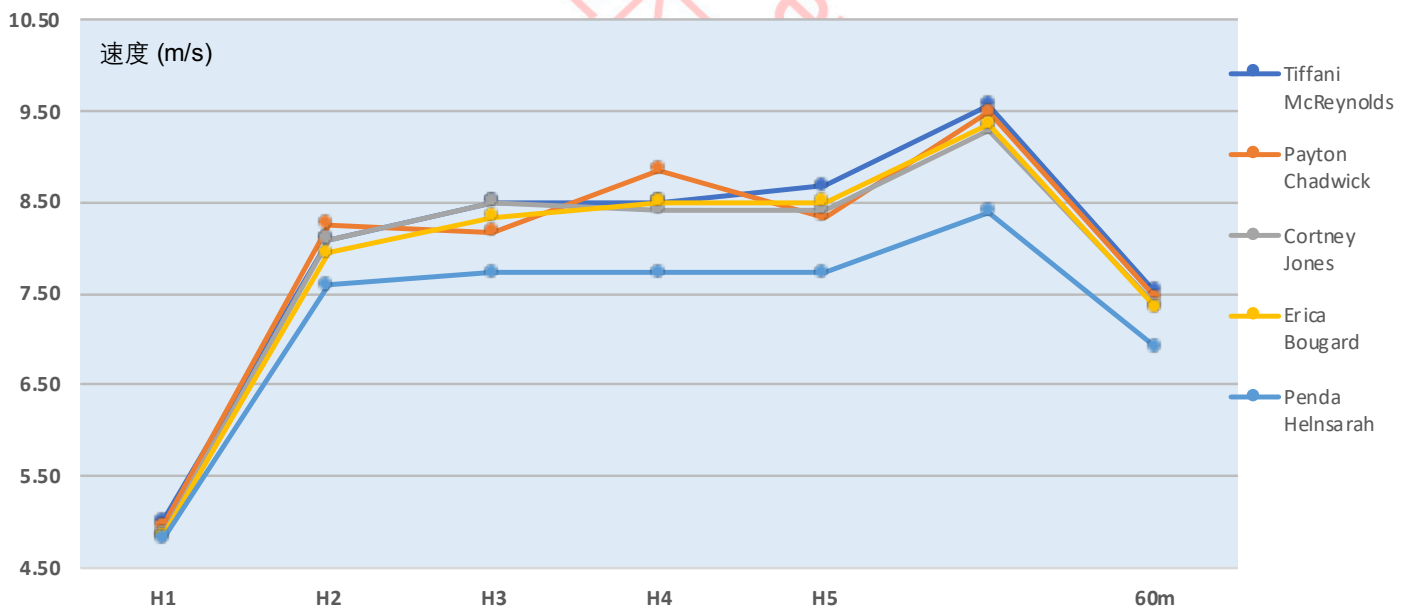
USATF National Indoor Championships, Albuquerque, NM, USA (Altitude)

Women's 60m Hurdles

Date: 2020.02.15

Semi-Final 2

			H1	H2	H3	H4	H5		60m	Lane / Place
McReynolds, Tiffani (USA) (1991)	time		2.59	3.64	4.64	5.64	6.62		7.98	6 / 1
	reaction time	0.156								
	interval velocity		5.02	8.10	8.50	8.50	8.67	9.56	7.52	
Chadwick, Payton (USA) (1995)	time		2.62	3.65	4.69	5.65	6.67		8.04	7 / 2
	reaction time	0.170								
	interval velocity		4.96	8.25	8.17	8.85	8.33	9.49	7.46	
Jones, Cortney (USA) (1999)	time		2.67	3.72	4.72	5.73	6.74		8.14	3 / 3
	reaction time	0.175								
	interval velocity		4.87	8.10	8.50	8.42	8.42	9.29	7.37	
Bougard, Erica (USA) (1993)	time		2.68	3.75	4.77	5.77	6.77		8.16	5 / 4
	reaction time	0.161								
	interval velocity		4.85	7.94	8.33	8.50	8.50	9.35	7.35	
Penda, Helnsarah (USA)	time	0.168	2.70	3.82	4.92	6.02	7.12		8.67	4 / 5
	reaction time									
	interval velocity		4.81	7.59	7.73	7.73	7.73	8.39	6.92	



Biomechanical Analysis

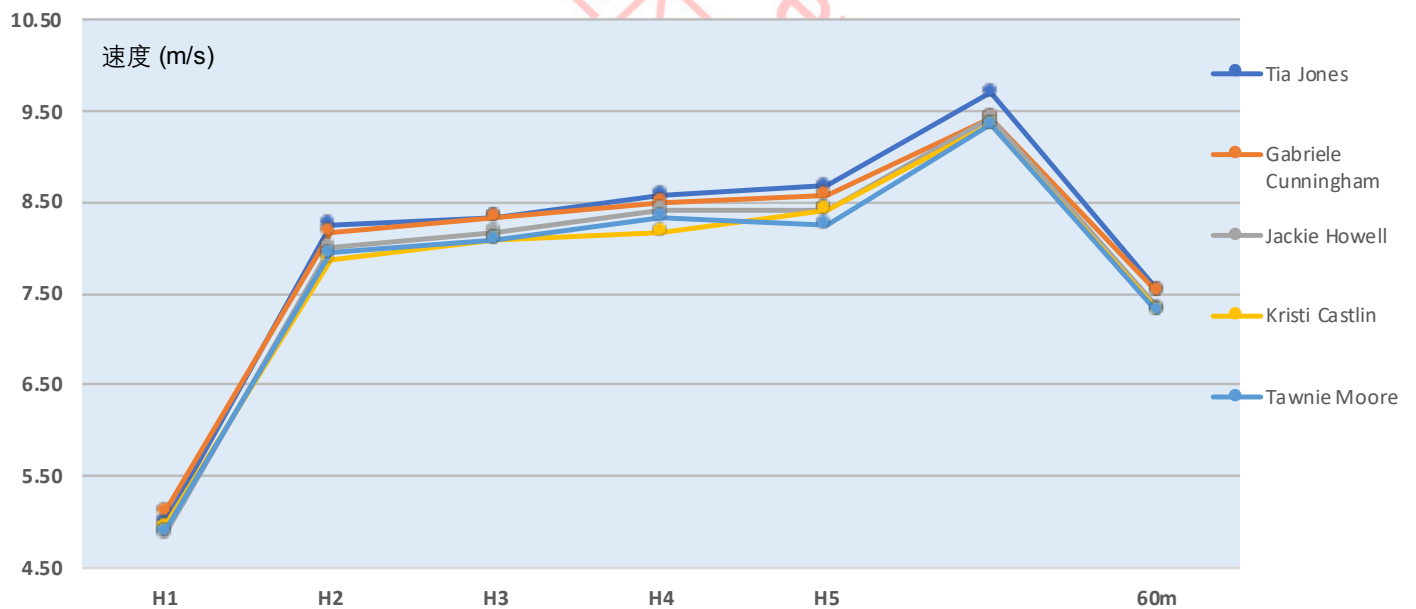
USATF National Indoor Championships, Albuquerque, NM, USA (Altitude)

Women's 60m Hurdles

Date: 2020.02.15

Semi-Final 1

			H1	H2	H3	H4	H5		60m	Lane / Place
Jones, Tia (USA) (2000)	time		2.60	3.63	4.65	5.64	6.62		7.96	3 / 1
	reaction time	0.162		1.03	1.02	0.99	0.98	1.34	PB	
	interval velocity		5.00	8.25	8.33	8.59	8.67	9.70	7.54	
Cunningham, Gabriele (USA) (1998)	time		2.54	3.58	4.60	5.60	6.59		7.97	6 / 2
	reaction time	0.164		1.04	1.02	1.00	0.99	1.38	PB	
	interval velocity		5.12	8.17	8.33	8.50	8.59	9.42	7.53	
Howell, Jackie (USA) (1996)	time		2.67	3.73	4.77	5.78	6.79		8.17	4 / 3
	reaction time	0.154		1.06	1.04	1.01	1.01	1.38		
	interval velocity		4.87	8.02	8.17	8.42	8.42	9.42	7.34	
Castlin, Kristi (USA) (1988)	time		2.62	3.70	4.75	5.79	6.80		8.19	5 / 4
	reaction time	0.136		1.08	1.05	1.04	1.01	1.39		
	interval velocity		4.96	7.87	8.10	8.17	8.42	9.35	7.33	
Moore, Tawnie (USA) (1995)	time		2.65	3.72	4.77	5.79	6.82		8.21	7 / 5
	reaction time	0.147		1.07	1.05	1.02	1.03	1.39		
	interval velocity		4.91	7.94	8.10	8.33	8.25	9.35	7.31	



