

2023 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

2023 Season Hurdles Report

Men's 110m Hurdles

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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
- For Diamond League meetings, I have included the Diamond League race analysis data provided by Omega Timing. This is done with a timing chip on the back of the athletes bib number, and it set to the actual distance of the hurdle not the touchdown distance of the athlete. Does the time start on the gun or when the athlete passes the 0.0m mark? This is a question I am still hoping to find an answer to.
- 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

2023 Top 10 Times - Men's 110m Hurdles

Tinch, Cordell (USA) (2000)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 NCAA Division II National Championships (Pueblo, CO) (Altitude) (TV Analysis)																			
date		27-May		time	2.50	3.50	4.50	5.48	6.46	7.44	8.41	9.43	10.43	11.46	Henson (2023) - Athlete First: 2023 year end hurdle report				
reaction time		interval		7 steps	1.00	1.00	0.98	0.98	0.98	0.97	1.02	1.00	1.03	1.41	5 / 1 2.98 2.93 3.05				
wind		6.0 m/s		velocity	5.49	9.14	9.14	9.33	9.33	9.33	9.42	8.96	9.14	8.87	9.94	8.55	9.20 9.36 8.99		
Parchment, Hansle (JAM) (1990)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 Prefontaine Classic (Eugene, OR)																			
date		17-Sep		time	2.47	3.50	4.48	5.47	6.45	7.42	8.40	9.40	10.40	11.41	Omega Timing - diamond league race analysis				
reaction time		0.168		interval	7 steps	1.03	0.98	0.99	0.98	0.97	0.98	1.00	1.00	1.01	1.52	PB	3.00 2.93 3.01		
wind		0.9 m/s		velocity	5.55	8.87	9.33	9.23	9.33	9.42	9.33	9.14	9.14	9.05	9.22	8.51	9.14 9.36 9.11		
Broadbell, Rasheed (JAM) (2000)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 Jamaican National Championships (Kingston, JAM) (TV Analysis)																			
date		9-Jul		time	2.50	3.55	4.55	5.53	6.53	7.53	8.50	9.50	10.48	11.48	Henson (2023) - Athlete First: 2023 year end hurdle report				
reaction time		interval		7 steps	1.05	1.00	0.98	1.00	1.00	0.97	1.00	0.98	1.00	1.46	PB	3.03 2.97 2.98			
wind		0.7 m/s		velocity	5.49	8.70	9.14	9.33	9.14	9.14	9.42	9.14	9.33	9.14	9.60	8.50	9.05 9.23 9.20		
Tinch, Cordell (USA) (2000)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 Trackwired Arkansas Grand Prix (Fayetteville, AR) (TV Analysis)																			
date		23-Jun		time	2.46	3.50	4.50	5.50	6.48	7.46	8.43	9.47	10.47	11.49	Henson (2023) - Athlete First: 2023 year end hurdle report				
reaction time		interval		7 steps	1.04	1.00	1.00	0.98	0.98	0.97	1.04	1.00	1.02	1.47	PB	3.04 2.93 3.06			
wind		1.3 m/s		velocity	5.58	8.79	9.14	9.14	9.33	9.33	9.42	8.79	9.14	8.96	9.54	8.49	9.02 9.36 8.96		
Holloway, Grant (USA) (1997)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 World Athletics Championships (Budapest, HUN) (TV Analysis)																			
date		21-Aug		time	2.44	3.44	4.40	5.36	6.36	7.36	8.36	9.38	10.42	11.52	Henson (2023) - Athlete First: 2023 year end hurdle report				
reaction time		0.135		interval	7 steps	1.00	0.96	0.96	1.00	1.00	1.00	1.02	1.04	1.10	1.44	2.92 3.00 3.16			
wind		0.0 m/s		velocity	5.62	9.14	9.52	9.52	9.14	9.14	9.14	8.96	8.79	8.31	9.74	8.49	9.39 9.14 8.68		
Parchment, Hansle (JAM) (1990)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 Xiamen Diamond League (Xiamen, CHN)																			
date		2-Sep		time	2.40	3.40	4.40	5.40	6.40	7.40	8.40	9.40	10.40	11.40	Omega Timing - diamond league race analysis				
reaction time		0.163		interval	7 steps	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.56	5 / 1 3.00 3.00 3.00				
wind		0.0 m/s		velocity	5.72	9.14	9.14	9.14	9.14	9.14	9.14	9.14	9.14	8.99	8.49	9.14 9.14 9.14			
Tinch, Cordell (USA) (2000)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 MIAA Championships (Jefferson City, MO) (TV Analysis)																			
date		7-May		time	2.40	3.40	4.40	5.37	6.34	7.31	8.34	9.34	10.36	11.40	Henson (2023) - Athlete First: 2023 year end hurdle report				
reaction time		interval		7 steps	1.00	1.00	0.97	0.97	0.97	1.03	1.00	1.02	1.04	1.57	4 / 1 2.97 2.97 3.06				
wind		3.0 m/s		velocity	5.72	9.14	9.14	9.42	9.42	9.42	8.87	9.14	8.96	8.79	8.93	8.48	9.23 9.23 8.96		
Holloway, Grant (USA) (1997)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 Meeting de Paris (Paris, FRA)																			
date		9-Jun		time	2.30	3.30	4.28	5.25	6.24	7.23	8.24	9.26	10.30	11.36	Omega Timing - diamond league race analysis				
reaction time		0.157		interval	7 steps	1.00	0.98	0.97	0.99	0.99	1.01	1.02	1.04	1.06	1.62	2.95 2.99 3.12			
wind		-0.5 m/s		velocity	5.97	9.14	9.33	9.42	9.23	9.23	9.05	8.96	8.79	8.62	8.65	8.47	9.29 9.17 8.79		
Britt, Jamal (USA) (1998)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 USATF Bermuda Grand Prix (Devonshire, BER) (TV Analysis)																			
date		21-May		time	2.50	3.52	4.53	5.53	6.52	7.52	8.53	9.55	10.60	11.65	Henson (2023) - Athlete First: 2023 year end hurdle report				
reaction time		0.124		interval	7 steps	1.02	1.01	1.00	0.99	1.00	1.01	1.02	1.05	1.05	1.34	3.03 3.00 3.12			
wind		4.0 m/s		velocity	5.49	8.96	9.05	9.14	9.23	9.14	9.05	8.96	8.70	8.70	10.46	8.47	9.05 9.14 8.79		
Holloway, Grant (USA) (1997)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 Adidas Atlanta City Games (Atlanta, GA) (street) (TV Analysis)																			
date		5-May		time	2.50	3.48	4.48	5.48	6.45	7.45	8.47	9.50	10.53	11.60	Henson (2023) - Athlete First: 2023 year end hurdle report				
reaction time		0.181		interval	7 steps	0.98	1.00	1.00	0.97	1.00	1.02	1.03	1.03	1.07	1.41	2.98 2.99 3.13			
wind		0.0 m/s		velocity	5.49	9.33	9.14	9.14	9.42	9.14	8.96	8.87	8.87	8.54	9.94	8.46	9.20 9.17 8.76		
Roberts, Daniel (USA) (1998)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 USATF New York City Grand Prix (Randalls Island, NY) (TV Analysis)																			
date		24-Jun		time	2.47	3.50	4.50	5.50	6.54	7.54	8.56	9.58	10.60	11.61	Henson (2023) - Athlete First: 2023 year end hurdle report				
reaction time		0.159		interval		1.03	1.00	1.00	1.04	1.00	1.02	1.02	1.02	1.01	1.40	3.03 3.06 3.05			
wind		1.6 m/s		velocity	5.55	8.87	9.14	9.14	8.79	9.14	8.96	8.96	8.96	9.05	10.01	8.46	9.05 8.96 8.99		
Holloway, Grant (USA) (1997)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 London Athletics Meet (London, GBR)																			
date		23-Jul		time	2.36	3.35	4.33	5.30	6.29	7.28	8.29	9.32	10.37	11.43	Omega Timing - diamond league race analysis				
reaction time		0.165		interval	7 steps	0.99	0.98	0.97	0.99	0.99	1.01	1.03	1.05	1.06	1.58	2.94 2.99 3.14			
wind		1.3 m/s		velocity	5.81	9.23	9.33	9.42	9.23	9.23	9.05	8.87	8.70	8.62	8.87	8.46	9.33 9.17 8.73		
Zhoya, Sasha (FRA) (2002)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Heat 2 - 2023 French National Championships (Albi, FRA) (TV Analysis)																			
date		29-Jul		time	2.52	3.56	4.58	5.56	6.52	7.52	8.52	9.52	10.54	11.58	Henson (2023) - Athlete First: 2023 year end hurdle report				
reaction time		0.173		interval	7 steps	1.04	1.02	0.98	0.96	1.00	1.00	1.00	1.02	1.04	1.43	3.04 2.96 3.06			
wind		5.3 m/s		velocity	5.44	8.79	8.96	9.33	9.52	9.14	9.14	9.14	8.96	8.79	9.80	8.46	9.02 9.26 8.96		
Zhoya, Sasha (FRA) (2002)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 French National Championships (Albi, FRA) (TV Analysis)																			
date		29-Jul		time	2.50	3.54	4.54	5.52	6.50	7.50	8.52	9.52	10.54	11.58	Henson (2023) - Athlete First: 2023 year end hurdle report				
reaction time		0.187		interval	7 steps	1.04	1.00	0.98	0.98	1.00	1.02	1.00	1.02	1.04	1.43	3.02 3.00 3.06			
wind		2.3 m/s		velocity	5.49	8.79	9.14	9.33	9.33	9.14	8.96	9.14	8.96	8.79	9.80	8.46	9.08 9.14 8.96		
Holloway, Grant (USA) (1997)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Semi-Final 2 - 2023 World Athletics Championships (Budapest, HUN) (TV Analysis)																			
date		21-Aug		time	2.44	3.44	4.42	5.40	6.38	7.38	8.40	9.42	10.46	11.53	Henson (2023) - Athlete First: 2023 year end hurdle report				
reaction time		0.137		interval	7 steps	1.00	0.98	0.98	0.98	1.00	1.02	1.02	1.04	1.07	1.49	2.96 3.00 3.13			
wind		-0.2 m/s		velocity	5.62	9.14	9.33	9.33	9.33	9.14	8.96	8.96	8.79	8.54	9.41	8.45	9.26 9.14 8.76		