Men's 400m Hurdles

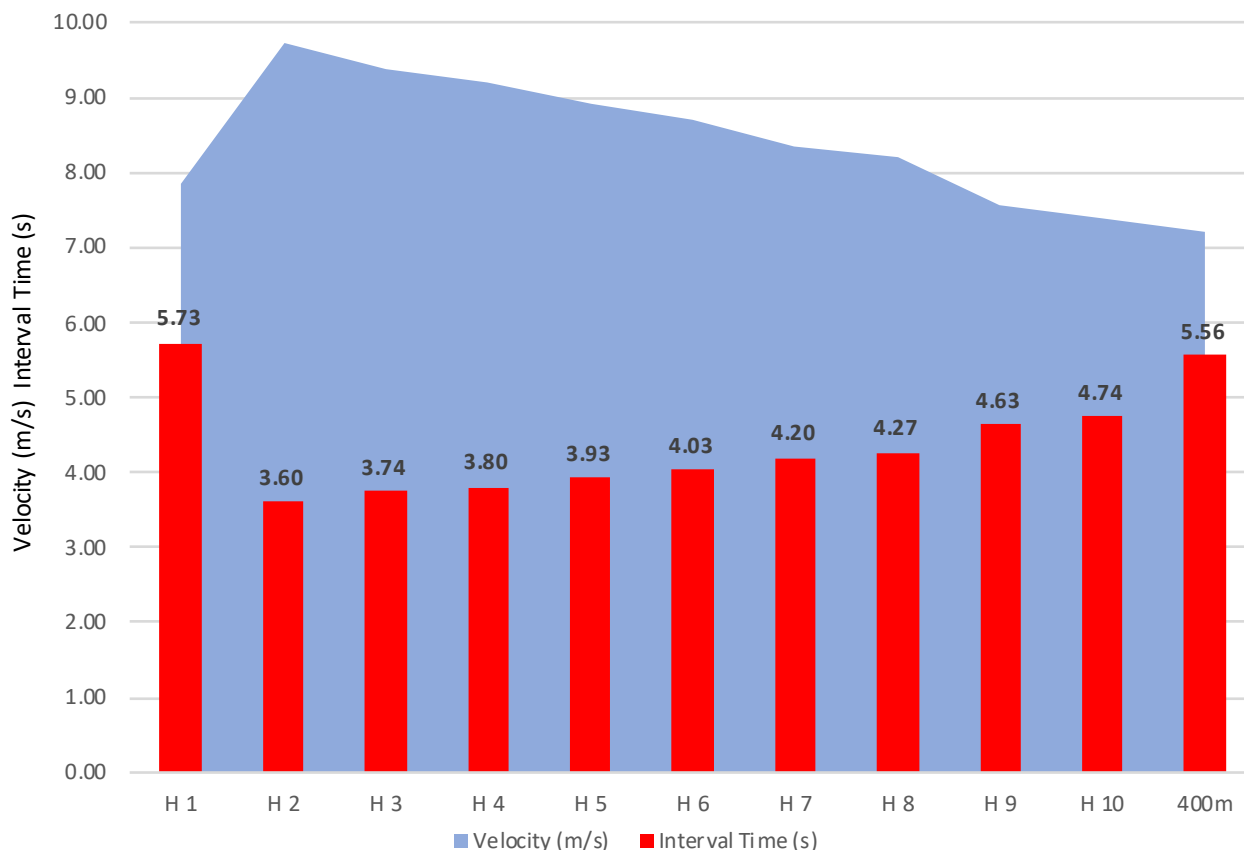
2020 Top 10 Times - Men's 400m Hurdles

Warholm, Karsten (NOR) (1996)																		
FINAL - 2020 Bauhaus Galan (Stockholm, SWE) (TV Analysis)																		
date	23-Aug	time	5.58	9.14	12.80	16.60	20.44	24.42	28.48	32.64	36.94	41.48	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
reaction time	0.161	interval		3.56	3.66	3.80	3.84	3.98	4.06	4.16	4.30	4.54	5.39	AR PB		11.02	11.88	13.00
		velocity	8.06	9.83	9.56	9.21	9.11	8.79	8.62	8.41	8.14	7.71	7.42	8.53		9.53	8.84	8.08
H1 lead leg	L	strides	20	13	13	13	13	13	13	13	13	15	18	157				
Henson (2020) - Athlete First: 2020 year end hurdle report																		
8 / 1																		
Warholm, Karsten (NOR) (1996)																		
FINAL - 2020 Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis)																		
date	17-Sep	time	5.64	9.24	12.95	16.75	20.65	24.66	28.80	33.07	37.47	41.91	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
reaction time	0.158	interval		3.60	3.71	3.80	3.90	4.01	4.14	4.27	4.40	4.44	5.16			11.11	12.05	13.11
		velocity	7.98	9.72	9.43	9.21	8.97	8.73	8.45	8.20	7.95	7.88	7.75	8.50		9.45	8.71	8.01
H1 lead leg	L	strides	20	13	13	13	13	13	13	13	13	15	18	157				
Henson (2020) - Athlete First: 2020 year end hurdle report																		
7 / 1																		
Warholm, Karsten (NOR) (1996)																		
FINAL - 2020 ISTAF (Berlin, GER) (TV Analysis)																		
date	13-Sep	time	5.64	9.24	12.88	16.64	20.56	24.56	28.68	32.92	37.24	41.88	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
reaction time	0.190	interval		3.60	3.64	3.76	3.92	4.00	4.12	4.24	4.32	4.64	5.20			11.00	12.04	13.20
		velocity	7.98	9.72	9.62	9.31	8.93	8.75	8.50	8.25	8.10	7.54	7.69	8.50		9.55	8.72	7.95
H1 lead leg	L	strides	20	13	13	13	13	13	13	13	13	15	18	157				
Henson (2020) - Athlete First: 2020 year end hurdle report																		
7 / 1																		
Warholm, Karsten (NOR) (1996)																		
FINAL - 2020 Herculis Meeting International d'Athletisme (Monaco, MON) (TV Analysis)																		
date	14-Aug	time	5.60	9.27	13.11	16.98	20.92	25.02	29.23	33.47	37.80	42.17	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
reaction time	0.132	interval		3.67	3.84	3.87	3.94	4.10	4.21	4.24	4.33	4.37	4.93			11.38	12.25	12.94
		velocity	8.04	9.54	9.11	9.04	8.88	8.54	8.31	8.25	8.08	8.01	8.11	8.49		9.23	8.57	8.11
H1 lead leg	L	strides	20	13	13	13	13	13	13	13	13	13	17	154				
Henson (2020) - Athlete First: 2020 year end hurdle report																		
7 / 1																		
Warholm, Karsten (NOR) (1996)																		
FINAL - 2020 Golden Spike (Ostrava, CZE) (TV Analysis)																		
date	8-Sep	time	5.77	9.37	13.05	16.82	20.65	24.69	28.89	33.13	37.77	42.37	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
reaction time	0.168	interval		3.60	3.68	3.77	3.83	4.04	4.20	4.24	4.64	4.60	5.25			11.05	12.07	13.48
		velocity	7.80	9.72	9.51	9.28	9.14	8.66	8.33	8.25	7.54	7.61	7.62	8.40		9.50	8.70	7.79
H1 lead leg	L	strides	20	13	13	13	13	13	13	13	15	15	18	159				
Henson (2020) - Athlete First: 2020 year end hurdle report																		
8 / 1																		
Warholm, Karsten (NOR) (1996)																		
FINAL - 2020 Norwegian National Championships (Bergen, NOR) (TV Analysis)																		
date	20-Sep	time	5.73	9.33	13.07	16.87	20.80	24.83	29.03	33.30	37.93	42.67	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
reaction time		interval		3.60	3.74	3.80	3.93	4.03	4.20	4.27	4.63	4.74	5.56			11.14	12.16	13.64
		velocity	7.85	9.72	9.36	9.21	8.91	8.68	8.33	8.20	7.56	7.38	7.19	8.29		9.43	8.63	7.70
H1 lead leg	L	strides	20	13	13	13	13	13	13	13	15	15	17.5	158.5				
Henson (2020) - Athlete First: 2020 year end hurdle report																		
7 / 1																		
Valliant, Ludvy (FRA) (1995)																		
FINAL - 2020 Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis)																		
date	17-Sep	time	5.87	9.58		21.15		29.53	33.90	38.54	43.28		Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
reaction time	0.185	interval		3.71		11.57		8.38	4.37	4.64	4.74		5.41					13.75
		velocity	7.67	9.43		9.08		8.35	8.01	7.54	7.38		7.39	8.22				7.64
H1 lead leg	R	strides	21	13					14	14	14		17.2	93.2				
Henson (2020) - Athlete First: 2020 year end hurdle report																		
6 / 2																		
Mägi, Rasmus (EST) (1992)																		
FINAL - 2020 Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis)																		
date	17-Sep	time	5.97	9.74		21.45		29.96	34.43	38.94	43.51		Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
reaction time	0.150	interval		3.77		11.71		8.51	4.47	4.51	4.57		5.21					13.55
		velocity	7.54	9.28		8.97		8.23	7.83	7.76	7.66		7.68	8.21				7.75
H1 lead leg	R	strides	20	13					14	14	14		17.5	92.5				
Henson (2020) - Athlete First: 2020 year end hurdle report																		
4 / 3																		
Copello, Yasmani (TUR) (1987)																		
FINAL - 2020 Herculis Meeting International d'Athletisme (Monaco, MON) (TV Analysis)																		
date	14-Aug	time	5.81	9.44	13.25	17.15	21.12	25.25	29.63	34.07	38.67	43.44	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
reaction time	0.192	interval		3.63	3.81	3.90	3.97	4.13	4.38	4.44	4.60	4.77	5.60			11.34	12.48	13.81
		velocity	7.75	9.64	9.19	8.97	8.82	8.47	7.99	7.88	7.61	7.34	7.14	8.16		9.26	8.41	7.60
H1 lead leg	R	strides	20	13	13	13	13	13	14	14	14	14	18	159				
Henson (2020) - Athlete First: 2020 year end hurdle report																		
5 / 2																		
Happio, Wilfried (FRA) (1998)																		
Race A - 2020 Meeting de La Tchaux (La Chaux-de-Fonds, SUI) (TV Analysis)																		
date	15-Aug	time	6.00	9.72	13.52	17.52	21.56	25.68	30.08	34.52	39.16	43.88	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
reaction time		interval		3.72	3.80	4.00	4.04	4.12	4.40	4.44	4.64	4.72	5.23			11.52	12.56	13.80
		velocity	7.50	9.41	9.21	8.75	8.66	8.50	7.95	7.88	7.54	7.42	7.65	8.14		9.11	8.36	7.61
H1 lead leg	L	strides	21	13	13	13	13	13	14	14	15	15	18	162				
Henson (2020) - Athlete First: 2020 year end hurdle report																		
1 / 1																		

Men's 400m Hurdles

Athlete: Karsten Warholm (1996) **Official Time (FAT):** 48.23
Affiliation: NOR / Puma **Lane / Place:** 4 / 1
Competition: 2020 Norweigen National Championships **Reaction Time:**
City: Bergen, NOR **H1 Lead Leg:** Left
Date: 2020.09.20 **Min Split (s):** 4.33
Round: FINAL **Max Split (s):** 5.45
Evaluated with: ObjectusVideo (TV Analysis) **Timing From:** First Movement
Quality & Frame Rate: 1920 x 1080 @ 30fps **Hurdle Specifications:** 45m / 35m / 91cm
Source: <https://www.youtube.com/watch?v=LV-upLoXX78> **Analysis:** athletefirst.org

Hurdle	Touchdown Time (s)	Interval Time (s)	Velocity (m/s)	Steps	
H 1	5.73	5.73	7.85	20	Start→H1 5.73
H 2	9.33	3.60	9.72	13	H1→H4 11.14
H 3	13.07	3.74	9.36	13	
H 4	16.87	3.80	9.21	13	
H 5	20.80	3.93	8.91	13	H4→H7 12.16
H 6	24.83	4.03	8.68	13	
H 7	29.03	4.20	8.33	13	
H 8	33.30	4.27	8.20	13	H7→H10 13.64
H 9	37.93	4.63	7.56	15	
H 10	42.67	4.74	7.38	15	
Finish (MT)	48.23	5.56	7.19	17.5	H10→Finish 5.56
Official Time	48.23	Ave Time = 4.35	Ave Vel = 8.09	158.5	



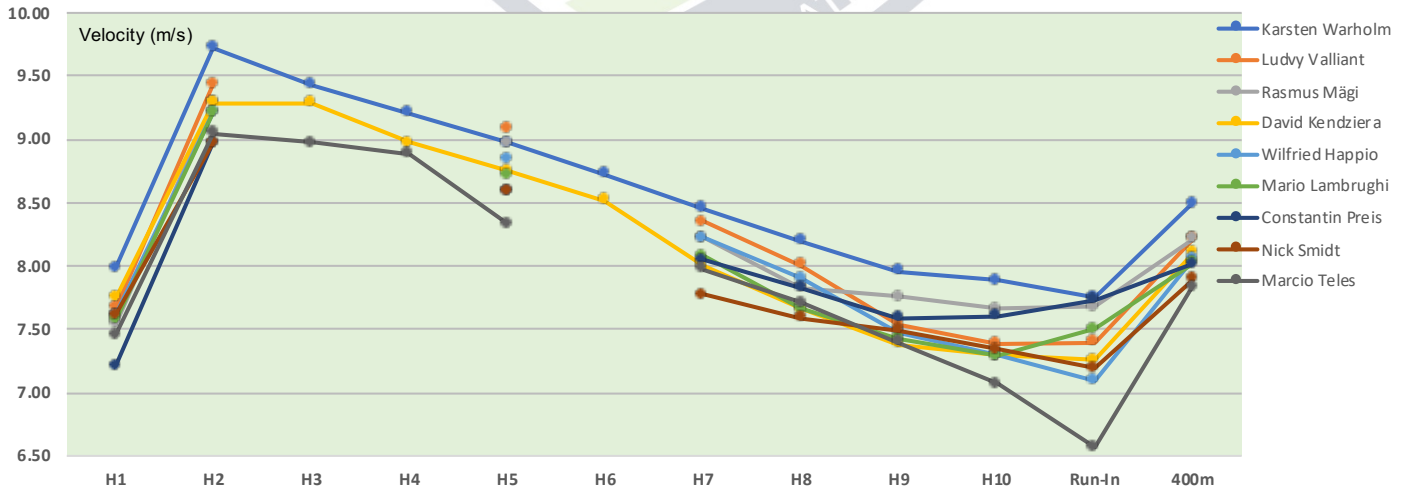
2020 Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis)

Men's 400m Hurdles

Date 2020.09.17

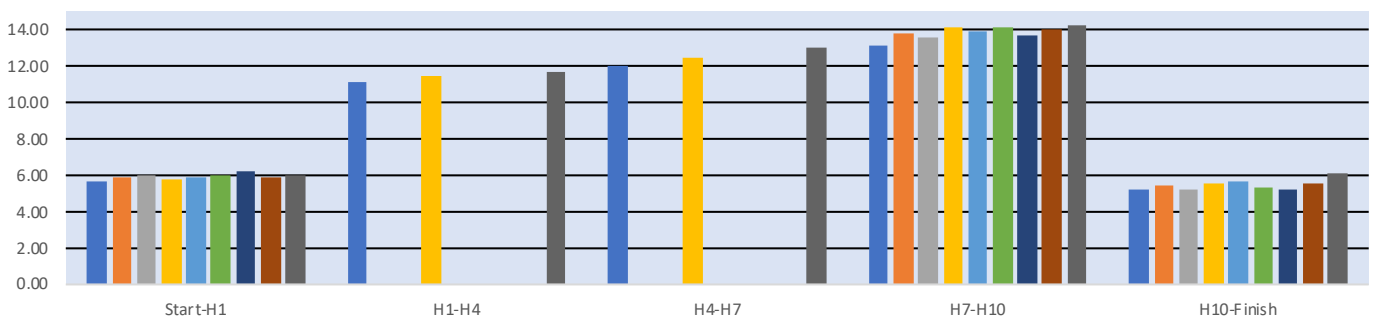
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Warholm, Karsten (NOR) (1996)	time		5.64	9.24	12.95	16.75	20.65	24.66	28.80	33.07	37.47	41.91		47.07	7 / 1			
	reaction time	0.158																
	interval			3.60	3.71	3.80	3.90	4.01	4.14	4.27	4.40	4.44	5.16			11.11	12.05	13.11
	velocity		7.98	9.72	9.43	9.21	8.97	8.73	8.45	8.20	7.95	7.88	7.75	8.50		9.45	8.71	8.01
Valliant, Ludvy (FRA) (1995)	time		5.87	9.58			21.15		29.53	33.90	38.54	43.28		48.69	6 / 2			
	reaction time	0.185			3.71		11.57		8.38	4.37	4.64	4.74	5.41					13.75
	interval			3.71			11.57		8.38	4.37	4.64	4.74	5.41					13.75
	velocity		7.67	9.43			9.08		8.35	8.01	7.54	7.38	7.39	8.22				7.64
Mägi, Rasmus (EST) (1992)	time		5.97	9.74			21.45		29.96	34.43	38.94	43.51		48.72	4 / 3			
	reaction time	0.150					11.71		8.51	4.47	4.51	4.57	5.21					13.55
	interval			3.77			11.71		8.51	4.47	4.51	4.57	5.21					13.55
	velocity		7.54	9.28			8.97		8.23	7.83	7.76	7.66	7.68	8.21				7.75
Kendziera, David (USA) (1994)	time		5.81	9.58	13.35	17.25	21.25	25.36	29.73	34.30	39.04	43.84		49.35	9 / 4			
	reaction time	0.172			3.77	3.90	4.00	4.11	4.37	4.57	4.74	4.80	5.51			11.44	12.48	14.11
	interval			3.77	3.90	4.00	4.11	4.37	4.57	4.74	4.80	5.51				11.44	12.48	14.11
	velocity		7.75	9.28	9.28	8.97	8.75	8.52	8.01	7.66	7.38	7.29	7.26	8.11		9.18	8.41	7.44
Happio, Wilfried (FRA) (1998)	time		5.91	9.71			21.59		30.10	34.53	39.21	44.01		49.65	5 / 5			
	reaction time	0.166			3.80		11.88		8.51	4.43	4.68	4.80	5.64					13.91
	interval			3.80			11.88		8.51	4.43	4.68	4.80	5.64					13.91
	velocity		7.61	9.21			8.84		8.23	7.90	7.48	7.29	7.09	8.06				7.55
Lambrughi, Mario (ITA) (1992)	time		5.94	9.74			21.79		30.46	35.03	39.74	44.54		49.87	2 / 6			
	reaction time	0.136			3.80		12.05		8.67	4.57	4.71	4.80	5.33					14.08
	interval			3.80			12.05		8.67	4.57	4.71	4.80	5.33					14.08
	velocity		7.58	9.21			8.71		8.07	7.66	7.43	7.29	7.50	8.02				7.46
Preis, Constantin (GER) (1998)	time		6.24	10.14			22.36		31.06	35.53	40.14	44.74		49.91	1 / 7			
	reaction time	0.250			3.90		12.22		8.70	4.47	4.61	4.60	5.17					13.68
	interval			3.90			12.22		8.70	4.47	4.61	4.60	5.17					13.68
	velocity		7.21	8.97			8.59		8.05	7.83	7.59	7.61	7.74	8.01				7.68
Smidt, Nick (NED) (1997)	time		5.91	9.81			22.05		31.06	35.67	40.34	45.11		50.67	3 / 8			
	reaction time	0.144			3.90		12.24		9.01	4.61	4.67	4.77	5.56					14.05
	interval			3.90			12.24		9.01	4.61	4.67	4.77	5.56					14.05
	velocity		7.61	8.97			8.58		7.77	7.59	7.49	7.34	7.19	7.89				7.47
Teles, Marcio (BRA) (1994)	time		6.04	9.91	13.81	17.75	21.95		30.73	35.27	40.00	44.95		51.04	8 / 9			
	reaction time	0.150			3.87	3.90	4.20		8.78	4.54	4.73	4.95	6.09			11.71	12.98	14.22
	interval			3.87	3.90	4.20			8.78	4.54	4.73	4.95	6.09			11.71	12.98	14.22
	velocity		7.45	9.04	8.97	8.88	8.33		7.97	7.71	7.40	7.07	6.57	7.84		8.97	8.09	7.38
	H1 lead leg	L			14	14	14			15	15	15	18.5	142.5				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=NNmygWl1x-g>

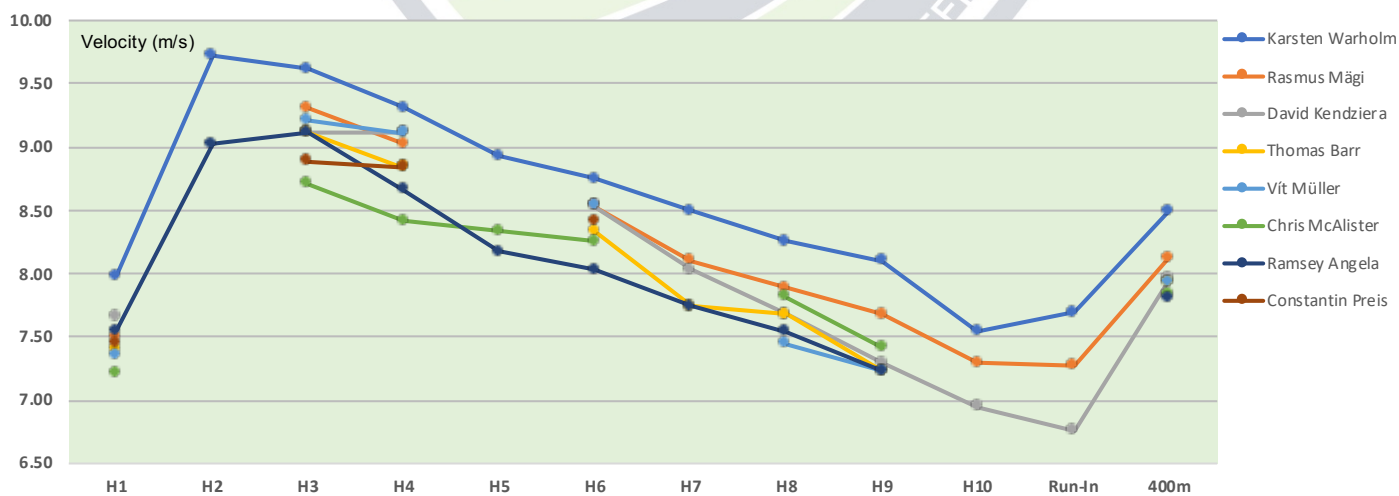
2020 ISTAF (Berlin, GER) (TV Analysis)

Men's 400m Hurdles

Date 2020.09.13

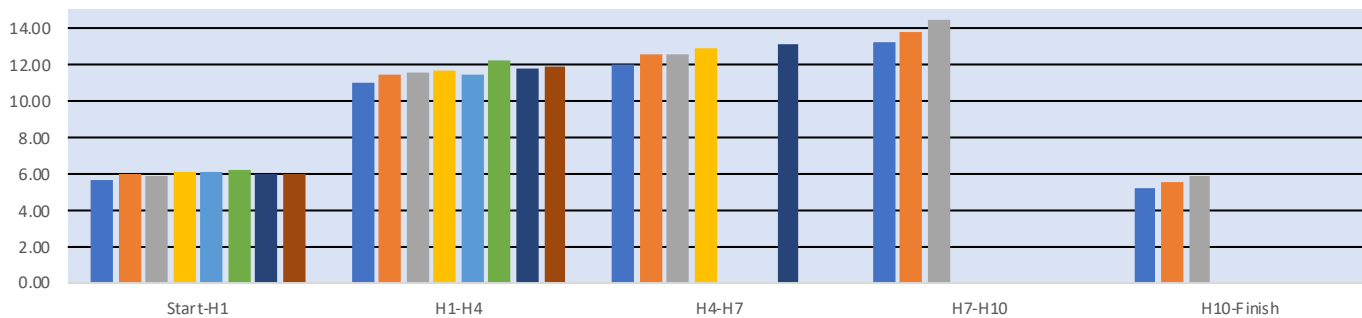
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Warholm, Karsten (NOR) (1996)	time		5.64	9.24	12.88	16.64	20.56	24.56	28.68	32.92	37.24	41.88		47.08	7 / 1			
	reaction time	0.190																
	interval																	
Mägi, Rasmus (EST) (1992)	time				13.52	17.40		25.60	29.92	34.36	38.92	43.72		49.22	6 / 2			
	reaction time	0.238																
	interval																	
Kendziera, David (USA) (1994)	time				13.56	17.40		25.60	29.96	34.52	39.32	44.36		50.28	4 / 3			
	reaction time	0.198																
	interval																	
Barr, Thomas (IRL) (1992)	time				13.76	17.72		26.12	30.64	35.20	40.04			50.41	3 / 4			
	reaction time	0.179																
	interval																	
Müller, Vit (CZE) (1996)	time				13.72	17.56		25.76		35.16	40.00			50.47	2 / 5			
	reaction time	0.204																
	interval																	
McAlister, Chris (GBR) (1999)	time				14.28	18.44	22.64	26.88		35.84	40.56			51.03	1 / 6			
	reaction time	0.188																
	interval																	
Angela, Ramsey (NED) (1999)	time				13.68	17.72	22.00	26.36	30.88	35.52	40.36			51.25	8 / 7			
	reaction time	0.195																
	interval																	
Preis, Constantin (GBR) (1998)	time				13.92	17.88		26.20						dnf	5 / --			
	reaction time	0.240																
	interval																	



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 50fps

Timing From: Gun Flash

Source: <https://www.youtube.com/watch?v=Sp4lpzQFIOE>

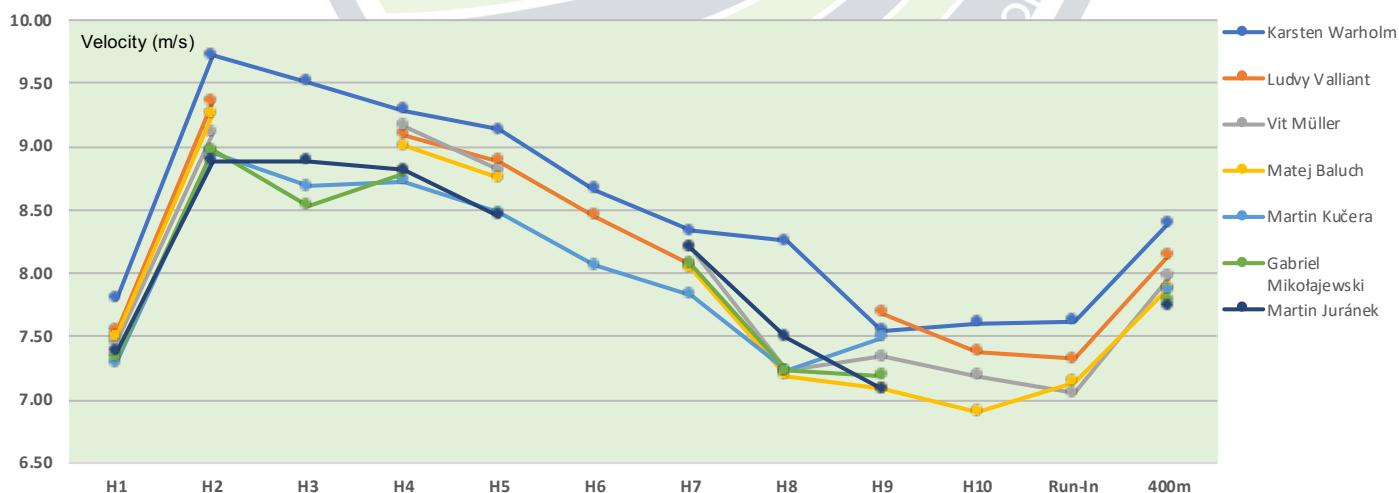
2020 Golden Spike (Ostrava, CZE) (TV Analysis)

Men's 400m Hurdles

Date 2020.09.08

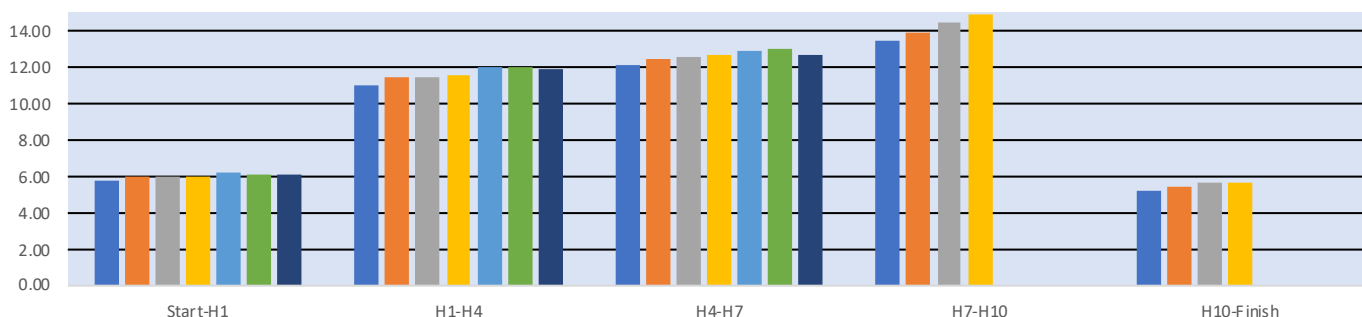
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Warholm, Karsten (NOR) (1996)	time		5.77	9.37	13.05	16.82	20.65	24.69	28.89	33.13	37.77	42.37		47.62	8 / 1			
	reaction time	0.168																
	interval			3.60	3.68	3.77	3.83	4.04	4.20	4.24	4.64	4.60	5.25			11.05	12.07	13.48
	velocity		7.80	9.72	9.51	9.28	9.14	8.66	8.33	8.25	7.54	7.61	7.62	8.40		9.50	8.70	7.79
Valliant, Ludvy (FRA) (1995)	time		5.97	9.71		17.41	21.35	25.49	29.83		38.94	43.68		49.14	6 / 2			
	reaction time	0.192																
	interval			3.74		7.70	3.94	4.14	4.34		9.11	4.74	5.46			11.44	12.42	13.85
	velocity		7.54	9.36		9.09	8.88	8.45	8.06		7.68	7.38	7.33	8.14		9.18	8.45	7.58
Müller, Vit (CZE) (1996)	time		6.04	9.88		17.52	21.49		30.03	34.87	39.64	44.51		50.18	5 / 3			
	reaction time	0.177																
	interval			3.84		7.64	3.97		8.54	4.84	4.77	4.87	5.67			11.48	12.51	14.48
	velocity		7.45	9.11		9.16	8.82		8.20	7.23	7.34	7.19	7.05	7.97		9.15	8.39	7.25
Baluch, Matej (SVK) (2000)	time		6.00	9.78		17.55	21.55		30.26	35.13	40.07	45.14		50.74	4 / 4			
	reaction time	0.154																
	interval			3.78		7.77	4.00		8.71	4.87	4.94	5.07	5.60	=PB		11.55	12.71	14.88
	velocity		7.50	9.26		9.01	8.75		8.04	7.19	7.09	6.90	7.14	7.88		9.09	8.26	7.06
Kučera, Martin (SVK) (1990)	time		6.17	10.08	14.11	18.12	22.25	26.59	31.06	35.90	40.57			50.84	7 / 5			
	reaction time	0.185																
	interval			3.91	4.03	4.01	4.13	4.34	4.47	4.84	4.67					11.95	12.94	
	velocity		7.29	8.95	8.68	8.73	8.47	8.06	7.83	7.23	7.49			7.87		8.79	8.11	
Mikołajewski, Gabriel (POL) (1999)	time		6.14	10.04	14.14	18.12			31.13	35.97	40.84			51.42	3 / 6			
	reaction time	0.145																
	interval			3.90	4.10	3.98			13.01	4.84	4.87					11.98	13.01	
	velocity		7.33	8.97	8.54	8.79			8.07	7.23	7.19			7.78		8.76	8.07	
Juránek, Martin (CZE) (1991)	time		6.10	10.04	13.98	17.95	22.09		30.63	35.30	40.24			51.71	2 / 7			
	reaction time	0.166																
	interval			3.94	3.94	3.97	4.14		8.54	4.67	4.94					11.85	12.68	
	velocity		7.38	8.88	8.88	8.82	8.45		8.20	7.49	7.09			7.74		8.86	8.28	
	H1 lead leg	L																
	strides		20	13	13	13	13	13	13	13	15	15	18	159				
	H1 lead leg	R																
	strides		23	15			15					17	17	87				
	H1 lead leg	R																
	strides		20	13		13	13		14		14			87				
	H1 lead leg	L																
	strides		21	14		14	14				15			78				
	H1 lead leg	L																
	strides		22	15		15	15					17	17	101				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=QexFqkzD3A>

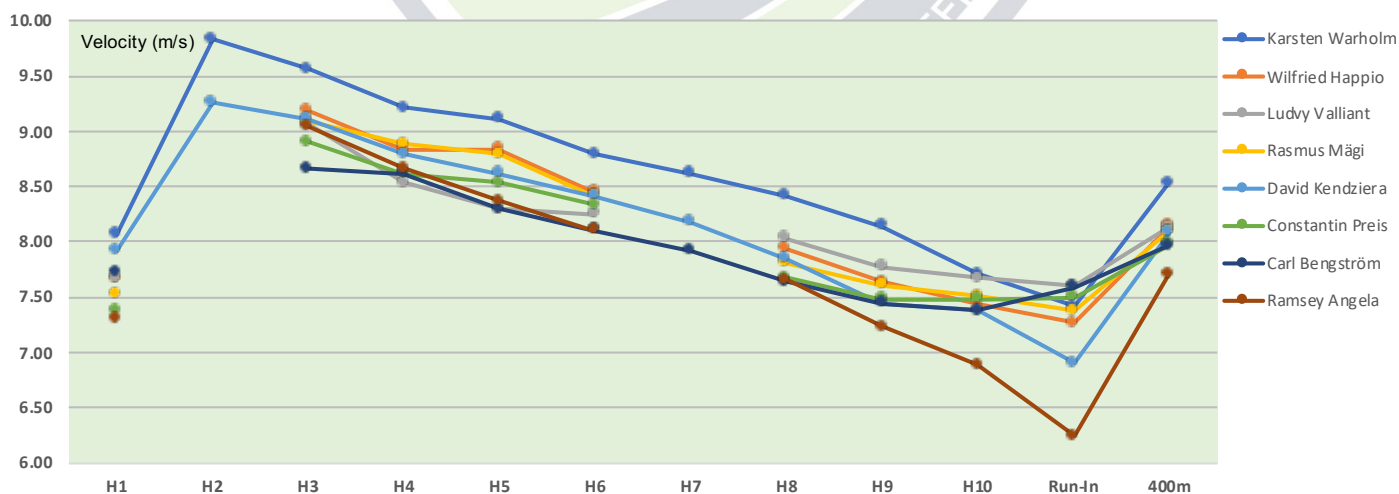
2020 Bauhaus Galan (Stockholm, SWE) (TV Analysis)