2023 Prefontaine Classic (Eugene, OR)

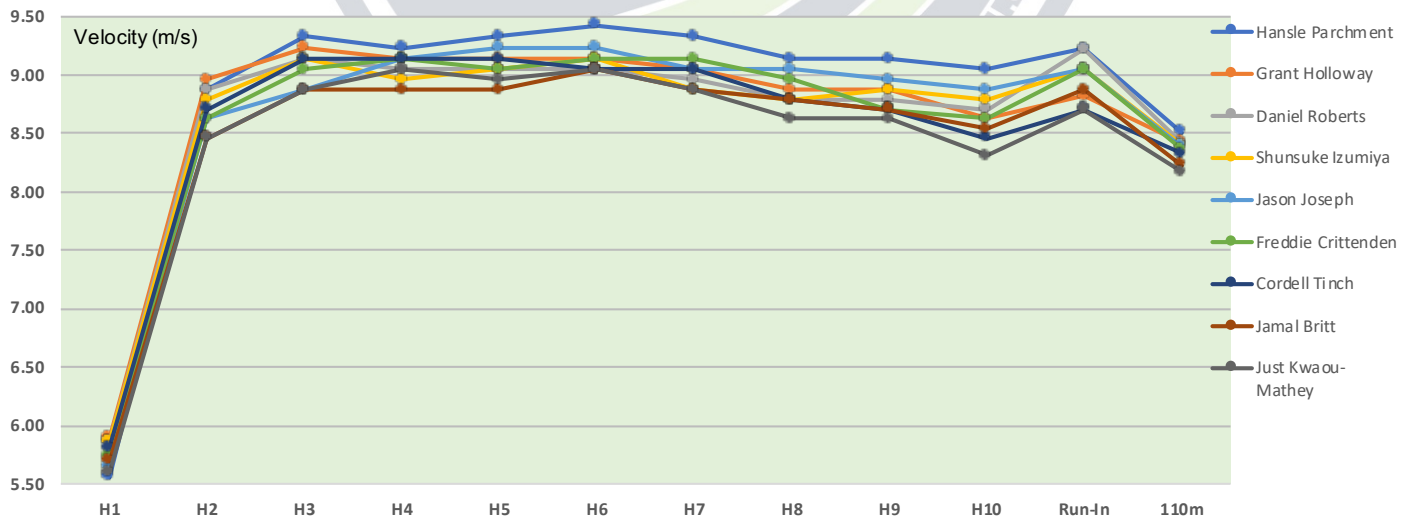
110m Hurdles

Date: 2023.09.17

Wind: 0.9 m/s

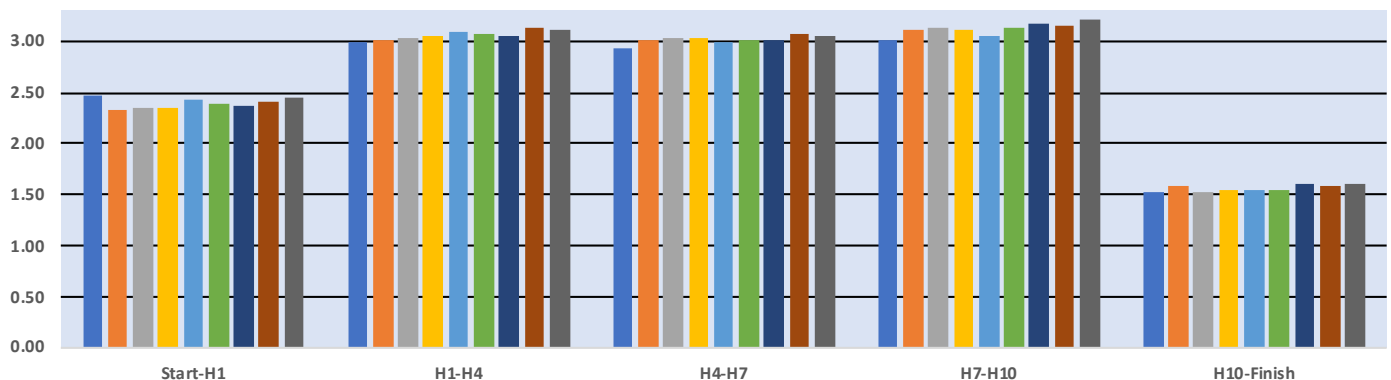
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Parchment, Hansle (JAM) (1990)	time		2.47	3.50	4.48	5.47	6.45	7.42	8.40	9.40	10.40	11.41		12.93	5 / 1	3.00	2.93	3.01
	reaction time	0.168											1.52	PB				
	interval velocity		7 steps	1.03	0.98	0.99	0.98	0.97	0.98	1.00	1.00	1.01	9.22	8.51				
Holloway, Grant (USA) (1997)	time		2.33	3.35	4.34	5.34	6.34	7.34	8.35	9.38	10.41	11.47		13.06	6 / 2	3.01	3.01	3.12
	reaction time	0.153											1.59					
	interval velocity		7 steps	5.89	8.96	9.23	9.14	9.14	9.14	9.05	8.87	8.87	8.62	8.82				
Roberts, Daniel (USA) (1998)	time		2.34	3.37	4.37	5.38	6.39	7.40	8.42	9.46	10.50	11.55		13.07	3 / 3	3.04	3.04	3.13
	reaction time	0.149											1.52					
	interval velocity		5.86	8.87	9.14	9.05	9.05	9.05	8.96	8.79	8.79	8.70	9.22	8.42				
Izumiya, Shunsuke (JPN) (2000)	time		2.34	3.38	4.38	5.40	6.41	7.41	8.44	9.48	10.51	11.55		13.10	7 / 4	3.06	3.04	3.11
	reaction time	0.136											1.55					
	interval velocity		7 steps	5.86	8.79	9.14	8.96	9.05	9.14	8.87	8.79	8.87	8.79	9.05				
Joseph, Jason (SUI) (1998)	time		2.43	3.49	4.52	5.52	6.51	7.50	8.51	9.52	10.54	11.57		13.12	8 / 5	3.09	2.99	3.06
	reaction time	0.156											1.55					
	interval velocity		7 steps	5.65	8.62	8.87	9.14	9.23	9.23	9.05	9.05	8.96	8.87	9.05				
Crittenden, Freddie (USA) (1994)	time		2.39	3.45	4.46	5.46	6.47	7.47	8.47	9.49	10.54	11.60		13.15	4 / 6	3.07	3.01	3.13
	reaction time	0.146											1.55					
	interval velocity		5.74	8.62	9.05	9.14	9.05	9.14	9.14	8.96	8.70	8.62	9.05	8.37				
Tinch, Cordell (USA) (2000)	time		2.36	3.41	4.41	5.41	6.41	7.42	8.43	9.47	10.52	11.60		13.21	2 / 7	3.05	3.02	3.17
	reaction time	0.148											1.61					
	interval velocity		7 steps	5.81	8.70	9.14	9.14	9.14	9.05	9.05	8.79	8.70	8.46	8.71				
Britt, Jamal (USA) (1998)	time		2.41	3.49	4.52	5.55	6.58	7.59	8.62	9.66	10.71	11.78		13.36	9 / 8	3.14	3.07	3.16
	reaction time	0.140											1.58					
	interval velocity		7 steps	5.69	8.46	8.87	8.87	8.87	9.05	8.87	8.79	8.70	8.54	8.87				
Kwaou-Mathey, Just (FRA) (1999)	time		2.45	3.53	4.56	5.57	6.59	7.60	8.63	9.69	10.75	11.85		13.46	1 / 9	3.12	3.06	3.22
	reaction time	0.159											1.61					
	interval velocity		7 steps	5.60	8.46	8.87	9.05	8.96	9.05	8.87	8.62	8.62	8.31	8.71				



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Sun 17 Sep 2023 13:57) - diamond league race analysis

<https://www.omegatiming.com/File/000203100102100101FFFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=xZ-6pB0DqXs>

2023 Xiamen Diamond League (Xiamen, CHN)

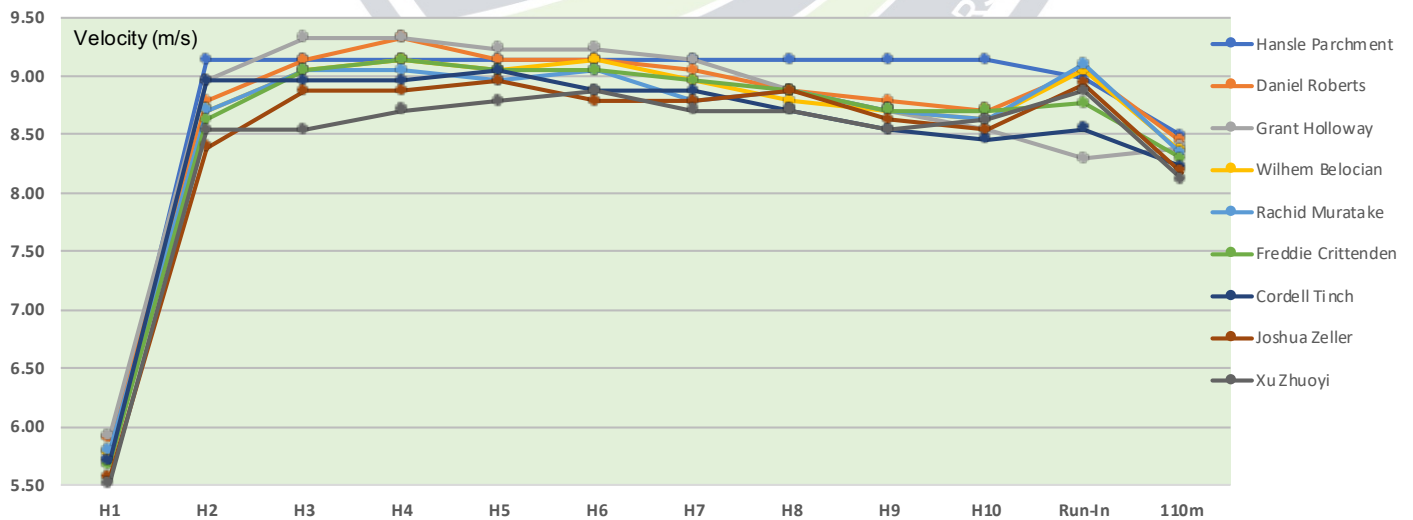
110m Hurdles

Date: 2023.09.02

Wind: 0.0 m/s

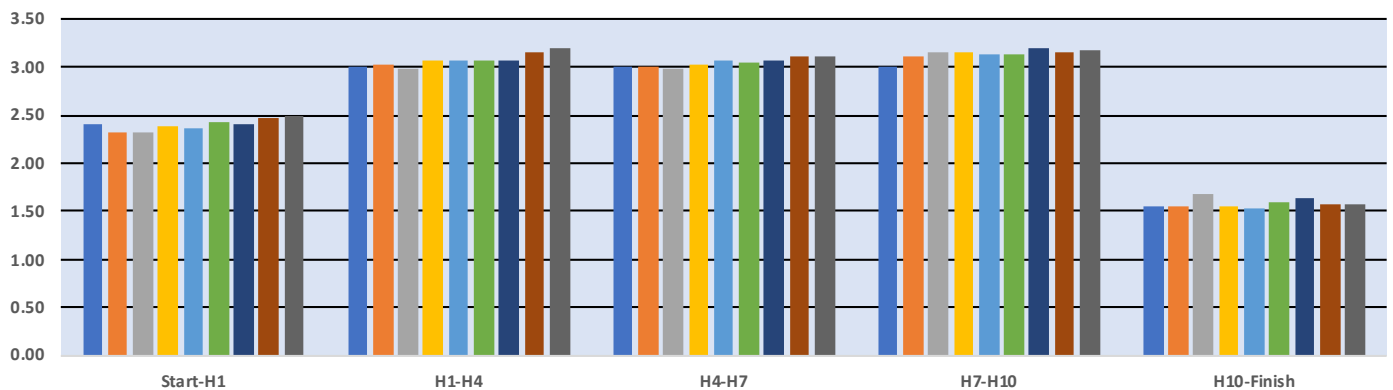
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Parchment, Hansle (JAM) (1990)	time	2.40	3.40	4.40	5.40	6.40	7.40	8.40	9.40	10.40	11.40		12.96	5 / 1			
	reaction time	0.163													3.00	3.00	3.00
	interval	7 steps	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.56			9.14	9.14	9.14
Roberts, Daniel (USA) (1998)	time	2.33	3.37	4.37	5.35	6.35	7.35	8.36	9.39	10.43	11.48		13.03	4 / 2			
	reaction time	0.140													3.02	3.01	3.12
	interval	7 steps	1.04	1.00	0.98	1.00	1.00	1.01	1.03	1.04	1.05	1.55			9.08	9.11	8.79
Holloway, Grant (USA) (1997)	time	2.32	3.34	4.32	5.30	6.29	7.28	8.28	9.31	10.36	11.43		13.12	6 / 3			
	reaction time	0.141													2.98	2.98	3.15
	interval	7 steps	1.02	0.98	0.98	0.99	0.99	1.00	1.03	1.05	1.07	1.69			9.20	9.20	8.70
Belocian, Wilhem (FRA) (1995)	time	2.38	3.43	4.44	5.44	6.45	7.45	8.47	9.51	10.56	11.62		13.17	3 / 4			
	reaction time	0.130													3.06	3.03	3.15
	interval	7 steps	1.05	1.01	1.00	1.01	1.00	1.02	1.04	1.05	1.06	1.55			8.96	9.05	8.70
Muratake, Rachid (JPN) (2002)	time	2.37	3.42	4.43	5.44	6.46	7.47	8.51	9.54	10.59	11.65		13.19	2 / 5			
	reaction time	0.153													3.07	3.07	3.14
	interval	7 steps	1.05	1.01	1.01	1.02	1.01	1.04	1.03	1.05	1.06	1.54			8.93	8.93	8.73
Crittenden, Freddie (USA) (1994)	time	2.42	3.48	4.49	5.49	6.50	7.51	8.53	9.56	10.61	11.66		13.26	7 / 6			
	reaction time	0.148													3.07	3.04	3.13
	interval	7 steps	1.06	1.01	1.00	1.01	1.01	1.02	1.03	1.05	1.05	1.60			8.93	9.02	8.76
Tinch, Cordell (USA) (2000)	time	2.41	3.43	4.45	5.47	6.48	7.51	8.54	9.59	10.66	11.74		13.38	8 / 7			
	reaction time	0.170													3.06	3.07	3.20
	interval	7 steps	1.02	1.02	1.02	1.01	1.03	1.03	1.05	1.07	1.08	1.64			8.96	8.93	8.57
Pereira, Rafael (BRA) (1997)		0.130	no information available										13.42	10 / 8			
Zeller, Joshua (GBR) (2000)	time	2.47	3.56	4.59	5.62	6.64	7.68	8.72	9.75	10.81	11.88		13.45				
	reaction time	0.147													3.15	3.10	3.16
	interval	7 steps	1.09	1.03	1.03	1.02	1.04	1.04	1.03	1.06	1.07	1.57			8.70	8.85	8.68
Xu Zhuoyi (CHN) (2003)	time	2.49	3.56	4.63	5.68	6.72	7.75	8.80	9.85	10.92	11.98		13.56	9 / 10			
	reaction time	0.166													3.19	3.12	3.18
	interval	7 steps	1.07	1.07	1.05	1.04	1.03	1.05	1.05	1.07	1.06	1.58			8.60	8.79	8.62
	time	2.49	3.56	4.63	5.68	6.72	7.75	8.80	9.85	10.92	11.98		13.56				
	reaction time	0.166															
	interval	7 steps	1.07	1.07	1.05	1.04	1.03	1.05	1.05	1.07	1.06	1.58					