Men's 400m Hurdles

Date 2020.08.23

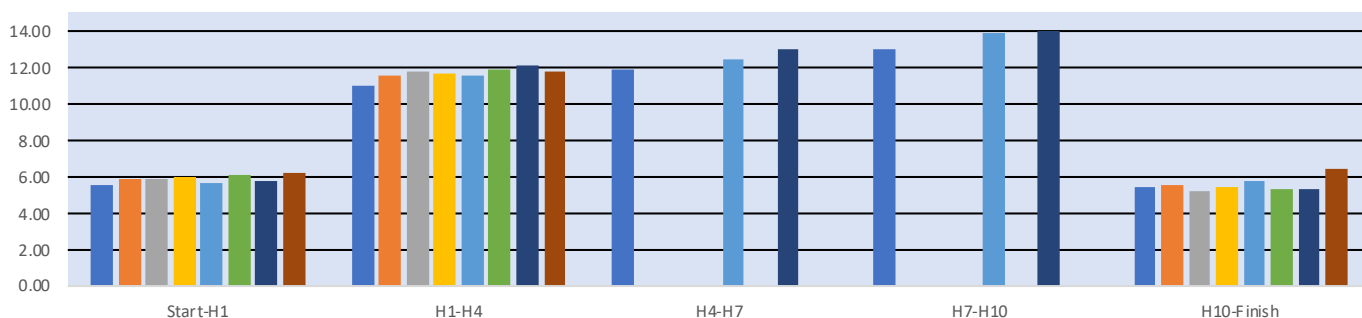
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Warholm, Karsten (NOR) (1996)	time		5.58	9.14	12.80	16.60	20.44	24.42	28.48	32.64	36.94	41.48		46.87	8 / 1			
	reaction time	0.161																
	interval			3.56	3.66	3.80	3.84	3.98	4.06	4.16	4.30	4.54	5.39	AR PB		11.02	11.88	13.00
	velocity		8.06	9.83	9.56	9.21	9.11	8.79	8.62	8.41	8.14	7.71	7.42	8.53		9.53	8.84	8.08
Happio, Wilfried (FRA) (1998)	time		5.86		13.48	17.44	21.40	25.54		34.36	38.94	43.64		49.14	5 / 2			
	reaction time	0.141																
	interval				7.62	3.96	3.96	4.14		8.82	4.58	4.70	5.50			11.58		
	velocity		7.68		9.19	8.84	8.84	8.45		7.94	7.64	7.45	7.27	8.14		9.07		
Valliant, Ludvy (FRA) (1995)	time		5.86		13.58	17.68	21.90	26.14		34.86	39.36	43.92		49.18	3 / 3			
	reaction time	0.169																
	interval				7.72	4.10	4.22	4.24		8.72	4.50	4.56	5.26			11.82		
	velocity		7.68		9.07	8.54	8.29	8.25		8.03	7.78	7.68	7.60	8.13		8.88		
Mägi, Rasmus (EST) (1992)	time		5.98		13.68	17.62	21.60	25.76		34.72	39.32	43.98		49.40	4 / 4			
	reaction time	0.159																
	interval				7.70	3.94	3.98	4.16		8.96	4.60	4.66	5.42			11.64		
	velocity		7.53		9.09	8.88	8.79	8.41		7.81	7.61	7.51	7.38	8.10		9.02		
Kendziera, David (USA) (1994)	time		5.68	9.46	13.30	17.28	21.34	25.50	29.78	34.24	38.94	43.68		49.47	7 / 5			
	reaction time	0.170																
	interval			3.78	3.84	3.98	4.06	4.16	4.28	4.46	4.70	4.74	5.79			11.60	12.50	13.90
	velocity		7.92	9.26	9.11	8.79	8.62	8.41	8.18	7.85	7.45	7.38	6.91	8.09		9.05	8.40	7.55
Preis, Constantin (GER) (1998)	time		6.10		13.96	18.02	22.12	26.32		35.44	40.12	44.80		50.13	2 / 6			
	reaction time	0.232																
	interval				7.86	4.06	4.10	4.20		9.12	4.68	4.68	5.33			11.92		
	velocity		7.38		8.91	8.62	8.54	8.33		7.68	7.48	7.48	7.50	7.98		8.81		
Bengström, Carl (SWE) (2000)	time		5.82		13.90	17.96	22.18	26.50	30.92	35.50	40.20	44.94		50.21	6 / 7			
	reaction time	0.187																
	interval				8.08	4.06	4.22	4.32	4.42	4.58	4.70	4.74	5.27			12.14	12.96	14.02
	velocity		7.73		8.66	8.62	8.29	8.10	7.92	7.64	7.45	7.38	7.59	7.97		8.65	8.10	7.49
Angela, Ramsey (NED) (1999)	time		6.16		13.90	17.94	22.12	26.44		35.58	40.42	45.50		51.90	1 / 8			
	reaction time	0.210																
	interval				7.74	4.04	4.18	4.32		9.14	4.84	5.08	6.40			11.78		
	velocity		7.31		9.04	8.66	8.37	8.10		7.66	7.23	6.89	6.25	7.71		8.91		
	time																	
	reaction time																	
	interval																	
	velocity																	



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 50fps

Timing From: Gun Flash

Source: <https://www.youtube.com/watch?v=Sp4lpzQFIOE>

2020 Herculis Meeting International d'Athletisme (Monaco, MON) (TV Analysis)

Men's 400m Hurdles

Date 2020.08.14

FINAL

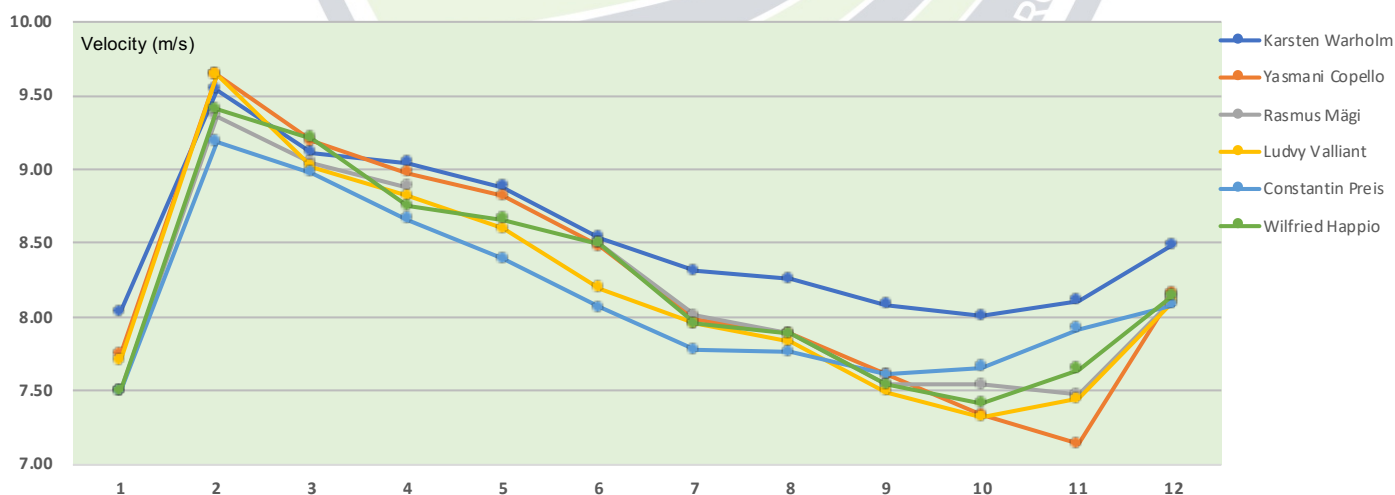
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Warholm, Karsten (NOR) (1996)	time		5.60	9.27	13.11	16.98	20.92	25.02	29.23	33.47	37.80	42.17		47.10	7 / 1			
	reaction time	0.132											4.93			11.38	12.25	12.94
	interval		8.04	3.67	3.84	3.87	3.94	4.10	4.21	4.24	4.33	4.37				9.23	8.57	8.11
	velocity		9.54	9.11	9.04	8.88	8.54	8.31	8.25	8.08	8.01	8.11						
Copello, Yasmani (TUR) (1987)	time		5.81	9.44	13.25	17.15	21.12	25.25	29.63	34.07	38.67	43.44		49.04	5 / 2			
	reaction time	0.192											5.60			11.34	12.48	13.81
	interval		7.75	3.63	3.81	3.90	3.97	4.13	4.38	4.44	4.60	4.77				9.26	8.41	7.60
	velocity		9.64	9.19	8.97	8.82	8.47	7.99	7.88	7.61	7.34	7.14						
Mägi, Rasmus (EST) (1992)	time		6.00	9.74	13.61	17.55	21.92	25.79	30.16	34.60	39.24	43.88		49.23	4 / 3			
	reaction time	0.146											5.35			11.55	12.61	13.72
	interval		7.50	3.74	3.87	3.94	4.07	4.24	4.37	4.44	4.64	4.64				9.09	8.33	7.65
	velocity		9.36	9.04	8.88	8.50	8.01	7.88	7.54	7.54	7.54	7.48						
Valliant, Ludvy (FRA) (1995)	time		5.84	9.47	13.35	17.32	21.39	25.66	30.06	34.53	39.20	43.98		49.35	6 / 4			
	reaction time	0.173											5.37			11.48	12.74	13.92
	interval		7.71	3.63	3.88	3.97	4.07	4.27	4.40	4.47	4.67	4.78				9.15	8.24	7.54
	velocity		9.64	9.02	8.82	8.60	8.20	7.95	7.83	7.49	7.32	7.45						
Preis, Constantin (GER) (1998)	time		6.00	9.81	13.71	17.75	21.92	26.26	30.76	35.27	39.87	44.44		49.49	8 / 5			
	reaction time	0.251											5.05			11.75	13.01	13.68
	interval		7.50	3.81	3.90	4.04	4.17	4.34	4.50	4.51	4.60	4.57				8.94	8.07	7.68
	velocity		9.19	8.97	8.66	8.39	8.06	7.78	7.76	7.61	7.66	7.92						
H1 lead leg	strides		21	13	13	13	13	13	14	14	14	14						

2020 Meeting de La Tchaux (La Chaux-de-Fonds, SUI) (TV Analysis)

Date 2020.08.15

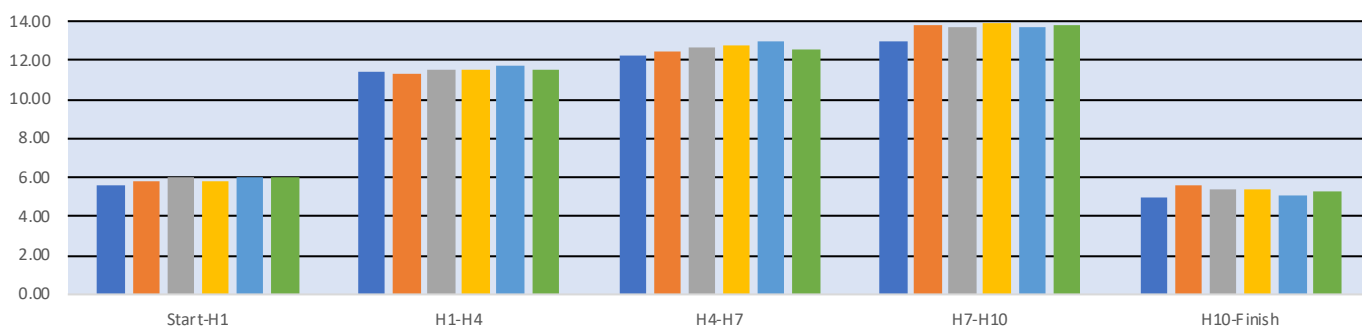
Race A

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Happio, Wilfried (FRA) (1998)	time		6.00	9.72	13.52	17.52	21.56	25.68	30.08	34.52	39.16	43.88		49.11	1 / 1			
	reaction time												5.23			11.52	12.56	13.80
	interval		7.50	3.72	3.80	4.00	4.04	4.12	4.40	4.44	4.64	4.72				9.11	8.36	7.61
	velocity		9.41	9.21	8.75	8.66	8.50	7.95	7.88	7.54	7.42	7.65						
H1 lead leg	strides		21	13	13	13	13	13	14	14	15	15						



Time Intervals (s)

Hurdle Phases



Herculis Meeting International d'Athletisme

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: https://www.youtube.com/watch?v=Cd_W75W8UdU

Meeting de La Tchaux

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: Gun Flash

Source: <https://www.youtube.com/watch?v=n89ksc7ZpRE>

2020 Impossible Games (Oslo, NOR) (TV Analysis) (300m Hurdles)**Men's 300m Hurdles**

Date 2020.06.11

FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Warholm, Karsten (NOR) (1996)	time	6.24	9.74	13.38	17.15	21.02	25.02	29.13					33.78	7 / 1			
	reaction time	0.182											4.65		10.91	11.98	
	interval		3.50	3.64	3.77	3.87	4.00	4.11					8.60		9.62	8.76	
	velocity		8.01	10.00	9.62	9.28	9.04	8.75	8.52								
	H1 lead leg	L											16.5				
	strides		20	13	13	13	13	13					114.5				

2019 Weltklasse (Zürich, SUI) (TV Analysis)**Men's 400m Hurdles**

Date 2019.08.29

FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Warholm, Karsten (NOR) (1996)	time	5.66	9.16	12.76	16.40	20.22	24.18	28.32	32.56	37.08	41.62		46.92	7 / 1			
	reaction time	0.140											5.30		10.74	11.92	13.30
	interval		3.50	3.60	3.64	3.82	3.96	4.14	4.24	4.52	4.54		8.53		9.78	8.81	7.89
	velocity		7.95	10.00	9.72	9.62	9.16	8.84	8.45	8.25	7.74	7.71	7.55				
	H1 lead leg	L											18.2				
	strides		20	13	13	13	13	13	13	15	15		159.2				

2019 Müller Anniversary Games (London, GBR) (TV Analysis)**Men's 400m Hurdles**

Date 2019.07.20

FINAL

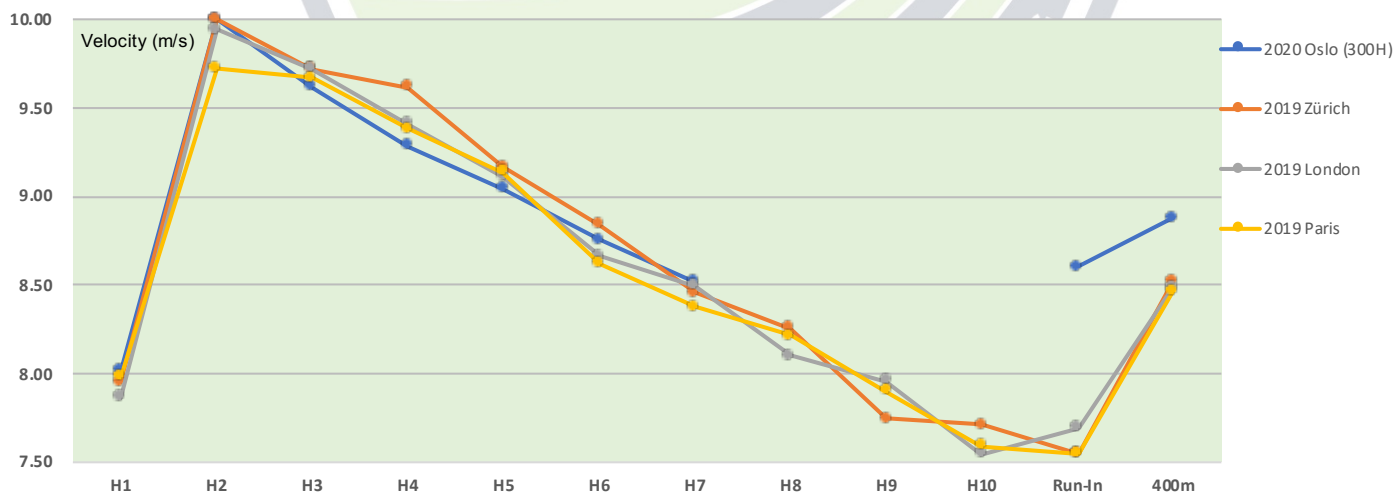
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Warholm, Karsten (NOR) (1996)	time	5.72	9.24	12.84	16.56	20.40	24.44	28.56	32.88	37.28	41.92		47.12	7 / 1			
	reaction time	0.160											5.20		10.84	12.00	13.36
	interval		3.52	3.60	3.72	3.84	4.04	4.12	4.32	4.40	4.64		8.49		9.69	8.75	7.86
	velocity		7.87	9.94	9.72	9.41	9.11	8.66	8.50	8.10	7.95	7.54	7.69				
	H1 lead leg	L											18				
	strides		20	13	13	13	13	13	13	13	14		156				

2019 Meeting de Paris (Paris, FRA) (TV Analysis)**Men's 400m Hurdles**

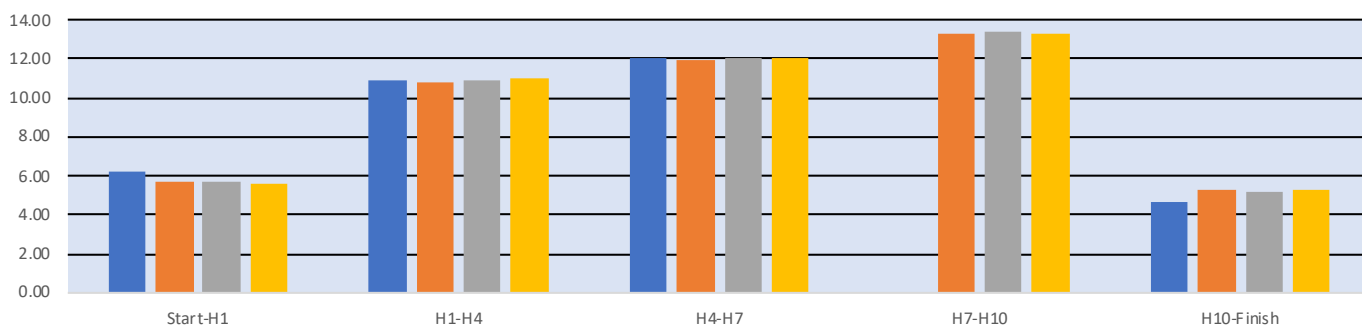
Date 2019.08.24

FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Warholm, Karsten (NOR) (1996)	time	5.64	9.24	12.86	16.59	20.42	24.48	28.66	32.92	37.35	41.96		47.26	7 / 1			
	reaction time	0.157											5.30		10.95	12.07	13.30
	interval		3.60	3.62	3.73	3.83	4.06	4.18	4.26	4.43	4.61		8.46		9.59	8.70	7.89
	velocity		7.98	9.72	9.67	9.38	9.14	8.62	8.37	8.22	7.90	7.59	7.55				
	H1 lead leg	L											18				
	strides		20	13	13	13	13	13	13	13	13		155				



Time Intervals (s)

Hurdle Phases**2020 Impossible Games (Oslo, NOR)**

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=aYUG74Uzr5M>**2019 Müller Anniversary Games (London, GBR)**

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: Gun Flash

Source: <https://www.youtube.com/watch?v=NViXZrbKwXc>**2019 Weltklasse (Zürich, SUI)**

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 50fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=JdYoaU0-HEc>**2019 Meeting de Paris (Paris, FRA)**

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 50fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=5KOpPPsPKFk>

Women's 400m Hurdles

2020 Top 10 Times - Women's 400m Hurdles

Bol, Femke (NED) (2000)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 Test Wedstrijd Papendal (Arnhem, NED)																		
date	18-Jul	time												53.79	4 / 1			
reaction time	0.246	interval	No Information Available															
		velocity																
H1 lead leg		strides																
Bol, Femke (NED) (2000)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis)													Henson (2020)	- Athlete First: 2020 year end hurdle report				
date	17-Sep	time	6.40	10.52	14.68	19.00	23.48	28.08	32.80	37.72	42.84	48.04		53.90	5 / 1			
reaction time	0.178	interval		4.12	4.16	4.32	4.48	4.60	4.72	4.92	5.12	5.20	5.86			12.60	13.80	15.24
		velocity	7.03	8.50	8.41	8.10	7.81	7.61	7.42	7.11	6.84	6.73	6.83	7.42		8.33	7.61	6.89
H1 lead leg	L	strides	21	15	15	15	15	15	15	15	16	16	18.5	176.5				
Bol, Femke (NED) (2000)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 Galà dei Castelli (Bellinzona, SUI) (TV Analysis)													Henson (2020)	- Athlete First: 2020 year end hurdle report				
date	1-Sep	time	6.60	10.76	15.00	19.32	23.72	28.32	33.08	38.04	43.28	48.56		54.33	3 / 1			
reaction time		interval		4.16	4.24	4.32	4.40	4.60	4.76	4.96	5.24	5.28	5.77			12.72	13.76	15.48
		velocity	6.82	8.41	8.25	8.10	7.95	7.61	7.35	7.06	6.68	6.63	6.93	7.36		8.25	7.63	6.78
H1 lead leg	L	strides	22	15	15	15	15	15	15	15	16	16	19	178				
Bol, Femke (NED) (2000)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 Test Wedstrijd Papendal (Arnhem, NED)																		
date	4-Jul	time												54.47	4 / 1			
reaction time	0.254	interval	No Information Available															
		velocity																
H1 lead leg		strides																
Ryzhykova, Anna (UKR) (1989)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis)													Henson (2020)	- Athlete First: 2020 year end hurdle report				
date	17-Sep	time	6.44	10.56	14.76	19.12	23.68	28.44	33.32	38.32	43.36	48.52		54.54	6 / 2			
reaction time	0.157	interval		4.12	4.20	4.36	4.56	4.76	4.88	5.00	5.04	5.16	6.02			12.68	14.20	15.20
		velocity	6.99	8.50	8.33	8.03	7.68	7.35	7.17	7.00	6.94	6.78	6.64	7.33		8.28	7.39	6.91
H1 lead leg	R	strides	22	14	14	14	14	15	15	15	15	15	19.7	172.7				
Bol, Femke (NED) (2000)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 István Gyulai Memorial (Székesfehérvár, HUN)													Henson (2020)	- Athlete First: 2020 year end hurdle report				
date	19-Aug	time	6.52	10.72	15.08	19.56	24.12	28.80	33.64	38.60	43.76	48.92		54.67	4 / 1			
reaction time	0.205	interval		4.20	4.36	4.48	4.56	4.68	4.84	4.96	5.16	5.16	5.75			13.04	14.08	15.28
		velocity	6.90	8.33	8.03	7.81	7.68	7.48	7.23	7.06	6.78	6.78	6.96	7.32		8.05	7.46	6.87
H1 lead leg	L	strides	22	15	15	15	15	15	15	15	16	16	19	178				
Bol, Femke (NED) (2000)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 Bauhaus Galan (Stockholm, SWE) (TV Analysis)													Henson (2020)	- Athlete First: 2020 year end hurdle report				
date	23-Aug	time	6.57		15.20	19.57	24.10	28.77	33.57	38.53	43.77	48.90		54.68	4 / 1			
reaction time	0.226	interval			8.63	4.37	4.53	4.67	4.80	4.96	5.24	5.13	5.78			13.00	14.00	15.33
		velocity	6.85		8.11	8.01	7.73	7.49	7.29	7.06	6.68	6.82	6.92	7.32		8.08	7.50	6.85
H1 lead leg	L	strides	21	15		15	15	15	15	15	16	16	18.5	161.5				
Tkachuk, Viktoriya (UKR) (1994)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis)													Henson (2020)	- Athlete First: 2020 year end hurdle report				
date	17-Sep	time	6.52	10.76	15.16	19.60	24.16	28.76	33.64	38.68	43.80	49.04		54.93	9 / 3			
reaction time	0.270	interval		4.24	4.40	4.44	4.56	4.60	4.88	5.04	5.12	5.24	5.89			13.08	14.04	15.40
		velocity	6.90	8.25	7.95	7.88	7.68	7.61	7.17	6.94	6.84	6.68	6.79	7.28		8.03	7.48	6.82
H1 lead leg	L	strides	22	15	15	15	15	15	16	16	16	16	19.7	180.7				
Sprunger, Leá (SUI) (1990)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 Galà dei Castelli (Bellinzona, SUI) (TV Analysis)													Henson (2020)	- Athlete First: 2020 year end hurdle report				
date	1-Sep	time	6.48	10.80	15.16	19.56	24.08	28.80	33.60	38.68	43.72	49.00		54.98	5 / 2			
reaction time		interval		4.32	4.36	4.40	4.52	4.72	4.80	5.08	5.04	5.28	5.98			13.08	14.04	15.40
		velocity	6.94	8.10	8.03	7.95	7.74	7.42	7.29	6.89	6.94	6.63	6.69	7.28		8.03	7.48	6.82
H1 lead leg	L	strides	21	14	14	14	14	15	15	15	15	15	18.5	170.5				
Tkachuk, Viktoriya (UKR) (1994)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 Galà dei Castelli (Bellinzona, SUI) (TV Analysis)													Henson (2020)	- Athlete First: 2020 year end hurdle report				
date	1-Sep	time	6.44	10.76	15.32	19.80	24.32	29.08	33.88	38.96	44.08	49.28		55.15	4 / 3			
reaction time		interval		4.32	4.56	4.48	4.52	4.76	4.80	5.08	5.12	5.20	5.87			13.36	14.08	15.40
		velocity	6.99	8.10	7.68	7.81	7.74	7.35	7.29	6.89	6.84	6.73	6.81	7.25		7.86	7.46	6.82
H1 lead leg	L	strides	22	15	15	15	15	15	15	16	16	16	19.5	179.5				

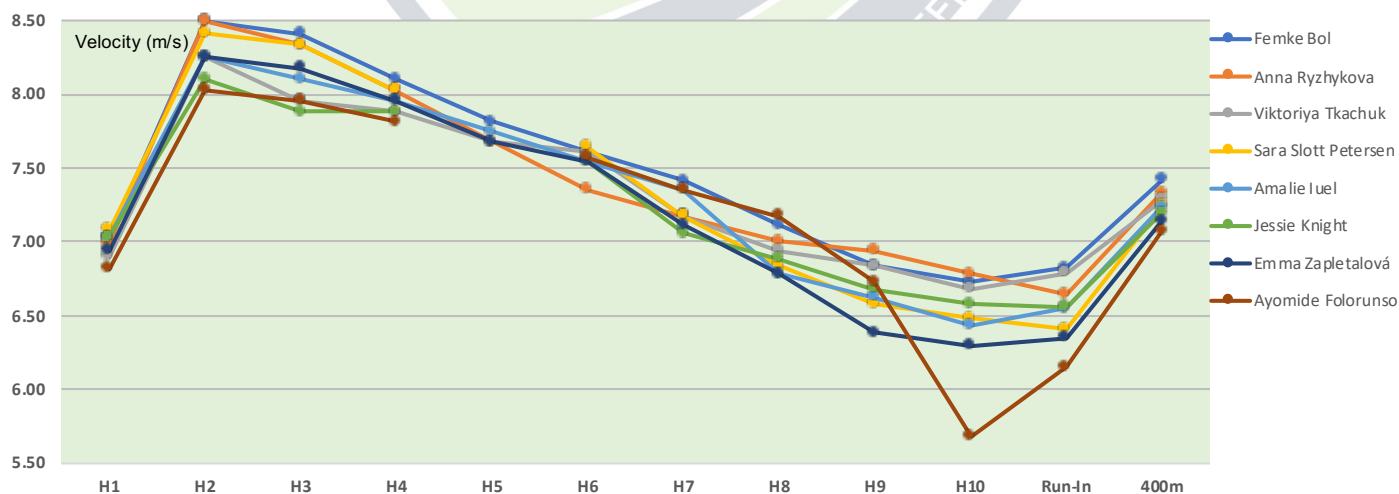
2020 Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis)