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Sat 2 Sep 2023 21:02) - diamond league race analysis

<https://www.omegatiming.com/File/0002031101020C0101FFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=4K6le2LRwPI>

2023 Weltklasse (Zürich, SUI)

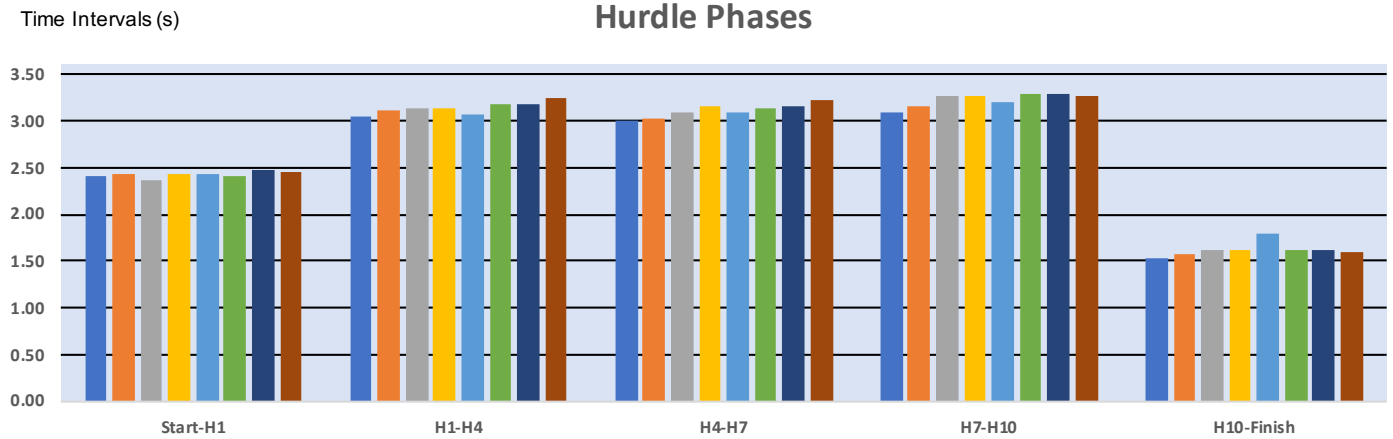
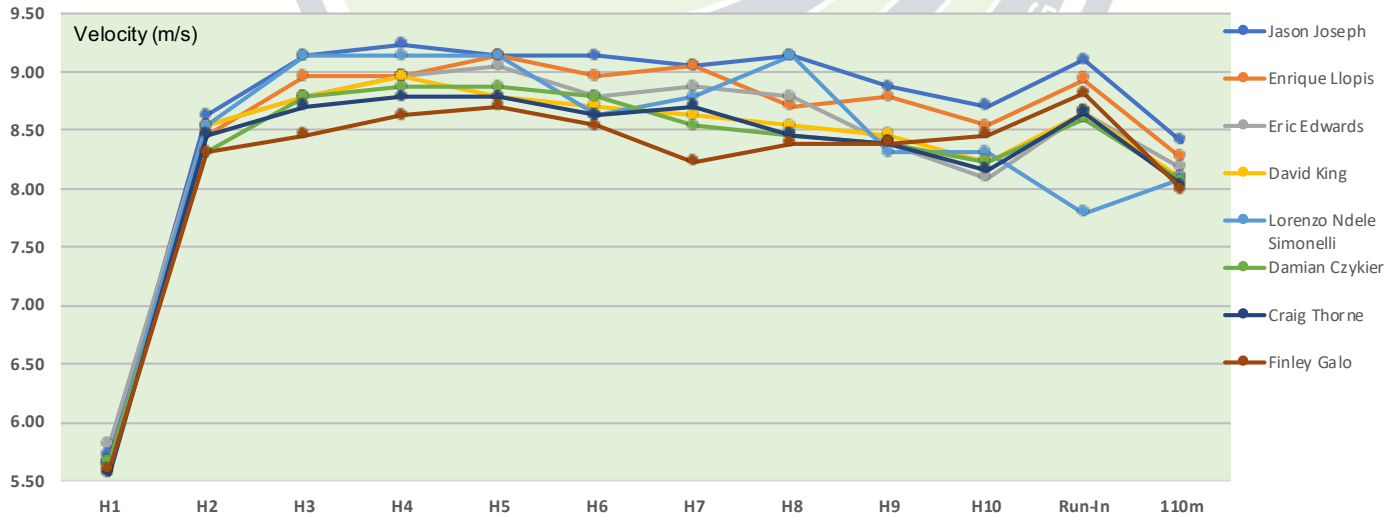
110m Hurdles

Date: 2023.08.31

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
Joseph, Jason (SUI) (1998)	time		2.40	3.46	4.46	5.45	6.45	7.45	8.46	9.46	10.49	11.54		13.08	5 / 1	3.05	3.01	3.08
	reaction time	0.137																
	interval		7 steps	1.06	1.00	0.99	1.00	1.00	1.01	1.00	1.03	1.05	1.54	NR PB				
Llopis, Enrique (ESP) (2000)	time		2.43	3.51	4.53	5.55	6.55	7.57	8.58	9.63	10.67	11.74		13.31	3 / 2	3.12	3.03	3.16
	reaction time	0.117																
	interval		7 steps	1.08	1.02	1.02	1.00	1.02	1.01	1.05	1.04	1.07	1.57					
Edwards, Eric (USA) (2000)	time		2.36	3.43	4.47	5.49	6.50	7.54	8.57	9.61	10.70	11.83		13.45	6 / 3	3.13	3.08	3.26
	reaction time	0.125																
	interval		7 steps	1.07	1.04	1.02	1.01	1.04	1.03	1.04	1.09	1.13	1.62					
King, David (GBR) (1994)	time		2.44	3.51	4.55	5.57	6.61	7.66	8.72	9.79	10.87	11.98		13.60	8 / 4	3.13	3.15	3.26
	reaction time	0.122																
	interval		7 steps	1.07	1.04	1.02	1.04	1.05	1.06	1.07	1.08	1.11	1.62					
Simonelli, Lorenzo Ndele (ITA) (1994)	time		2.43	3.50	4.50	5.50	6.50	7.56	8.60	9.60	10.70	11.80		13.60	4 / 5	3.07	3.10	3.20
	reaction time	0.142																
	interval		7 steps	1.07	1.00	1.00	1.00	1.06	1.04	1.00	1.10	1.10	1.80					
Czykier, Damian (POL) (1992)	time		2.42	3.52	4.56	5.59	6.62	7.66	8.73	9.81	10.90	12.01		13.64	7 / 6	3.17	3.14	3.28
	reaction time	0.144																
	interval		7 steps	1.10	1.04	1.03	1.03	1.04	1.07	1.08	1.09	1.11	1.63					
Thorne, Craig (CAN) (2001)	time		2.47	3.55	4.60	5.64	6.68	7.74	8.79	9.87	10.96	12.08		13.70	2 / 7	3.17	3.15	3.29
	reaction time	0.148																
	interval		7 steps	1.08	1.05	1.04	1.04	1.06	1.05	1.08	1.09	1.12	1.62					
Gaio, Finley (SUI) (1999)	time		2.45	3.55	4.63	5.69	6.74	7.81	8.92	10.01	11.10	12.18		13.77	9 / 8	3.24	3.23	3.26
	reaction time	0.154																
	interval		7 steps	1.10	1.08	1.06	1.05	1.07	1.11	1.09	1.09	1.08	1.59					
	velocity		5.60	8.31	8.46	8.62	8.70	8.54	8.23	8.39	8.39	8.46	8.82	7.99		8.46	8.49	8.41



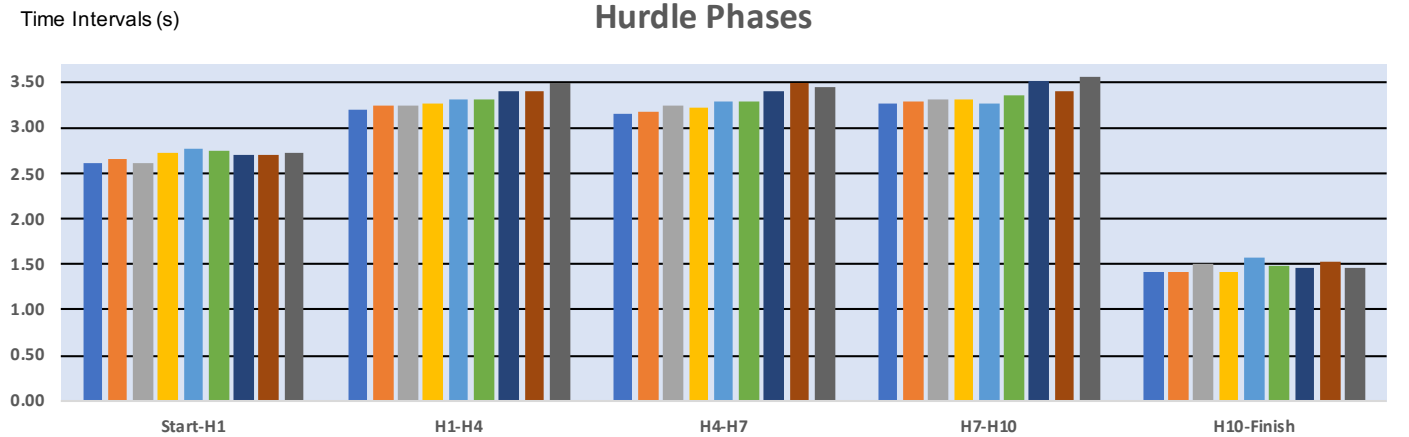
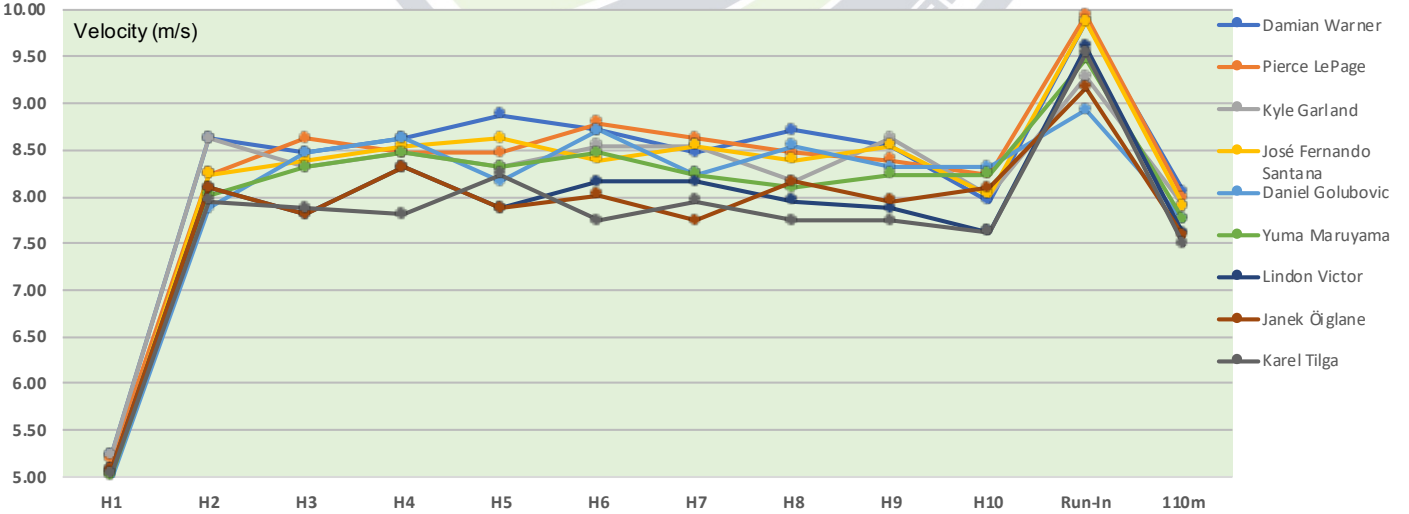
Source: Omega Timing (Thu 31 Aug 2023 20:01) - diamond league race analysis
<https://www.omegatiming.com/File/0002030D0102060101FFFFFFFFFFFF4D.pdf>

Video: <https://www.youtube.com/watch?v=9wPn3xcHodI>

Biomechanical Analysis

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

Decathlon - 110m Hurdles				Date: 2023.08.26	Wind: 0.2 m/s				Heat 3													
				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10			
Warner, Damian (CAN) (1989)	time			2.62	3.68	4.76	5.82	6.85	7.90	8.98	10.03	11.10	12.25		13.67	4 / 1						
	reaction time	0.151		7 steps	1.06	1.08	1.06	1.03	1.05	1.08	1.05	1.07	1.15	1.42			3.20	3.16	3.27			
	interval		velocity	5.24	8.62	8.46	8.62	8.87	8.70	8.46	8.70	8.54	7.95	9.87	8.05		8.57	8.68	8.39			
LePage, Pierce (CAN) (1996)	time			2.65	3.76	4.82	5.90	6.98	8.02	9.08	10.16	11.25	12.36		13.77	3 / 2						
	reaction time	0.183		7 steps	1.11	1.06	1.08	1.08	1.04	1.06	1.08	1.09	1.11	1.41	PB		3.25	3.18	3.28			
	interval		velocity	5.18	8.23	8.62	8.46	8.46	8.79	8.62	8.46	8.39	8.23	9.94	7.99		8.44	8.62	8.36			
Garland, Kyle (USA) (2000)	time			2.62	3.68	4.78	5.86	6.96	8.03	9.10	10.22	11.28	12.42		13.93	5 / 3						
	reaction time	0.137		7 steps	1.06	1.10	1.08	1.10	1.07	1.07	1.12	1.06	1.14	1.51			3.24	3.24	3.32			
	interval		velocity	5.24	8.62	8.31	8.46	8.31	8.54	8.54	8.16	8.62	8.02	9.28	7.90		8.46	8.46	8.26			
				Date: 2023.08.26	Wind: 0.1 m/s				Heat 2													
				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10			
Santana, José Fernando (BRA) (1999)	time			2.73	3.84	4.93	6.00	7.06	8.15	9.22	10.31	11.38	12.52		13.94	4 / 1						
	reaction time	0.158		7 steps	1.11	1.09	1.07	1.06	1.09	1.07	1.09	1.07	1.14	1.42	PB		3.27	3.22	3.30			
	interval		velocity	5.03	8.23	8.39	8.54	8.62	8.39	8.54	8.39	8.54	8.02	9.87	7.89		8.39	8.52	8.31			
Golubovic, Daniel (AUS) (1993)	time			2.76	3.92	5.00	6.06	7.18	8.23	9.34	10.41	11.51	12.61		14.18	6 / 2						
	reaction time	0.178			1.16	1.08	1.06	1.12	1.05	1.11	1.07	1.10	1.10	1.57			3.30	3.28	3.27			
	interval		velocity	4.97	7.88	8.46	8.62	8.16	8.70	8.23	8.54	8.31	8.31	8.93	7.76		8.31	8.36	8.39			
Maruyama, Yuma (JPN) (1998)	time			2.74	3.88	4.98	6.06	7.16	8.24	9.35	10.48	11.59	12.70		14.18	7 / 2	Matsubayashi (2023)					
	reaction time	0.192		7 steps	1.14	1.10	1.08	1.10	1.08	1.11	1.13	1.11	1.11	1.48			3.32	3.29	3.35			
	interval		velocity	5.01	8.02	8.31	8.46	8.31	8.46	8.23	8.09	8.23	8.23	9.47	7.76		8.26	8.33	8.19			
				Date: 2023.08.26	Wind: 0.2 m/s				Heat 1													
				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10			
Victor, Lndon (GRN) (1993)	time			2.70	3.83	5.00	6.10	7.26	8.38	9.50	10.65	11.81	13.01		14.47	7 / 1						
	reaction time	0.149		7 steps	1.13	1.17	1.10	1.16	1.12	1.12	1.15	1.16	1.20	1.46			3.40	3.40	3.51			
	interval		velocity	5.08	8.09	7.81	8.31	7.88	8.16	8.16	7.95	7.88	7.62	9.60	7.60		8.06	8.06	7.81			
Õiglane, Janek (EST) (1994)	time			2.70	3.83	5.00	6.10	7.26	8.40	9.58	10.70	11.85	12.98		14.51	6 / 2						
	reaction time	0.143			1.13	1.17	1.10	1.16	1.14	1.18	1.12	1.15	1.13	1.53			3.40	3.48	3.40			
	interval		velocity	5.08	8.09	7.81	8.31	7.88	8.02	7.75	8.16	7.95	8.09	9.16	7.58		8.06	7.88	8.06			
Tilga, Karel (EST) (1998)	time			2.73	3.88	5.04	6.21	7.32	8.50	9.65	10.83	12.01	13.21		14.68	8 / 3						
	reaction time	0.166		7 steps	1.15	1.16	1.17	1.11	1.18	1.15	1.18	1.18	1.20	1.47			3.48	3.44	3.56			
	interval		velocity	5.03	7.95	7.88	7.81	8.23	7.75	7.95	7.75	7.75	7.62	9.54	7.49		7.88	7.97	7.70			



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=sqmNcG6EqNM>

Maruyama, Yuma

Source: Matsubayashi, T. (2023). Performance analysis of decathlon athletes in the 2023 season. Bulletin of Studies in Athletics of JAAF, 19, p 161. (in Japanese)

<https://www.jaaf.or.jp/pdf/about/publish/2023/4-13.pdf>

Video: <https://www.youtube.com/watch?v=sqmNcG6EqNM>

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

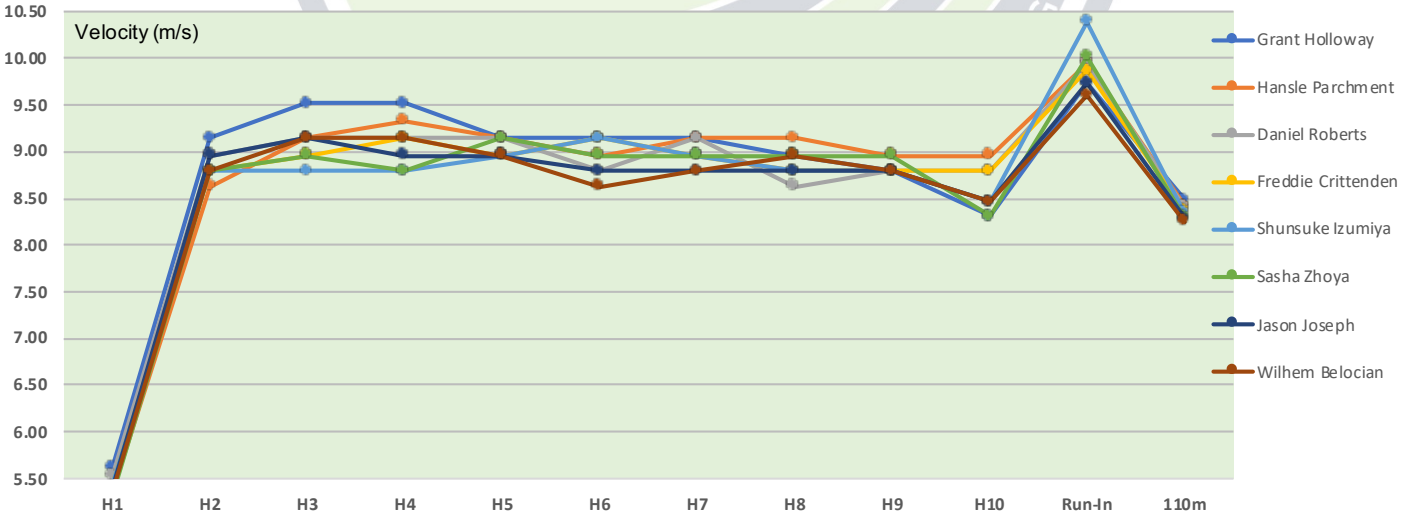
110m Hurdles

Date: 2023.08.21

Wind: 0.0 m/s

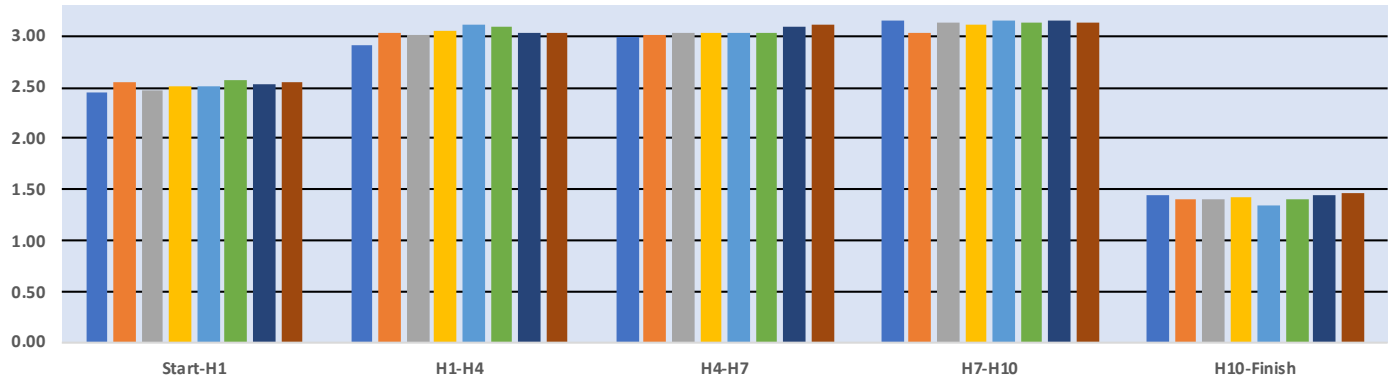
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Holloway, Grant (USA) (1997)	time		2.44	3.44	4.40	5.36	6.36	7.36	8.36	9.38	10.42	11.52		12.96	5 / 1			
	reaction time	0.135														2.92	3.00	3.16
	interval		7 steps	1.00	0.96	0.96	1.00	1.00	1.00	1.02	1.04	1.10	1.44			9.39	9.14	8.68
Parchment, Hansle (JAM) (1990)	time		2.56	3.62	4.62	5.60	6.60	7.62	8.62	9.62	10.64	11.66		13.07	8 / 2			
	reaction time	0.169														3.04	3.02	3.04
	interval		7 steps	1.06	1.00	0.98	1.00	1.02	1.00	1.00	1.02	1.02	1.41			9.02	9.08	9.02
Roberts, Daniel (USA) (1998)	time		2.48	3.50	4.50	5.50	6.50	7.54	8.54	9.60	10.64	11.68		13.09	3 / 3			
	reaction time	0.143														3.02	3.04	3.14
	interval			1.02	1.00	1.00	1.00	1.04	1.00	1.06	1.04	1.04	1.41			9.08	9.02	8.73
Crittenden, Freddie (USA) (1994)	time		2.52	3.56	4.58	5.58	6.60	7.60	8.62	9.66	10.70	11.74		13.16	4 / 4			
	reaction time	0.140														3.06	3.04	3.12
	interval			1.04	1.02	1.00	1.02	1.00	1.02	1.04	1.04	1.04	1.42			8.96	9.02	8.79
Izumiya, Shunsuke (JPN) (2000)	time		2.52	3.56	4.60	5.64	6.66	7.66	8.68	9.72	10.76	11.84		13.19	6 / 5			
	reaction time	0.143														3.12	3.04	3.16
	interval		7 steps	1.04	1.04	1.04	1.02	1.00	1.02	1.04	1.04	1.08	1.35			8.79	9.02	8.68
Zhoya, Sasha (FRA) (2002)	time		2.58	3.62	4.64	5.68	6.68	7.70	8.72	9.74	10.76	11.86		13.26	7 / 6			
	reaction time	0.166														3.10	3.04	3.14
	interval		7 steps	1.04	1.02	1.04	1.00	1.02	1.02	1.02	1.02	1.10	1.40			8.85	9.02	8.73
Joseph, Jason (SUI) (1998)	time		2.54	3.56	4.56	5.58	6.60	7.64	8.68	9.72	10.76	11.84		13.28	9 / 7			
	reaction time	0.143														3.04	3.10	3.16
	interval		7 steps	1.02	1.00	1.02	1.02	1.04	1.04	1.04	1.04	1.08	1.44			9.02	8.85	8.68
Belocian, Wilhem (FRA) (1995)	time		2.56	3.60	4.60	5.60	6.62	7.68	8.72	9.74	10.78	11.86		13.32	2 / 8			
	reaction time	0.158														3.04	3.12	3.14
	interval			1.04	1.00	1.00	1.02	1.06	1.04	1.02	1.04	1.08	1.46			9.02	8.79	8.73
	velocity		5.62	9.14	9.52	9.52	9.14	9.14	9.14	8.96	8.79	8.31	9.74	8.49				