Women's 400m Hurdles

Date 2020.09.17

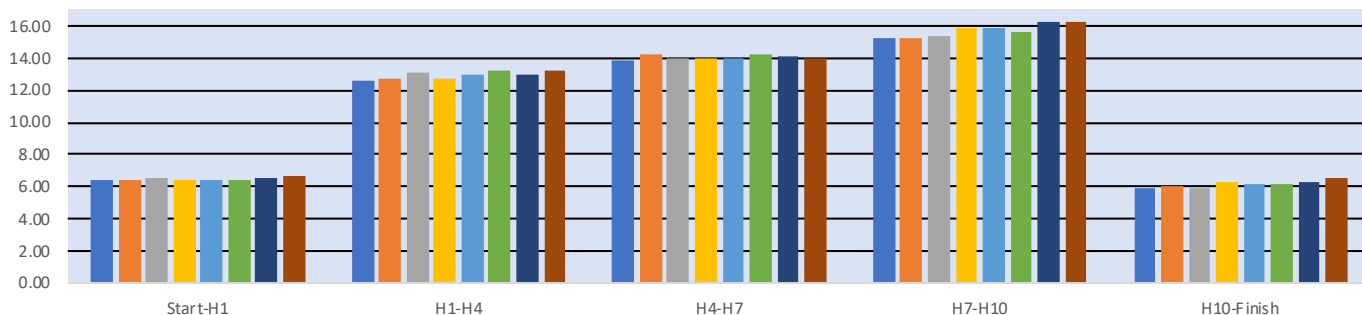
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Bol, Femke (NED) (2000)	time		6.40	10.52	14.68	19.00	23.48	28.08	32.80	37.72	42.84	48.04		53.90	5 / 1			
	reaction time	0.178	interval	4.12	4.16	4.32	4.48	4.60	4.72	4.92	5.12	5.20	5.86			12.60	13.80	15.24
			velocity	7.03	8.50	8.41	8.10	7.81	7.61	7.42	7.11	6.84	6.73	7.42		8.33	7.61	6.89
	H1 lead leg	L	strides	21	15	15	15	15	15	15	16	16	18.5	176.5				
Ryzhykova, Anna (UKR) (1989)	time		6.44	10.56	14.76	19.12	23.68	28.44	33.32	38.32	43.36	48.52		54.54	6 / 2			
	reaction time	0.157	interval	4.12	4.20	4.36	4.56	4.76	4.88	5.00	5.04	5.16	6.02			12.68	14.20	15.20
			velocity	6.99	8.50	8.33	8.03	7.68	7.35	7.17	7.00	6.94	6.78	7.33		8.28	7.39	6.91
	H1 lead leg	R	strides	22	14	14	14	15	15	15	15	15	19.7	172.7				
Tkachuk, Viktoriya (UKR) (1994)	time		6.52	10.76	15.16	19.60	24.16	28.76	33.64	38.68	43.80	49.04		54.93	9 / 3			
	reaction time	0.270	interval	4.24	4.40	4.44	4.56	4.60	4.88	5.04	5.12	5.24	5.89	PB		13.08	14.04	15.40
			velocity	6.90	8.25	7.95	7.88	7.61	7.17	6.94	6.84	6.68	6.79	7.28		8.03	7.48	6.82
	H1 lead leg	L	strides	22	15	15	15	15	16	16	16	16	19.7	180.7				
Petersen, Sara Slott (DEN) (1987)	time		6.36	10.52	14.72	19.08		28.24	33.12	38.24	43.56	48.96		55.20	3 / 4			
	reaction time	0.114	interval	4.16	4.20	4.36		9.16	4.88	5.12	5.32	5.40	6.24			12.72	14.04	15.84
			velocity	7.08	8.41	8.33	8.03	7.64	7.17	6.84	6.58	6.48	6.41	7.25		8.25	7.48	6.63
	H1 lead leg	R	strides	22	15	15	15		16	16	17	17	21	169				
luel, Amalie (NOR) (1994)	time		6.40	10.64	14.96	19.36	23.88	28.52	33.28	38.44	43.72	49.16		55.27	8 / 5			
	reaction time	0.143	interval	4.24	4.32	4.40	4.52	4.64	4.76	5.08	5.24	5.44	6.11			12.96	13.92	15.88
			velocity	7.03	8.25	8.10	7.95	7.74	7.54	7.35	6.78	6.63	6.43	6.55	7.24	8.10	7.54	6.61
	H1 lead leg	L	strides	23	15	15	15	15	15	16	16	16	19	180				
Knight, Jessie (GBR) (1994)	time		6.40	10.72	15.16	19.60		28.88	33.84	38.92	44.16	49.48		55.58	2 / 6			
	reaction time	0.164	interval	4.32	4.44	4.44		9.28	4.96	5.08	5.24	5.32	6.10			13.20	14.24	15.64
			velocity	7.03	8.10	7.88	7.88	7.54	7.06	6.89	6.68	6.58	6.56	7.20		7.95	7.37	6.71
	H1 lead leg	R	strides	23	15	15	15		15	15	16	16	19.2	149.2				
Zapletalová, Emma (SVK) (2000)	time		6.48	10.72	15.00	19.40	23.96	28.60	33.52	38.68	44.16	49.72		56.02	7 / 7			
	reaction time	0.135	interval	4.24	4.28	4.40	4.56	4.64	4.92	5.16	5.48	5.56	6.30			12.92	14.12	16.20
			velocity	6.94	8.25	8.18	7.95	7.68	7.54	7.11	6.78	6.39	6.29	7.14		8.13	7.44	6.48
	H1 lead leg	R	strides	23	15	15	15	15	16	16	17	17	19.7	183.7				
Folorunso, Ayomide (ITA) (1996)	time		6.60	10.96	15.36	19.84		29.08	33.84	38.72	43.92	50.08		56.58	4 / 8			
	reaction time	0.187	interval	4.36	4.40	4.48		9.24	4.76	4.88	5.20	6.16	6.50			13.24	14.00	16.24
			velocity	6.82	8.03	7.95	7.81	7.58	7.35	7.17	6.73	5.68	6.15	7.07		7.93	7.50	6.47
	H1 lead leg	L	strides	23	16	16	16		15	15	15	19	21	156				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=0pdKBd84NgA>

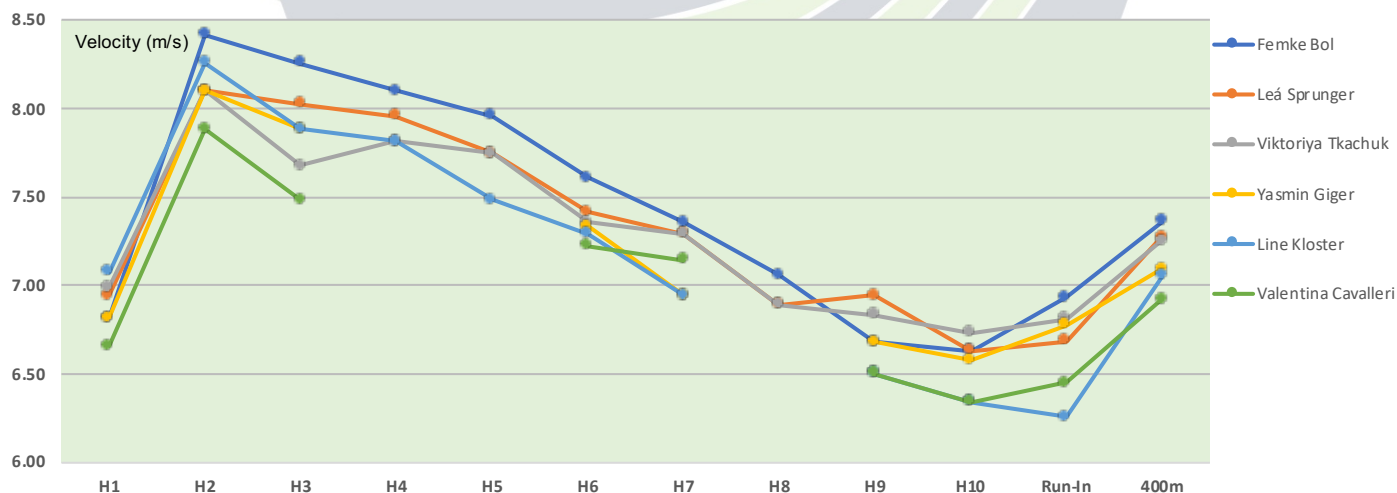
2020 Galà dei Castelli (Bellinzona, SUI) (TV Analysis)

Women's 400m Hurdles

Date 2020.09.15

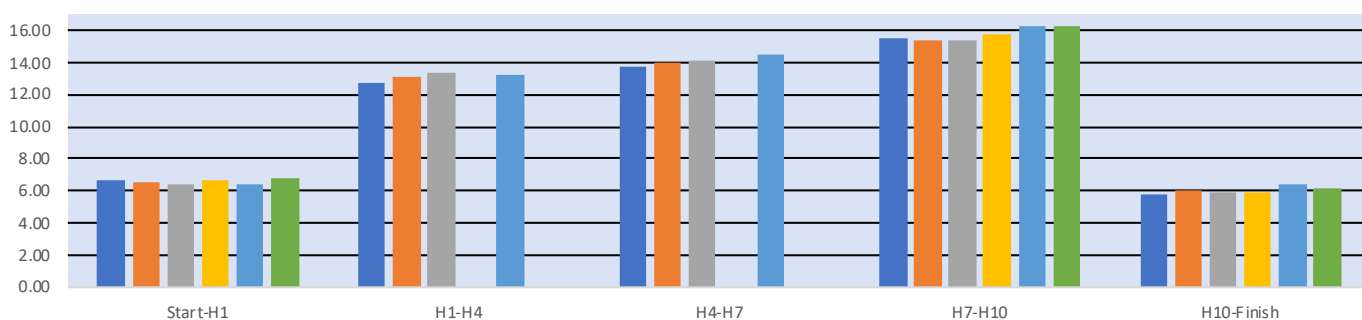
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Bol, Femke (NED) (2000)	time		6.60	10.76	15.00	19.32	23.72	28.32	33.08	38.04	43.28	48.56		54.33	3 / 1			
	reaction time																	
	interval			4.16	4.24	4.32	4.40	4.60	4.76	4.96	5.24	5.28	5.77			12.72	13.76	15.48
	velocity		6.82	8.41	8.25	8.10	7.95	7.61	7.35	7.06	6.68	6.63	6.93	7.36		8.25	7.63	6.78
Sprunger, Leá (SUI) (1990)	H1 lead leg	L													5 / 2			
	strides		22	15	15	15	15	15	15	15	16	16	19	178				
	time		6.48	10.80	15.16	19.56	24.08	28.80	33.60	38.68	43.72	49.00		54.98				
	reaction time																	
Tkachuk, Viktoriya (UKR) (1994)	interval			4.32	4.36	4.40	4.52	4.72	4.80	5.08	5.04	5.28	5.98		4 / 3	13.08	14.04	15.40
	velocity		6.94	8.10	8.03	7.95	7.74	7.42	7.29	6.89	6.94	6.63	6.69	7.28		8.03	7.48	6.82
	H1 lead leg	R																
	strides		21	14	14	14	14	15	15	15	15	15	18.5	170.5				
Giger, Yasmin (SUI) (1999)	time		6.44	10.76	15.32	19.80	24.32	29.08	33.88	38.96	44.08	49.28		55.15	2 / 4			
	reaction time																	
	interval			4.32	4.56	4.48	4.52	4.76	4.80	5.08	5.12	5.20	5.87			13.36	14.08	15.40
	velocity		6.99	8.10	7.68	7.81	7.74	7.35	7.29	6.89	6.84	6.73	6.81	7.25		7.86	7.46	6.82
Kloster, Line (NOR) (1990)	H1 lead leg	L													6 / 5			
	strides		22	15	15	15	15	15	15	16	16	16	19.5	179.5				
	time		6.60	10.92	15.36			29.68	34.72		45.20	50.52		56.42				
	reaction time																	
Cavalleri, Valentina (ITA) (1995)	interval			4.32	4.44			14.32	5.04		10.48	5.32	5.90		1 / 6			
	velocity		6.82	8.10	7.88			7.33	6.94		6.68	6.58	6.78	7.09				15.80
	H1 lead leg	R																6.65
	strides		23	15	15				16			17	20.2	106.2				
Kloster, Line (NOR) (1990)	time		6.36	10.60	15.04	19.52	24.20	29.00	34.04		44.80	50.32		56.71	6 / 5			
	reaction time																	
	interval			4.24	4.44	4.48	4.68	4.80	5.04		10.76	5.52	6.39			13.16	14.52	16.28
	velocity		7.08	8.25	7.88	7.81	7.48	7.29	6.94		6.51	6.34	6.26	7.05		7.98	7.23	6.45
Cavalleri, Valentina (ITA) (1995)	H1 lead leg	R													1 / 6			
	strides		22	15	15	15	15	16	16			17	20	151				
	time		6.76	11.20	15.88			30.42	35.32		46.08	51.60		57.80				
	reaction time																	
Cavalleri, Valentina (ITA) (1995)	interval			4.44	4.68			14.54	4.90		10.76	5.52	6.20		1 / 6			
	velocity		6.66	7.88	7.48			7.22	7.14		6.51	6.34	6.45	6.92				16.28
	H1 lead leg	L																6.45
	strides		23	16	16				16			17	20.5	108.5				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

Source: https://www.youtube.com/watch?v=RvC_SV6o9QY

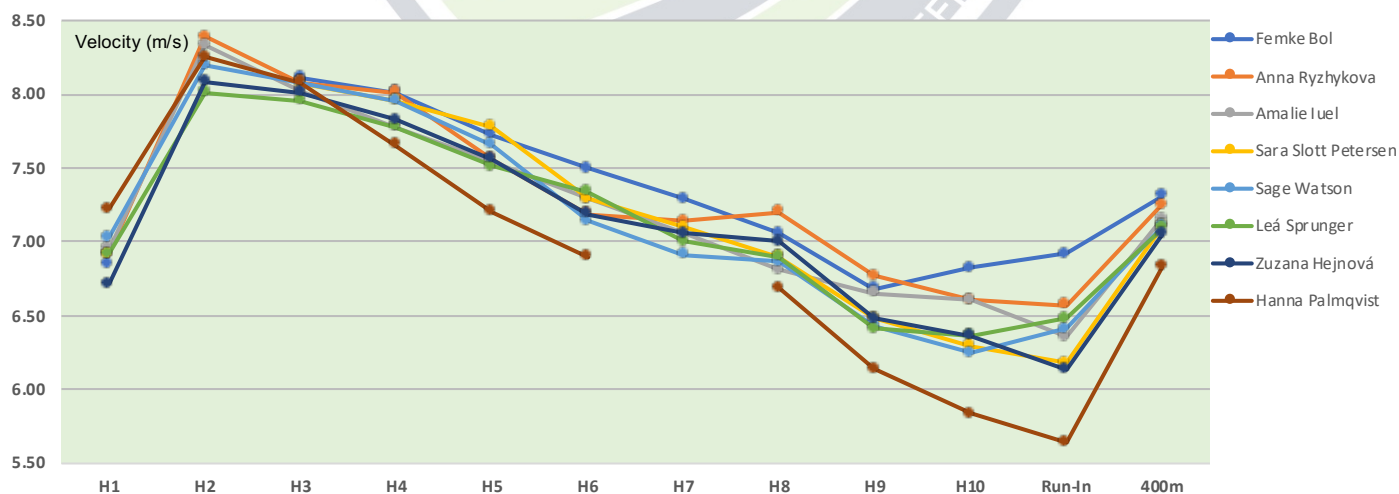
2020 Bauhaus Galan (Stockholm, SWE) (TV Analysis)