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=ReedOS8lbY4>

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

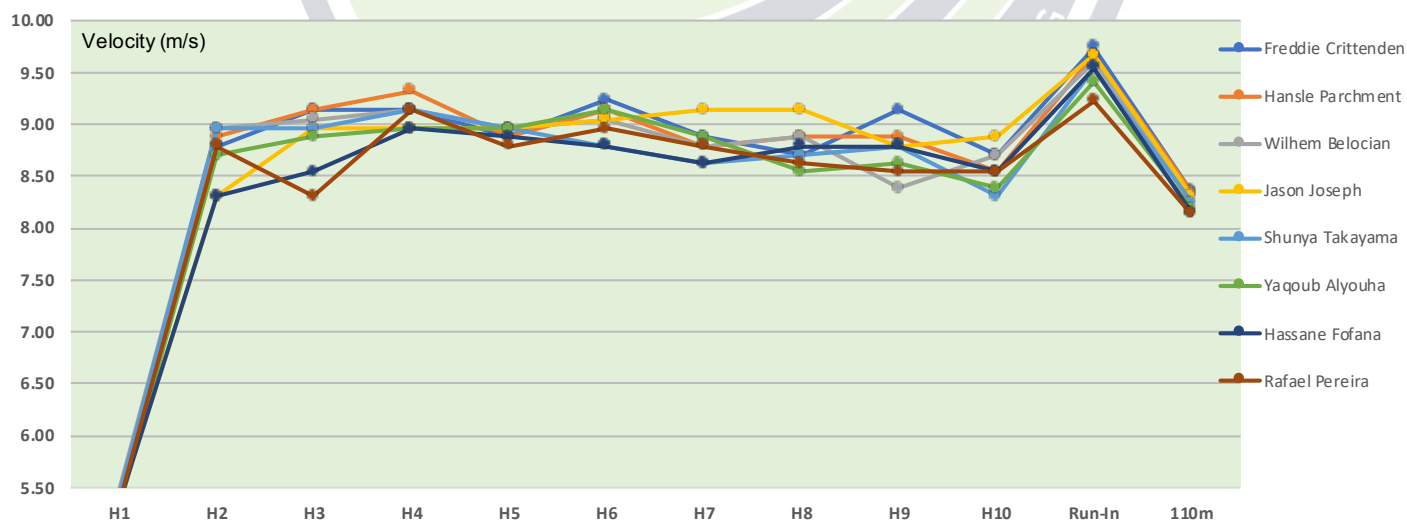
110m Hurdles

Date: 2023.08.21

Wind: -0.1 m/s

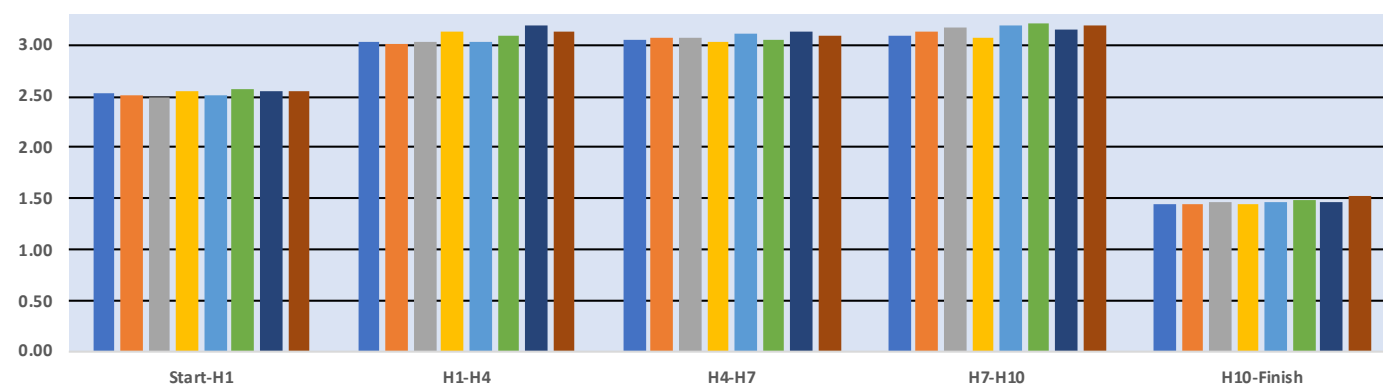
Semi-Final 3

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Crittenden, Freddie (USA) (1994)	time	2.54	3.58	4.58	5.58	6.61	7.60	8.63	9.68	10.68	11.73		13.17	6 / 1			
	reaction time	0.156													3.04	3.05	3.10
	interval		1.04	1.00	1.00	1.03	0.99	1.03	1.05	1.00	1.05	1.44			9.02	8.99	8.85
Parchment, Hansle (JAM) (1990)	time	2.52	3.55	4.55	5.53	6.56	7.56	8.60	9.63	10.66	11.73		13.18	5 / 2			
	reaction time	0.138													3.01	3.07	3.13
	interval		1.03	1.00	0.98	1.03	1.00	1.04	1.03	1.03	1.07	1.45			9.11	8.93	8.76
Belocian, Wilhem (FRA) (1995)	time	2.50	3.52	4.53	5.53	6.55	7.56	8.60	9.63	10.72	11.77		13.23	4 / 3			
	reaction time	0.140													3.03	3.07	3.17
	interval		1.02	1.01	1.00	1.02	1.01	1.04	1.03	1.09	1.05	1.46			9.05	8.93	8.65
Joseph, Jason (SUI) (1998)	time	2.56	3.66	4.68	5.70	6.72	7.73	8.73	9.73	10.77	11.80		13.25	8 / 4			
	reaction time	0.163													3.14	3.03	3.07
	interval		1.10	1.02	1.02	1.02	1.01	1.00	1.00	1.04	1.03	1.45			8.73	9.05	8.93
Takayama, Shunya (JPN) (1994)	time	2.52	3.54	4.56	5.56	6.58	7.62	8.68	9.73	10.77	11.87		13.34	7 / 5			
	reaction time	0.135													3.04	3.12	3.19
	interval		1.02	1.02	1.00	1.02	1.04	1.06	1.05	1.04	1.10	1.47			9.02	8.79	8.60
Alyouha, Yaqoub (KUW) (1993)	time	2.58	3.63	4.66	5.68	6.70	7.70	8.73	9.80	10.86	11.95		13.44	2 / 6			
	reaction time	0.157													3.10	3.05	3.22
	interval		1.05	1.03	1.03	1.02	1.00	1.03	1.07	1.06	1.09	1.49			8.85	8.99	8.52
Fofana, Hassane (ITA) (1992)	time	2.56	3.66	4.73	5.75	6.78	7.82	8.88	9.92	10.96	12.03		13.50	9 / 7			
	reaction time	0.147													3.19	3.13	3.15
	interval		1.10	1.07	1.02	1.03	1.04	1.06	1.04	1.04	1.07	1.47			8.60	8.76	8.70
Pereira, Rafael (BRA) (1997)	time	2.56	3.60	4.70	5.70	6.74	7.76	8.80	9.86	10.93	12.00		13.52	3 / 8			
	reaction time	0.160													3.14	3.10	3.20
	interval		1.04	1.10	1.00	1.04	1.02	1.04	1.06	1.07	1.07	1.52			8.73	8.85	8.57
	velocity	5.40	8.79	9.14	9.14	8.87	9.23	8.87	8.70	9.14	8.70	9.74	8.35				
	velocity	5.44	8.96	8.96	9.14	8.96	8.79	8.62	8.70	8.79	8.31	9.54	8.25				
	velocity	5.36	8.31	8.54	8.96	8.87	8.79	8.62	8.79	8.79	8.54	9.54	8.15				
	velocity	5.32	8.70	8.87	8.96	8.96	9.14	8.87	8.54	8.62	8.39	9.41	8.18				
	velocity	5.36	8.31	8.54	8.96	8.87	8.79	8.62	8.79	8.79	8.54	9.54	8.15				
	velocity	5.36	8.79	8.31	9.14	8.79	8.96	8.79	8.62	8.54	8.54	9.22	8.14				