Women's 400m Hurdles

Date 2020.08.23

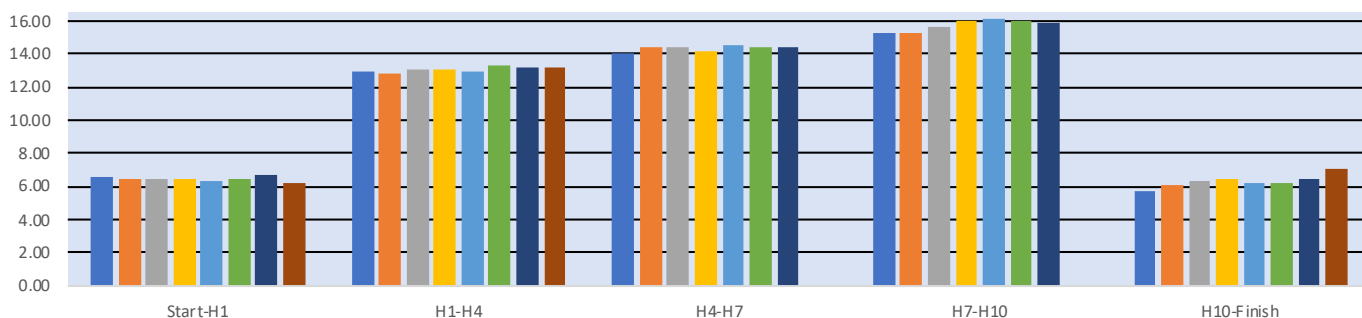
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Bol, Femke (NED) (2000)	time		6.57		15.20	19.57	24.10	28.77	33.57	38.53	43.77	48.90		54.68	4 / 1			
	reaction time	0.226			8.63	4.37	4.53	4.67	4.80	4.96	5.24	5.13	5.78			13.00	14.00	15.33
	interval velocity		6.85		8.11	8.01	7.73	7.49	7.29	7.06	6.68	6.82	6.92	7.32		8.08	7.50	6.85
	H1 lead leg	L	21	15		15	15	15	15	15	16	16	18.5	161.5				
Ryzhykova, Anna (UKR) (1989)	time		6.50	10.67	15.00	19.37	24.00	28.87	33.77	38.63	43.80	49.10		55.19	2 / 2			
	reaction time	0.156			4.17	4.33	4.37	4.63	4.87	4.90	5.17	5.30	6.09			12.87	14.40	15.33
	interval velocity		6.92	8.39	8.08	8.01	7.56	7.19	7.14	7.20	6.77	6.60	6.57	7.25		8.16	7.29	6.85
	H1 lead leg	R	21	14		14	15	15	15	16	15	16	19.5	160.5				
Iuel, Amalie (NOR) (1994)	time		6.47	10.67	15.03	19.53	24.17	28.97	33.93	39.07	44.33	49.63		55.92	8 / 3			
	reaction time	0.162			4.20	4.36	4.50	4.64	4.80	4.96	5.14	5.26	5.30	6.29		13.06	14.40	15.70
	interval velocity		6.96	8.33	8.03	7.78	7.54	7.29	7.06	6.81	6.65	6.60	6.36	7.15		8.04	7.29	6.69
	H1 lead leg	L	22	15		15	15	15	15	16	16	16	19	164				
Petersen, Sara Slott (DEN) (1987)	time		6.50		15.17	19.57	24.07	28.87	33.80	38.87	44.27	49.83		56.30	5 / 4			
	reaction time	0.209			8.67	4.40	4.50	4.80	4.93	5.07	5.40	5.56	6.47			13.07	14.23	16.03
	interval velocity		6.92		8.07	7.95	7.78	7.29	7.10	6.90	6.48	6.29	6.18	7.10		8.03	7.38	6.55
	H1 lead leg	R	21	15		15	15	16	16	17	18	18	21.5	172.5				
Watson, Sage (CAN) (1994)	time		6.40	10.67	15.00	19.40	23.97	28.87	33.93	39.03	44.47	50.07		56.31	3 / 5			
	reaction time	0.208			4.27	4.33	4.40	4.57	4.90	5.06	5.10	5.44	5.60	6.24		13.00	14.53	16.14
	interval velocity		7.03	8.20	8.08	7.95	7.66	7.14	6.92	6.86	6.43	6.25	6.41	7.10		8.08	7.23	6.51
	H1 lead leg	R	21	15		15	15	16	16	16	17	17	20	168				
Sprunger, Leá (SUI) (1990)	time		6.50	10.87	15.27	19.77	24.43	29.20	34.20	39.27	44.73	50.23		56.40	6 / 6			
	reaction time	0.151			4.37	4.40	4.50	4.66	4.77	5.00	5.07	5.46	5.50	6.17		13.27	14.43	16.03
	interval velocity		6.92	8.01	7.95	7.78	7.51	7.34	7.00	6.90	6.41	6.36	6.48	7.09		7.91	7.28	6.55
	H1 lead leg	R	20	14	14	14	14	15	15	15	16	16	19	172				
Hejnová, Zuzana (CZE) (1986)	time		6.70	11.03	15.40	19.87	24.50	29.37	34.33	39.33	44.73	50.23		56.75	7 / 7			
	reaction time	0.151			4.33	4.37	4.47	4.63	4.87	4.96	5.00	5.40	5.50	6.52		13.17	14.46	15.90
	interval velocity		6.72	8.08	8.01	7.83	7.56	7.19	7.06	7.00	6.48	6.36	6.13	7.05		7.97	7.26	6.60
	H1 lead leg	R	21	15	15	15	15	16	16	16	17	17	20.5	183.5				
Palmqvist, Hanna (SWE) (1996)	time		6.23	10.47	14.80	19.37	24.23	29.30		39.77	45.47	51.47		58.56	1 / 8			
	reaction time	0.168			4.24	4.33	4.67	4.86	5.07	10.47	5.70	6.00	7.09			13.14		
	interval velocity		7.22	8.25	8.08	7.66	7.20	6.90		6.69	6.14	5.83	5.64	6.83		7.99		
	H1 lead leg	L	21	15		15	16	16			18	18	22.2	141.2				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 30fps

Timing From: Gun Flash

Source: <https://www.youtube.com/watch?v=YVuMDueaxHc>

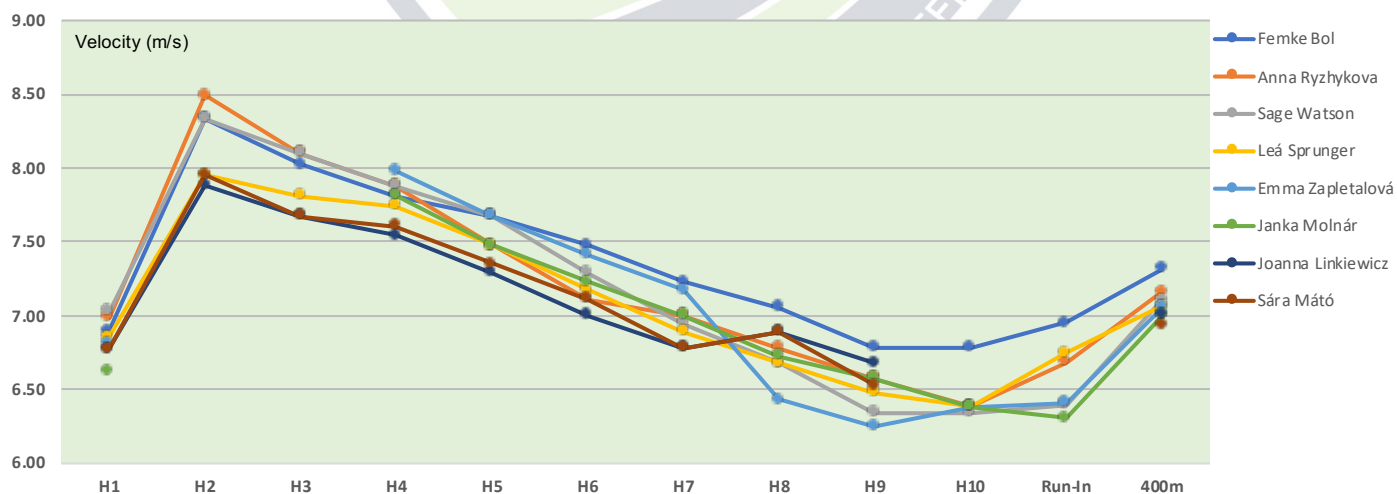
2020 István Gyulai Memorial (Székesfehérvár, HUN) (TV Analysis)

Women's 400m Hurdles

Date 2020.08.19

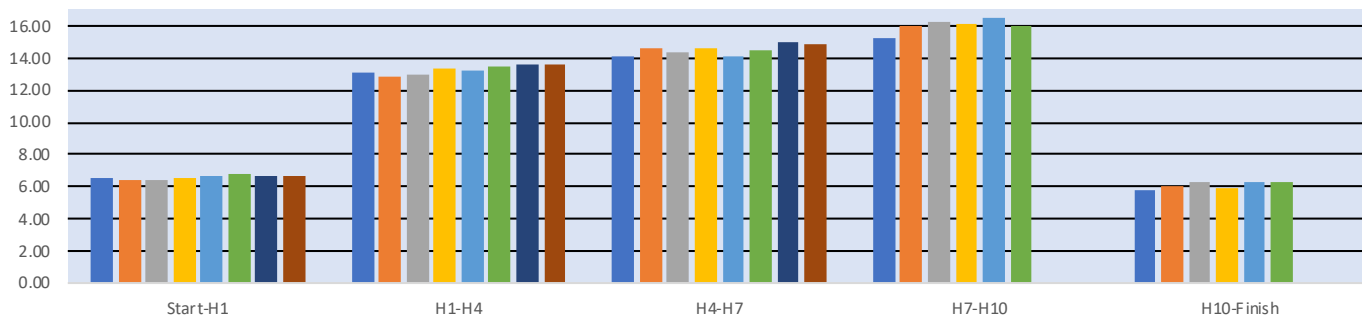
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Bol, Femke (NED) (2000)	time		6.52	10.72	15.08	19.56	24.12	28.80	33.64	38.60	43.76	48.92		54.67	4 / 1			
	reaction time	0.205																
	interval		6.90	4.20	4.36	4.48	4.56	4.68	4.84	4.96	5.16	5.16	5.75			13.04	14.08	15.28
	velocity		6.90	8.33	8.03	7.81	7.68	7.48	7.23	7.06	6.78	6.78	6.96	7.32		8.05	7.46	6.87
Ryzhykova, Anna (UKR) (1989)	H1 lead leg	L	22	15	15	15	15	15	15	15	16	16	19	178				
	time		6.44	10.56	14.88	19.32	24.00	28.92	33.92	39.08	44.40	49.88		55.86	3 / 2			
	reaction time	0.162																
	interval		6.99	4.12	4.32	4.44	4.68	4.92	5.00	5.16	5.32	5.48	5.98			12.88	14.60	15.96
Watson, Sage (CAN) (1994)	velocity		6.99	8.50	8.10	7.88	7.48	7.11	7.00	6.78	6.58	6.39	6.69	7.16		8.15	7.19	6.58
	H1 lead leg	R	22	14	14	14	15	15	15	15	16	16	19.5	175.5				
	time		6.40	10.60	14.92	19.36	23.92	28.72	33.76	39.00	44.52	50.04		56.29	5 / 3			
	reaction time	0.199																
Sprunger, Leá (SUI) (1990)	interval		7.03	4.20	4.32	4.44	4.56	4.80	5.04	5.24	5.52	5.52	6.25			12.96	14.40	16.28
	velocity		7.03	8.33	8.10	7.88	7.68	7.29	6.94	6.68	6.34	6.34	6.40	7.11		8.10	7.29	6.45
	H1 lead leg	R	22	15	15	15	15	16	16	16	17	17	20	184				
	time		6.56	10.96	15.44	19.96	24.64	29.52	34.60	39.84	45.24	50.72		56.65	6 / 4			
Zapletalová, Emma (SVK) (2000)	reaction time	0.207																
	interval		6.86	4.40	4.48	4.52	4.68	4.88	5.08	5.24	5.40	5.48	5.93			13.40	14.64	16.12
	velocity		6.86	7.95	7.81	7.74	7.48	7.17	6.89	6.68	6.48	6.39	6.75	7.06		7.84	7.17	6.51
	H1 lead leg	R	21	14	14	14	14	15	15	15	16	16		154				
Linkiewicz, Joanna (POL) (1990)	time		6.60			19.76	24.32	29.04	33.92	39.36	44.96	50.44		56.68	1 / 5			
	reaction time	0.129				13.16	4.56	4.72	4.88	5.44	5.60	5.48	6.24	NR NUR		13.16	14.16	16.52
	interval		6.82			7.98	7.68	7.42	7.17	6.43	6.25	6.39	6.41	7.06		7.98	7.42	6.36
	velocity		6.82			7.98	7.68	7.42	7.17	6.43	6.25	6.39	6.41	7.06		7.98	7.42	6.36
Molnár, Janka (HUN) (2001)	H1 lead leg	R	23				15	15	15	16	17	16	20	137				
	time		6.80			20.24	24.92	29.76	34.76	39.96	45.28	50.76		57.10	2 / 6			
	reaction time	0.218				13.44	4.68	4.84	5.00	5.20	5.32	5.48	6.34			13.44	14.52	16.00
	interval		6.62			7.81	7.48	7.23	7.00	6.73	6.58	6.39	6.31	7.01		7.81	7.23	6.56
Linkiewicz, Joanna (POL) (1990)	velocity		6.62			7.81	7.48	7.23	7.00	6.73	6.58	6.39	6.31	7.01		7.81	7.23	6.56
	H1 lead leg	R	24				16	16	17	17	17	17		124				
	time		6.64	11.08	15.64	20.28	25.08	30.08	35.24	40.32	45.56			57.11	8 / 7			
	reaction time	0.175				4.44	4.56	4.64	4.80	5.00	5.16	5.08	5.24			13.64	14.96	
Mátó, Sára (HUN) (2000)	interval		6.78	7.88	7.68	7.54	7.29	7.00	6.78	6.89	6.68			7.00		7.70	7.02	
	velocity		6.78	7.88	7.68	7.54	7.29	7.00	6.78	6.89	6.68			7.00		7.70	7.02	
	H1 lead leg	L	24	16	16	16	16	17	17	17	17			156				
	time		6.64	11.04	15.60	20.20	24.96	29.88	35.04	40.12	45.48			57.61	7 / 8			
Mátó, Sára (HUN) (2000)	reaction time	0.195				4.40	4.56	4.60	4.76	4.92	5.16	5.08	5.36			13.56	14.84	
	interval		6.78	7.95	7.68	7.61	7.35	7.11	6.78	6.89	6.53			6.94		7.74	7.08	
	velocity		6.78	7.95	7.68	7.61	7.35	7.11	6.78	6.89	6.53			6.94		7.74	7.08	
	H1 lead leg	L	22	15	15	15	16	16	16	16	17			148				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=RY1bSOTs4ac>