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=JAak2zqOPzA>

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

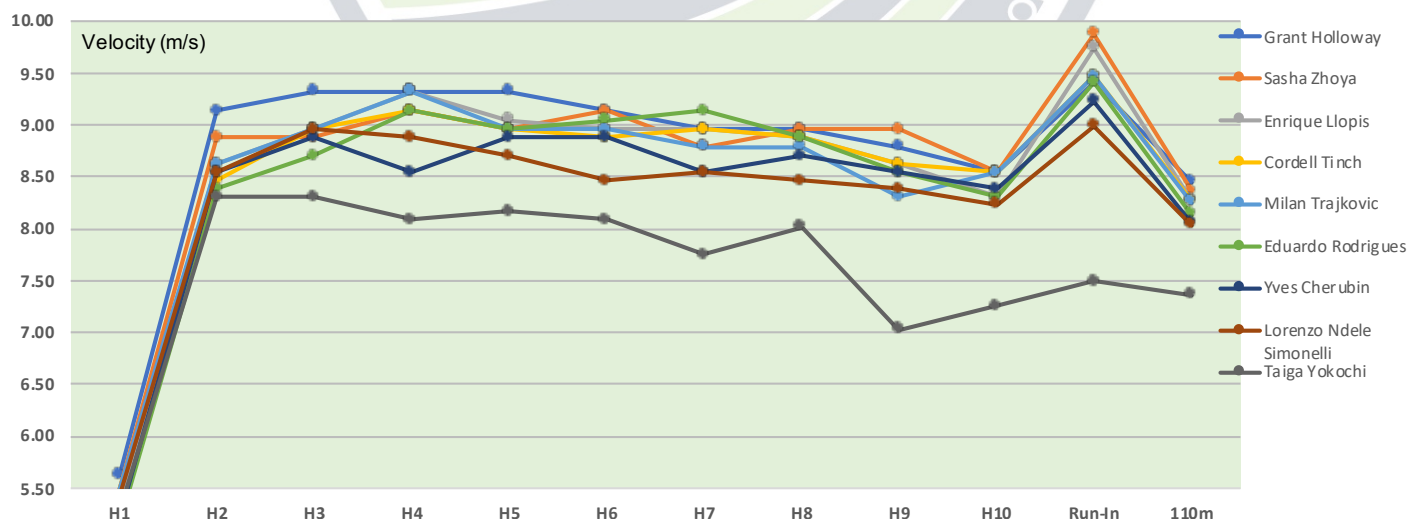
110m Hurdles

Date: 2023.08.21

Wind: -0.2 m/s

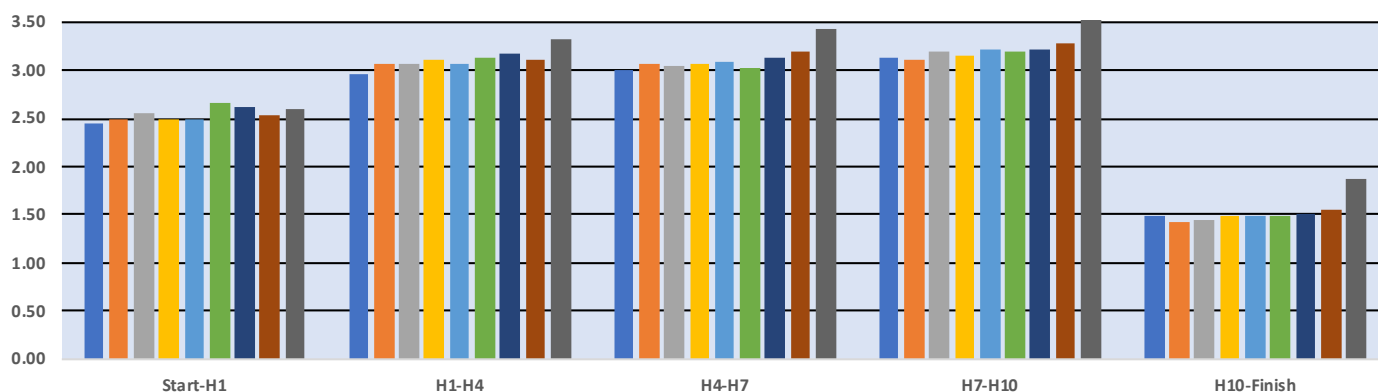
Semi-Final 2

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Holloway, Grant (USA) (1997)	time		2.44	3.44	4.42	5.40	6.38	7.38	8.40	9.42	10.46	11.53		13.02	5 / 1			
	reaction time	0.137											1.49			2.96	3.00	3.13
	interval velocity		7 steps	1.00	0.98	0.98	0.98	1.00	1.02	1.02	1.04	1.07	1.49	8.45		9.26	9.14	8.76
Zhoya, Sasha (FRA) (2002)	time		2.50	3.53	4.56	5.56	6.58	7.58	8.62	9.64	10.66	11.73		13.15	7 / 2			
	reaction time	0.129											1.42			3.06	3.06	3.11
	interval velocity		7 steps	1.03	1.03	1.00	1.02	1.00	1.04	1.02	1.02	1.07	1.42	13.15		8.96	8.96	8.82
Llopi, Enrique (ESP) (2000)	time		2.56	3.62	4.64	5.62	6.63	7.65	8.67	9.70	10.76	11.86		13.30	6 / 3			
	reaction time	0.146											1.44			3.06	3.05	3.19
	interval velocity		7 steps	1.06	1.02	0.98	1.01	1.02	1.03	1.06	1.10	1.10	1.44	13.30		8.96	8.99	8.60
Tinch, Cordell (USA) (2000)	time		2.50	3.58	4.60	5.60	6.62	7.65	8.67	9.70	10.76	11.83		13.31	3 / 4			
	reaction time	0.168											1.48			3.10	3.07	3.16
	interval velocity		7 steps	1.08	1.02	1.00	1.02	1.03	1.02	1.03	1.06	1.07	1.48	13.31		8.85	8.93	8.68
Trajkovic, Milan (CYP) (1992)	time		2.50	3.56	4.58	5.56	6.58	7.60	8.64	9.68	10.78	11.85		13.33	4 / 5			
	reaction time	0.137											1.48			3.06	3.08	3.21
	interval velocity		7 steps	1.06	1.02	0.98	1.02	1.02	1.04	1.04	1.10	1.07	1.48	13.33		8.96	8.90	8.54
Rodrigues, Eduardo (BRA) (1995)	time		2.66	3.75	4.80	5.80	6.82	7.83	8.83	9.86	10.93	12.03		13.52	8 / 6			
	reaction time	0.142											1.49			3.14	3.03	3.20
	interval velocity		7 steps	1.09	1.05	1.00	1.02	1.01	1.00	1.03	1.07	1.10	1.49	13.52		8.73	9.05	8.57
Cherubin, Yves (HAI) (1999)	time		2.63	3.70	4.73	5.80	6.83	7.86	8.93	9.98	11.05	12.14		13.66	9 / 7			
	reaction time	0.178											1.52			3.17	3.13	3.21
	interval velocity		7 steps	1.07	1.03	1.07	1.03	1.03	1.07	1.05	1.07	1.09	1.52	13.66		8.65	8.76	8.54
Simonelli, Lorenzo Ndele (ITA) (2002)	time		2.53	3.60	4.62	5.65	6.70	7.78	8.85	9.93	11.02	12.13		13.69	2 / 8			
	reaction time	0.151											1.56			3.12	3.20	3.28
	interval velocity		7 steps	1.07	1.02	1.03	1.05	1.08	1.07	1.08	1.09	1.11	1.56	13.69		8.79	8.57	8.36
Yokochi, Taiga (JPN) (2000)	time		2.60	3.70	4.80	5.93	7.05	8.18	9.36	10.50	11.80	13.06		14.93	1 / 9			
	reaction time	0.173											1.87			3.33	3.43	3.70
	interval velocity		7 steps	1.10	1.10	1.13	1.12	1.13	1.18	1.14	1.30	1.26	1.87	14.93		8.23	7.99	7.41



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=JAqk2zqOPzA>

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

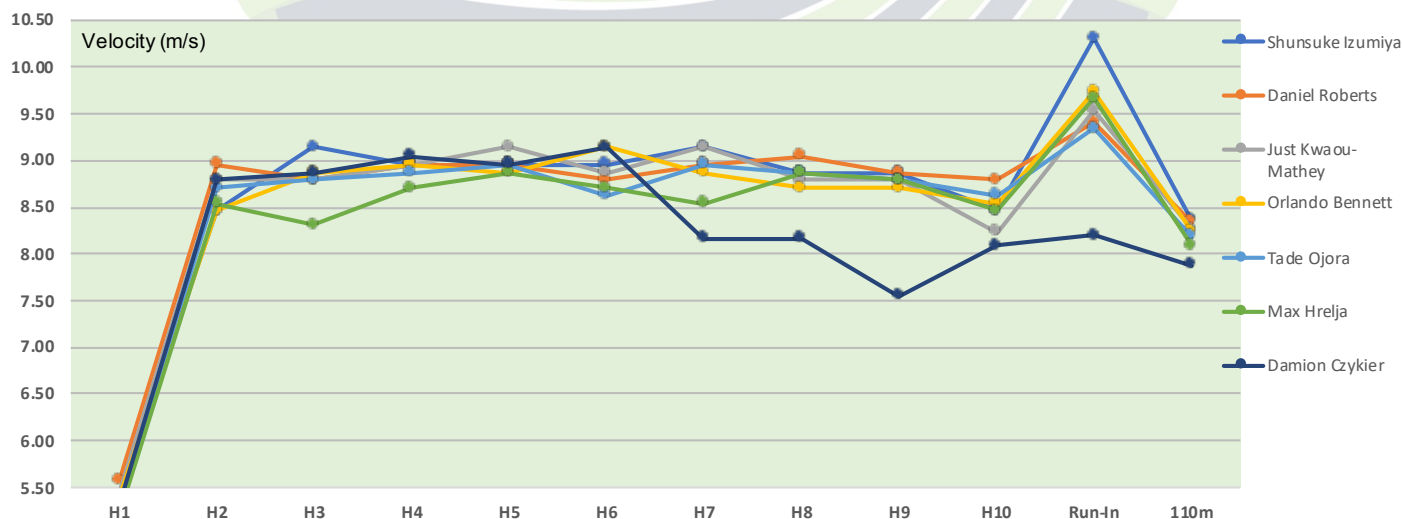
110m Hurdles

Date: 2023.08.21

Wind: -0.2 m/s

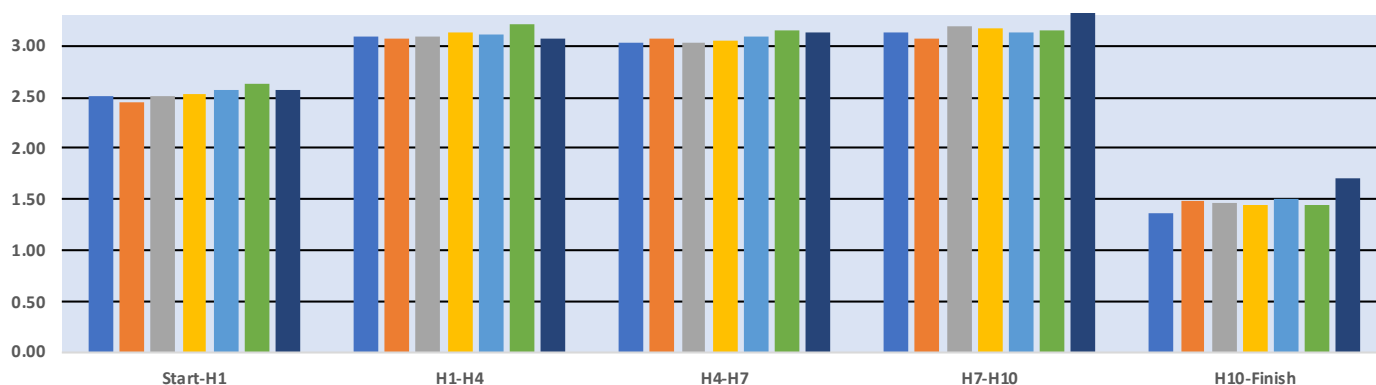
Semi-Final 1

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Izumiya, Shunsuke (JPN) (2000)	time	2.52	3.60	4.60	5.62	6.64	7.66	8.66	9.69	10.72	11.80		13.16	6 / 1			
	reaction time	0.129													3.10	3.04	3.14
	interval		7 steps	1.08	1.00	1.02	1.02	1.00	1.03	1.03	1.08	1.36			8.85	9.02	8.73
	velocity	5.44	8.46	9.14	8.96	8.96	8.96	9.14	8.87	8.87	8.46	10.31	8.36				
Roberts, Daniel (USA) (1998)	time	2.46	3.48	4.52	5.54	6.56	7.60	8.62	9.63	10.66	11.70		13.19	5 / 2			
	reaction time	0.144										1.49			3.08	3.08	3.08
	interval		7 steps	1.02	1.04	1.02	1.02	1.04	1.02	1.01	1.03	1.04			8.90	8.90	8.90
	velocity	5.58	8.96	8.79	8.96	8.96	8.79	8.96	9.05	8.87	8.79	9.41	8.34				
Kwaou-Mathey, Just (FRA) (1999)	time	2.52	3.56	4.60	5.62	6.62	7.65	8.65	9.69	10.73	11.84		13.31	2 / 3			
	reaction time	0.165													3.10	3.03	3.19
	interval		7 steps	1.04	1.04	1.02	1.00	1.03	1.00	1.04	1.11	1.47			8.85	9.05	8.60
	velocity	5.44	8.79	8.79	8.96	9.14	8.87	9.14	8.79	8.79	8.23	9.54	8.26				
Bennett, Orlando (JAM) (1999)	time	2.54	3.62	4.65	5.67	6.70	7.70	8.73	9.78	10.83	11.90		13.34	9 / 4			
	reaction time	0.144										1.44			3.13	3.06	3.17
	interval		7 steps	1.08	1.03	1.02	1.03	1.00	1.03	1.05	1.07	1.44			8.76	8.96	8.65
	velocity	5.40	8.46	8.87	8.96	8.87	9.14	8.87	8.70	8.70	8.54	9.74	8.25				
Ojora, Tade (GBR) (1999)	time	2.58	3.63	4.67	5.70	6.72	7.78	8.80	9.83	10.87	11.93		13.43	7 / 5			
	reaction time	0.144										1.50			3.12	3.10	3.13
	interval		7 steps	1.05	1.04	1.03	1.02	1.06	1.02	1.03	1.04	1.06			8.79	8.85	8.76
	velocity	5.32	8.70	8.79	8.87	8.96	8.62	8.96	8.87	8.79	8.62	9.35	8.19				
Hrelja, Max (SWE) (1998)	time	2.63	3.70	4.80	5.85	6.88	7.93	9.00	10.03	11.07	12.15		13.60	8 / 6			
	reaction time	0.162													3.22	3.15	3.15
	interval		7 steps	1.07	1.10	1.05	1.03	1.07	1.03	1.04	1.08	1.45			8.52	8.70	8.70
	velocity	5.22	8.54	8.31	8.70	8.87	8.70	8.54	8.87	8.79	8.46	9.67	8.09				
Czykier, Damian (POL) (1992)	time	2.58	3.62	4.65	5.66	6.68	7.68	8.80	9.92	11.13	12.26		13.97	3 / 7			
	reaction time	0.162										1.71			3.08	3.14	3.46
	interval		7 steps	1.04	1.03	1.01	1.02	1.00	1.12	1.12	1.21	1.13			8.90	8.73	7.92
	velocity	5.32	8.79	8.87	9.05	8.96	9.14	8.16	8.16	7.55	8.09	8.20	7.87				



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=JAqk2zqOPzA>

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

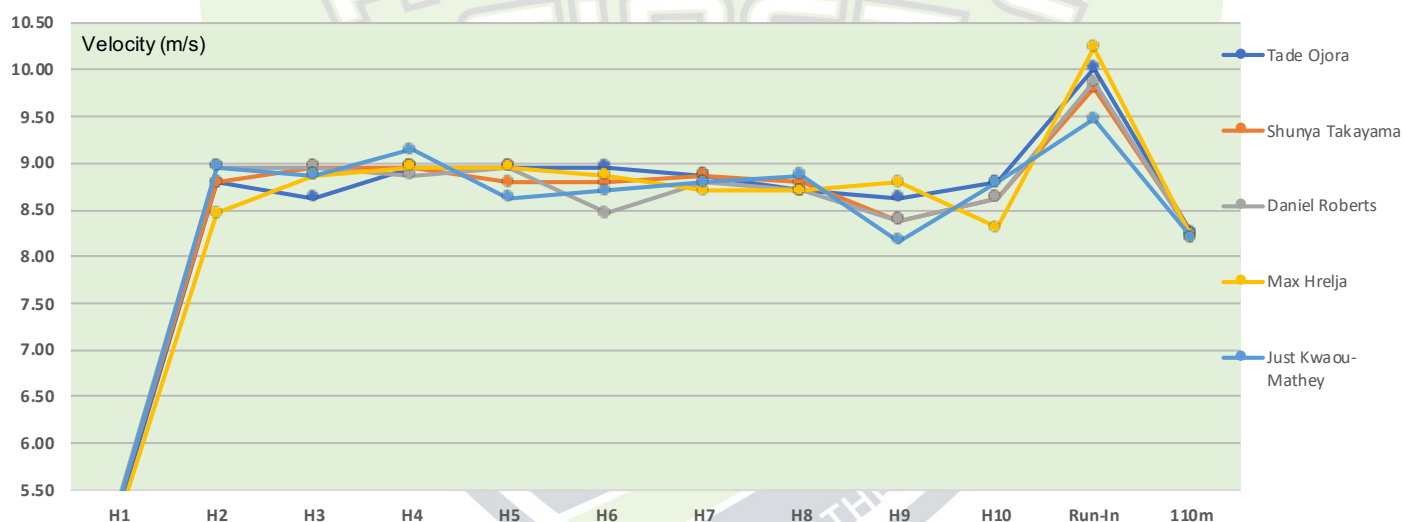
110m Hurdles

Date: 2023.08.20

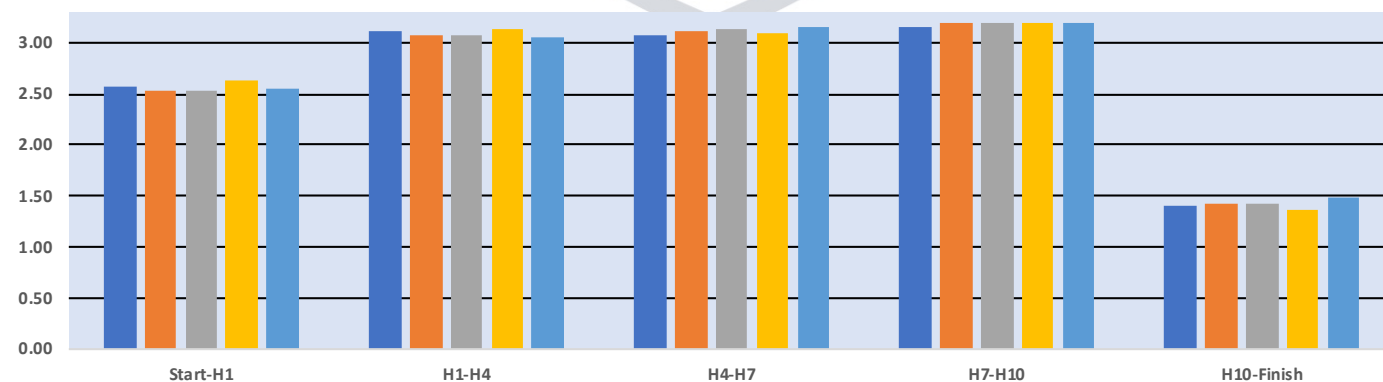
Wind: -0.9 m/s

Heat 5

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Ojora, Tade (GBR) (1999)	time		2.58	3.62	4.68	5.70	6.72	7.74	8.77	9.82	10.88	11.92		13.32	2 / 1			
	reaction time	0.148														3.12	3.07	3.15
	interval		7 steps	1.04	1.06	1.02	1.02	1.02	1.03	1.05	1.06	1.04	1.40			8.79	8.93	8.70
Takayama, Shunya (JPN) (1994)	time		2.54	3.58	4.60	5.62	6.66	7.70	8.73	9.77	10.86	11.92		13.35	9 / 2			
	reaction time	0.146														3.08	3.11	3.19
	interval			1.04	1.02	1.02	1.04	1.04	1.03	1.04	1.09	1.06	1.43			8.90	8.82	8.60
Roberts, Daniel (USA) (1998)	time		2.53	3.55	4.57	5.60	6.62	7.70	8.74	9.79	10.88	11.94		13.36	5 / 3			
	reaction time	0.155														3.07	3.14	3.20
	interval			1.02	1.02	1.03	1.02	1.08	1.04	1.05	1.09	1.06	1.42			8.93	8.73	8.57
Hrelja, Max (SWE) (1998)	time		2.63	3.71	4.74	5.76	6.78	7.81	8.86	9.91	10.95	12.05		13.42	7 / 4			
	reaction time	0.138														3.13	3.10	3.19
	interval		7 steps	1.08	1.03	1.02	1.02	1.03	1.05	1.05	1.04	1.10	1.37	PB		8.76	8.85	8.60
Kwaou-Mathey, Just (FRA) (1999)	time		2.55	3.57	4.60	5.60	6.66	7.71	8.75	9.78	10.90	11.94		13.42	3 / 5			
	reaction time	0.160														3.05	3.15	3.19
	interval		7 steps	1.02	1.03	1.00	1.06	1.05	1.04	1.03	1.12	1.04	1.48			8.99	8.70	8.60
	velocity		5.32	8.79	8.62	8.96	8.96	8.96	8.87	8.70	8.62	8.79	10.01	8.26				
			5.22	8.46	8.87	8.96	8.96	8.87	8.70	8.70	8.79	8.31	10.23	8.20				
			5.38	8.96	8.87	9.14	8.62	8.70	8.79	8.87	8.16	8.79	9.47	8.20				



Time Intervals (s)