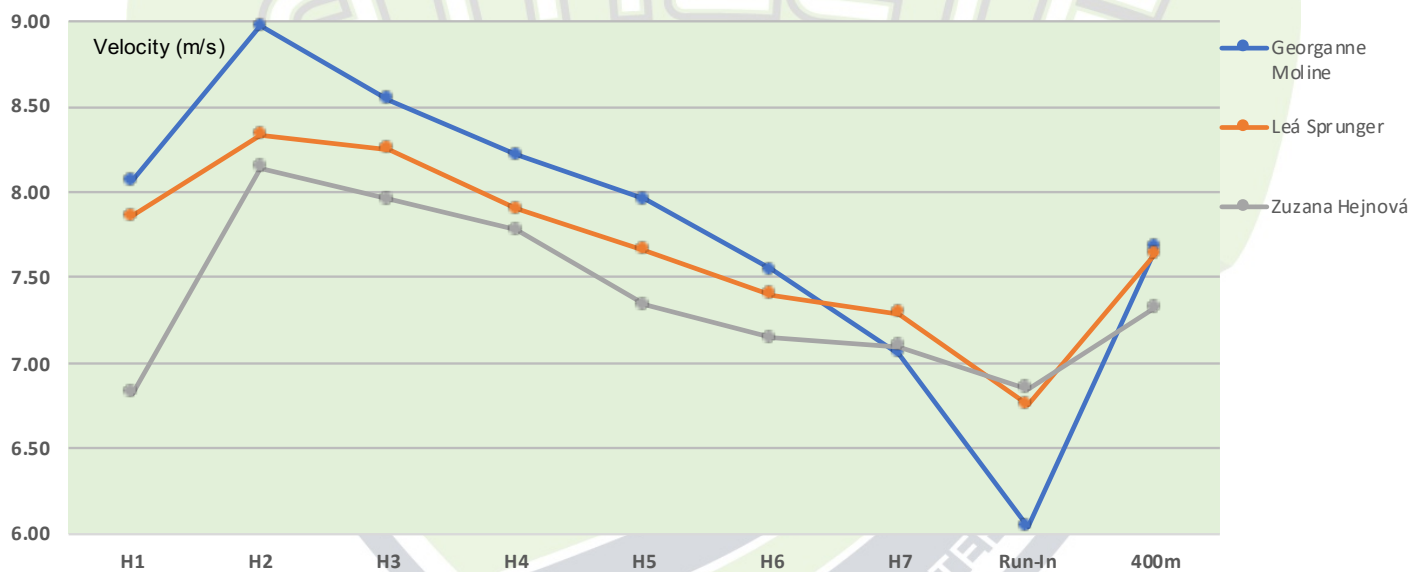
2020 Inspiration Games (Zürich, SUI) (TV Analysis) (300m Hurdles)

Women's 300m Hurdles

Date 2020.07.09

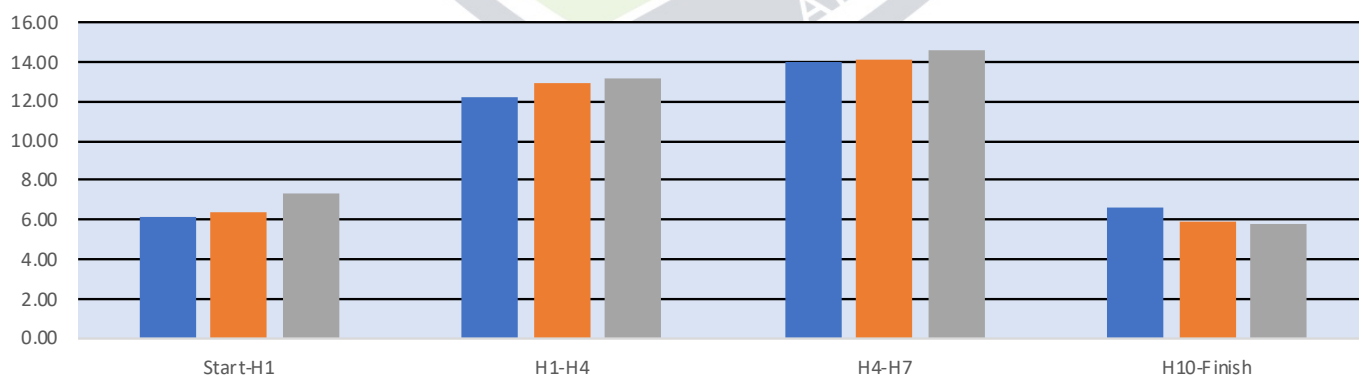
FINAL

		H1	H2	H3	H4	H5	H6	H7	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
(Walnut, CA)														
Moline, Georganne (USA) (1990)	time	6.20	10.10	14.20	18.46	22.86	27.50	32.46		39.08	3 / 1			
	reaction time		3.90	4.10	4.26	4.40	4.64	4.96	6.62			12.26	14.00	
	velocity	8.06	8.97	8.54	8.22	7.95	7.54	7.06	6.04	7.68		8.56	7.50	
	H1 lead leg R strides	22	15	15	15	15	16	16	22.5	136.5				
(Zürich, SUI)														
Sprunger, Leá (SUI) (1990)	time	6.36	10.56	14.80	19.23	23.80	28.53	33.33		39.25	5 / 2			
	reaction time		4.20	4.24	4.43	4.57	4.73	4.80	5.92			12.87	14.10	
	velocity	7.86	8.33	8.25	7.90	7.66	7.40	7.29	6.76	7.64		8.16	7.45	
	H1 lead leg R strides	21	14	14	14	14	15	15	20	127				
(Papendal, NED)														
Hejnová, Zuzana (CZE) (1986)	time	7.33	11.63	16.03	20.53	25.30	30.20	35.13		40.97	3 / 3			
	reaction time		4.30	4.40	4.50	4.77	4.90	4.93	5.84			13.20	14.60	
	velocity	6.82	8.14	7.95	7.78	7.34	7.14	7.10	6.85	7.32		7.95	7.19	
	H1 lead leg R strides	25	15	15	15	16	16	16	20	138				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 30fps

Timing From: First Movement - Moline

Gun Flash - Sprunger

Gun Flash - Hejnová

Source: <https://www.youtube.com/watch?v=vzTrAfKNIWQ>

Biomechanical Analysis

2020 Impossible Games (Oslo, NOR) (TV Analysis) (300m Hurdles)

Women's 300m Hurdles

Date 2020.06.11

FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Petersen, Sara Slott (DEN) (1987)	time		7.04	11.14	15.38	19.72	24.22	28.96	34.00					39.42	4 / 1			
	reaction time	0.125											5.42			12.68	14.28	
	interval			4.10	4.24	4.34	4.50	4.74	5.04				7.38	7.61		8.28	7.35	
	velocity		7.10	8.54	8.25	8.06	7.78	7.38	6.94				20	137				
Iuel, Amalie (NOR) (1994)	H1 lead leg	R	25	15	15	15	15	15	17									
	time		7.00	11.08	15.45	19.89	24.42	29.09	33.90					39.44	8 / 2			
	reaction time	0.137											5.54			12.89	14.01	
	interval			4.08	4.37	4.44	4.53	4.67	4.81				7.22	7.61		8.15	7.49	
Sprunger, Leá (SUI) (1990)	velocity		7.14	8.58	8.01	7.88	7.73	7.49	7.28				18.7	133.7				
	H1 lead leg	L	25	15	15	15	15	15	15									
	time		6.94	11.04	15.28	19.85	24.49	29.30	34.27					39.86	6 / 3			
	reaction time	0.151											5.59			12.91	14.42	
	interval			4.10	4.24	4.57	4.64	4.81	4.97				7.16	7.53		8.13	7.28	
	velocity		7.20	8.54	8.25	7.66	7.54	7.28	7.04				18.2	125.2				
	H1 lead leg	R	23	13	13	14	14	15	15									
	strides																	

2017 Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis)

Women's 400m Hurdles

Date 2017.06.08

FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Petersen, Sara Slott (DEN) (1987)	time		6.56	10.80	15.08	19.32	23.72	28.28	32.96	37.92	43.04	48.32		54.35	4 / 2			
	reaction time	0.158											6.03			12.76	13.64	15.36
	interval			4.24	4.28	4.24	4.40	4.56	4.68	4.96	5.12	5.28	6.63	7.36		8.23	7.70	6.84
	velocity		6.86	8.25	8.18	8.25	7.95	7.68	7.48	7.06	6.84	6.63	6.63	7.36				
	H1 lead leg	R	22	15	15	15	15	15	15	16	16	17	20.5	181.5				
	strides																	

2018 Bislett Games (Oslo, NOR) (TV Analysis)

Women's 400m Hurdles

Date 2018.06.07

FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Iuel, Amalie (NOR) (1994)	time		6.44	10.60	15.04		24.20	28.92	33.88	38.96	44.04	49.20		55.26	8 / 6			
	reaction time	0.140											6.06	NR PB				15.32
	interval			4.16	4.44		9.16	4.72	4.96	5.08	5.08	5.16	6.60	7.24				6.85
	velocity		6.99	8.41	7.88		7.64	7.42	7.06	6.89	6.89	6.78	6.60	7.24				
	H1 lead leg	L	23	15	15			15	15	16	16	16		131				
	strides																	

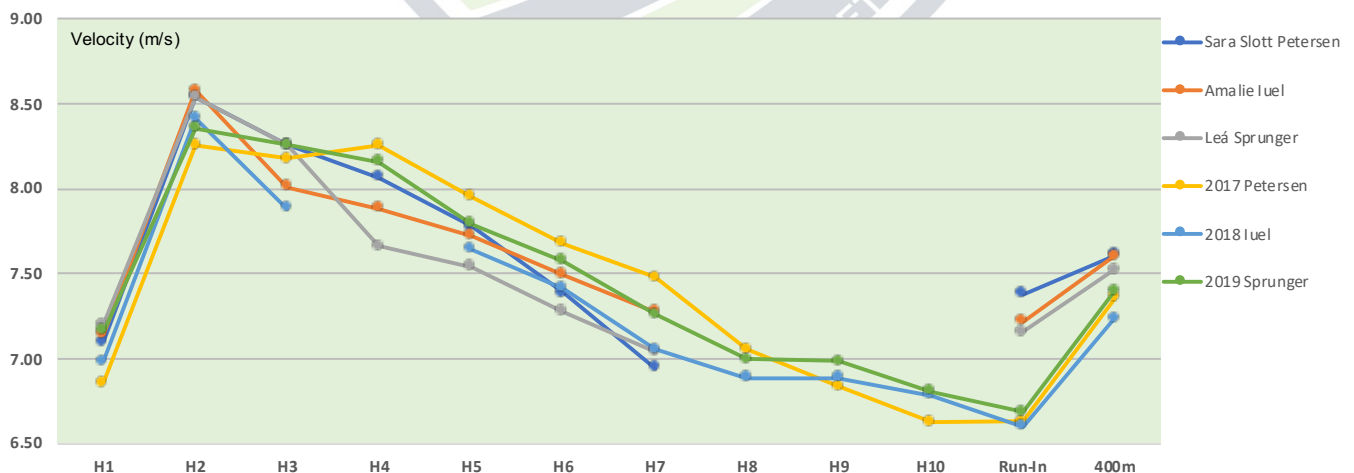
2019 IAAF World Championships (Doha, QAT) (TV Analysis)

Women's 400m Hurdles

Date 2019.10.04

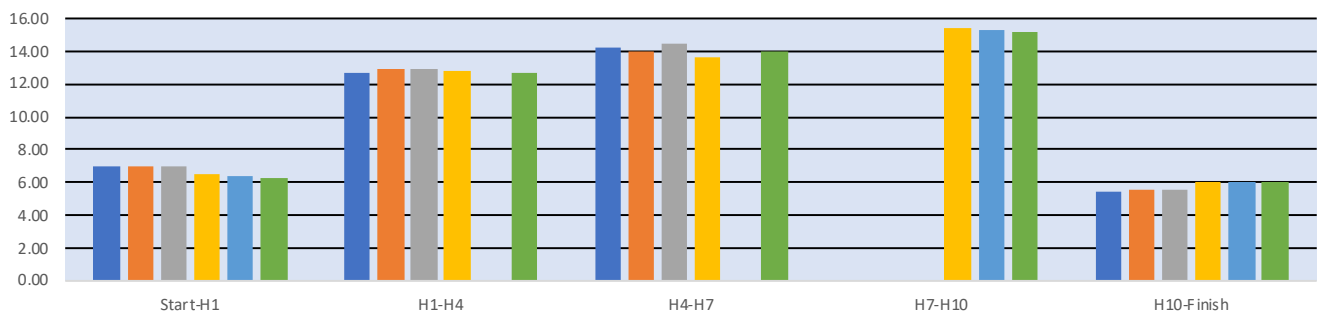
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Sprunger, Leá (SUI) (1990)	time		6.28	10.47	14.71	19.00	23.49	28.11	32.93	37.93	42.94	48.08		54.06	9 / 4			
	reaction time	0.199											5.98	NR PB		12.72	13.93	15.15
	interval			4.19	4.24	4.29	4.49	4.62	4.82	5.00	5.01	5.14	6.69	7.40		8.25	7.54	6.93
	velocity		7.17	8.35	8.25	8.16	7.80	7.58	7.26	7.00	6.99	6.81	6.69	7.40				
	H1 lead leg	R	23	14	14	14	14	15	15	15	15	15	18.5	172.5				
	strides																	



Time Intervals (s)

Hurdle Phases



2020 Impossible Games (Oslo, NOR)

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=x9DfCY4MKYk>

2017 Golden Gala Pietro Mennea (Rome, ITA)

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: https://www.youtube.com/watch?v=ZAz0GS_4QTY

2018 Bislett Games (Oslo, NOR)

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=YydzQ7yNeA>

2019 IAAF World Championships (Doha, QAT)

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 25fps

Timing From: First Movement

Source: https://www.youtube.com/watch?v=Kw2vO3aU5_Y