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=W4r-yvIQ5wI&t=72s>

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

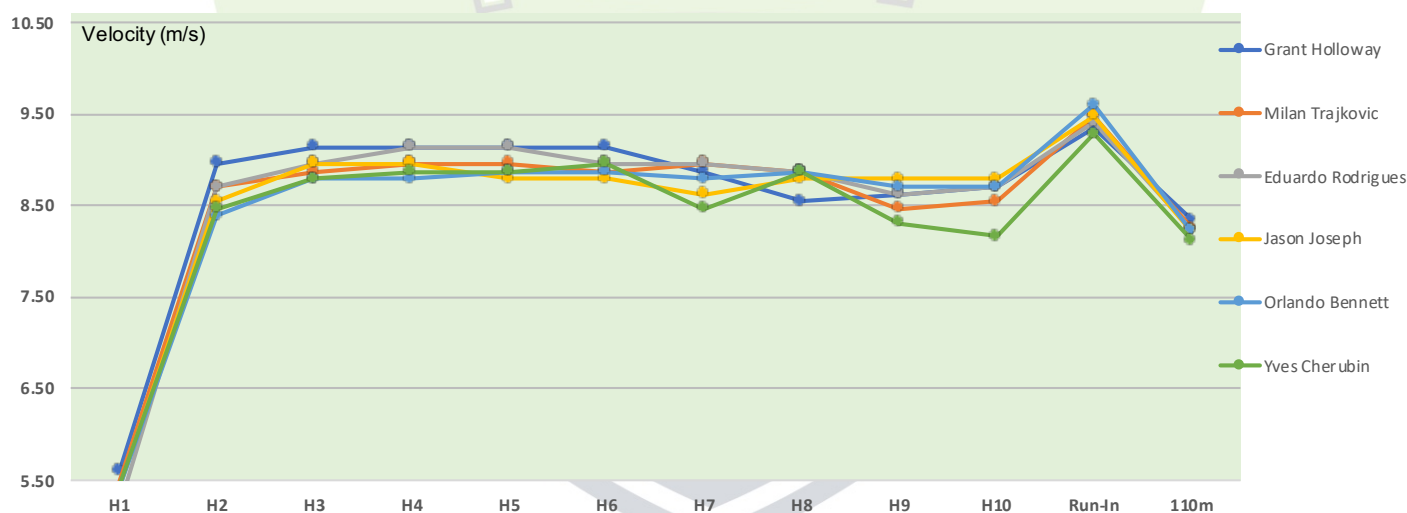
110m Hurdles

Date: 2023.08.20

Wind: -0.6 m/s

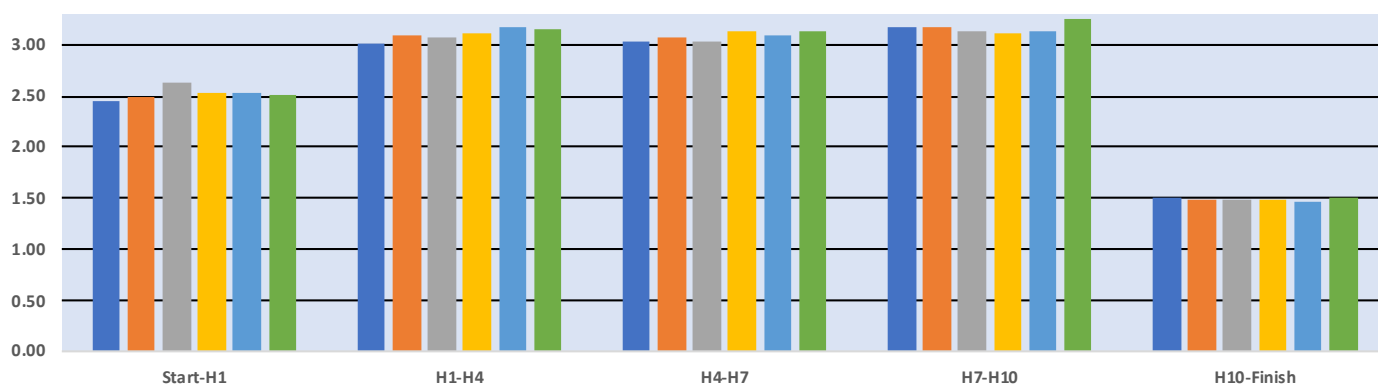
Heat 4

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Holloway, Grant (USA) (1997)	time	2.45	3.47	4.47	5.47	6.47	7.47	8.50	9.57	10.63	11.68		13.18	5 / 1			
	reaction time	0.153													3.02	3.03	3.18
	interval	7 steps	1.02	1.00	1.00	1.00	1.00	1.03	1.07	1.06	1.05	1.50			9.08	9.05	8.62
Trajkovic, Milan (CYP) (1992)	time	2.50	3.55	4.58	5.60	6.62	7.65	8.67	9.70	10.78	11.85		13.33	4 / 2			
	reaction time	0.164													3.10	3.07	3.18
	interval	7 steps	1.05	1.03	1.02	1.02	1.03	1.02	1.03	1.08	1.07	1.48			8.85	8.93	8.62
Rodrigues, Eduardo (BRA) (1995)	time	2.63	3.68	4.70	5.70	6.70	7.72	8.74	9.77	10.83	11.88		13.37	1 / 3			
	reaction time	0.150													3.07	3.04	3.14
	interval	7 steps	1.05	1.02	1.00	1.00	1.02	1.02	1.03	1.06	1.05	1.49			8.93	9.02	8.73
Joseph, Jason (SUI) (1998)	time	2.53	3.60	4.62	5.64	6.68	7.72	8.78	9.82	10.86	11.90		13.38	2 / 4			
	reaction time	0.159													3.11	3.14	3.12
	interval	7 steps	1.07	1.02	1.02	1.04	1.04	1.06	1.04	1.04	1.04	1.48			8.82	8.73	8.79
Bennett, Orlando (JAM) (1999)	time	2.53	3.62	4.66	5.70	6.73	7.76	8.80	9.83	10.88	11.93		13.39	9 / 5			
	reaction time	0.140													3.17	3.10	3.13
	interval	7 steps	1.09	1.04	1.04	1.03	1.03	1.04	1.03	1.05	1.05	1.46			8.65	8.85	8.76
Cherubin, Yves (HAI) (1999)	time	2.52	3.60	4.64	5.67	6.70	7.72	8.80	9.83	10.93	12.05		13.56	6 / 6			
	reaction time	0.180													3.15	3.13	3.25
	interval	7 steps	1.08	1.04	1.03	1.03	1.02	1.08	1.03	1.10	1.12	1.51	PB		8.70	8.76	8.44
	velocity	5.60	8.96	9.14	9.14	9.14	9.14	8.87	8.54	8.62	8.70	9.35	8.35				
	velocity	5.49	8.70	8.87	8.96	8.96	8.87	8.96	8.87	8.46	8.54	9.47	8.25				
	velocity	5.22	8.70	8.96	9.14	9.14	8.96	8.96	8.87	8.62	8.70	9.41	8.23				
	velocity	5.42	8.54	8.96	8.96	8.79	8.79	8.62	8.79	8.79	8.79	9.47	8.22				
	velocity	5.42	8.39	8.79	8.79	8.87	8.87	8.79	8.87	8.70	8.70	9.60	8.22				
	velocity	5.44	8.46	8.79	8.87	8.87	8.96	8.46	8.87	8.31	8.16	9.28	8.11				



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=W4r-vvIQ5wI&t=72s>

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

110m Hurdles

Date: 2023.08.20

Wind: 0.0 m/s

Heat 3

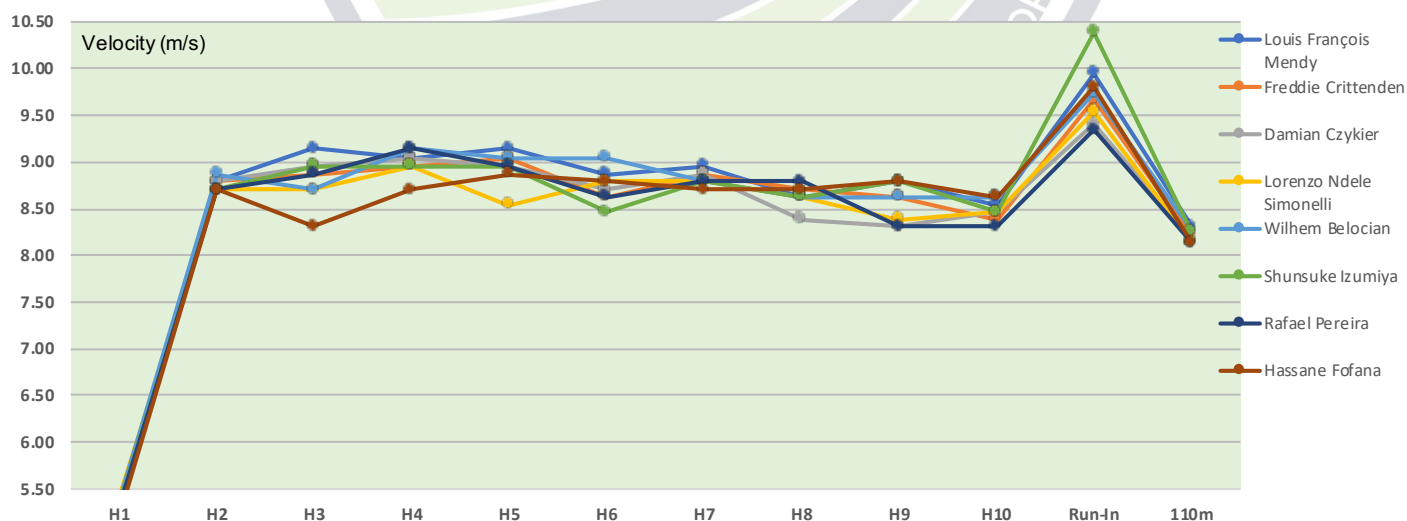
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Mendy, Louis François (SEN) (1999)	time	2.56	3.60	4.60	5.61	6.61	7.64	8.66	9.72	10.76	11.83		13.24	6 / 1			
	reaction time	0.176													3.05	3.05	3.17
	interval velocity		1.04	1.00	1.01	1.00	1.03	1.02	1.06	1.04	1.07	1.41			8.99	8.99	8.65
Crittenden, Freddie (USA) (1994)	time	2.56	3.60	4.63	5.65	6.66	7.72	8.75	9.80	10.86	11.95		13.40	3 / 2			
	reaction time	0.148													3.09	3.10	3.20
	interval velocity		1.04	1.03	1.02	1.01	1.06	1.03	1.05	1.06	1.09	1.45			8.87	8.85	8.57
Czykier, Damian (POL) (1992)	time	2.56	3.60	4.62	5.63	6.65	7.70	8.73	9.82	10.92	12.00		13.49	7 / 3			
	reaction time	0.152													3.07	3.10	3.27
	interval velocity		1.04	1.02	1.01	1.02	1.05	1.03	1.09	1.10	1.08	1.49			8.93	8.85	8.39
Simonelli, Lorenzo Ndele (ITA) (2002)	time	2.53	3.58	4.63	5.65	6.72	7.76	8.80	9.86	10.95	12.03		13.50	4 / 4			
	reaction time	0.152													3.12	3.15	3.23
	interval velocity		1.05	1.05	1.02	1.07	1.04	1.04	1.06	1.09	1.08	1.47			8.79	8.70	8.49

Date: 2023.08.20

Wind: 0.5 m/s

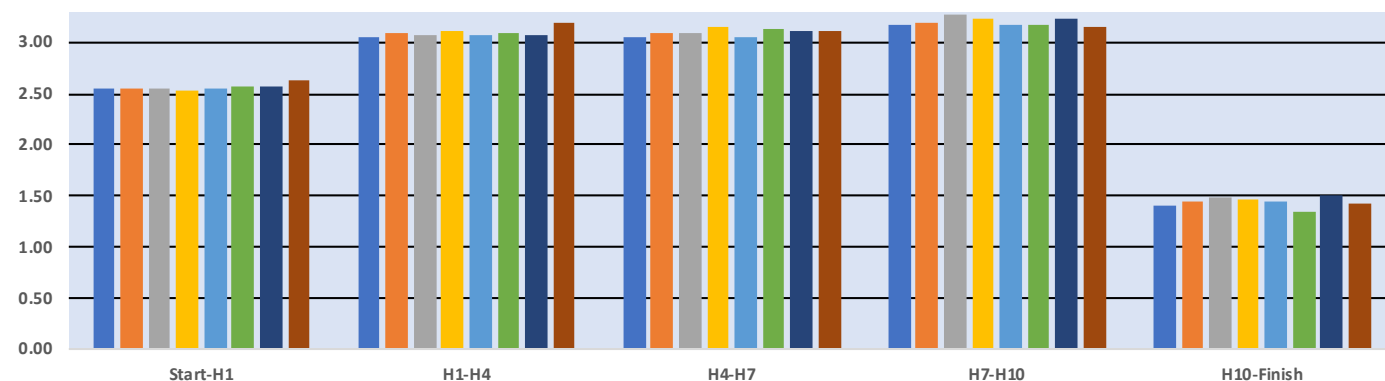
Heat 2

		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	2.55	3.58	4.63	5.63	6.64	7.65	8.69	9.75	10.81	11.87		13.31	9 / 1			
	reaction time	0.156													3.08	3.06	3.18
	interval velocity		1.03	1.05	1.00	1.01	1.01	1.04	1.06	1.06	1.06	1.44			8.90	8.96	8.62
Izumiya, Shunsuke (JPN) (2000)	time	2.57	3.62	4.64	5.66	6.68	7.76	8.80	9.86	10.90	11.98		13.33	6 / 2			
	reaction time	0.146													3.09	3.14	3.18
	interval velocity		1.05	1.02	1.02	1.02	1.08	1.04	1.06	1.04	1.08	1.35			8.87	8.73	8.62
Pereira, Rafael (BRA) (1997)	time	2.58	3.63	4.66	5.66	6.68	7.74	8.78	9.82	10.92	12.02		13.52	4 / 3			
	reaction time	0.146													3.08	3.12	3.24
	interval velocity		1.05	1.03	1.00	1.02	1.06	1.04	1.04	1.10	1.10	1.50			8.90	8.79	8.46
Fofana, Hassane (ITA) (1992)	time	2.63	3.68	4.78	5.83	6.86	7.90	8.95	10.00	11.04	12.10		13.53	5 / 4			
	reaction time	0.141													3.20	3.12	3.15
	interval velocity		1.05	1.10	1.05	1.03	1.04	1.05	1.05	1.04	1.06	1.43			8.57	8.79	8.70



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=W4r-yvIQ5wI&t=72s>

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

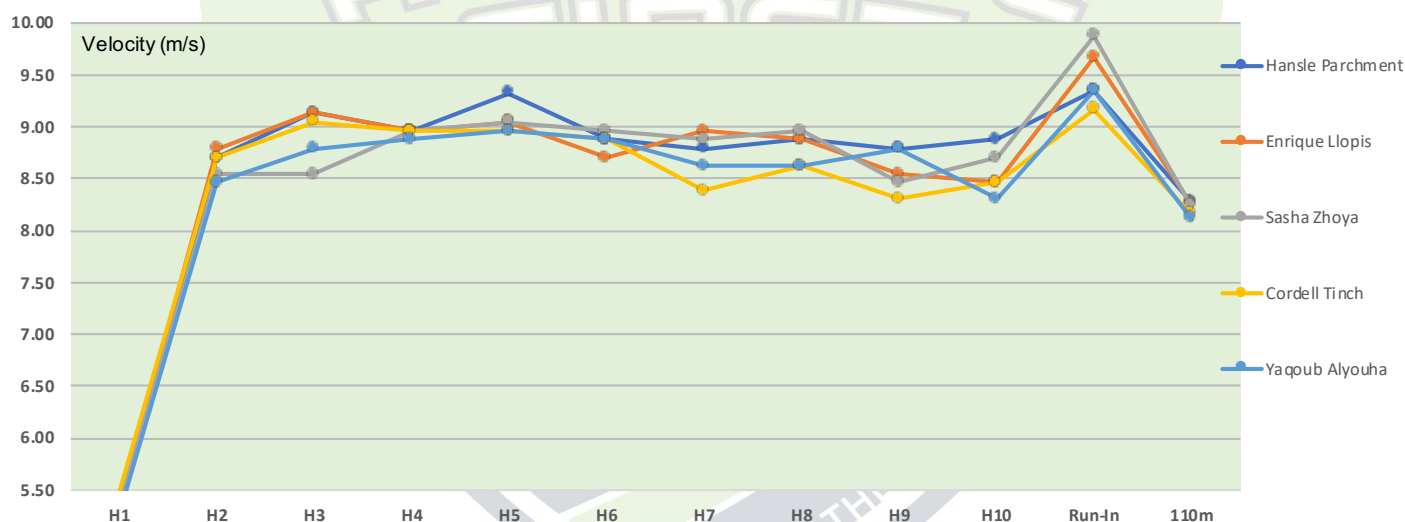
110m Hurdles

Date: 2023.08.20

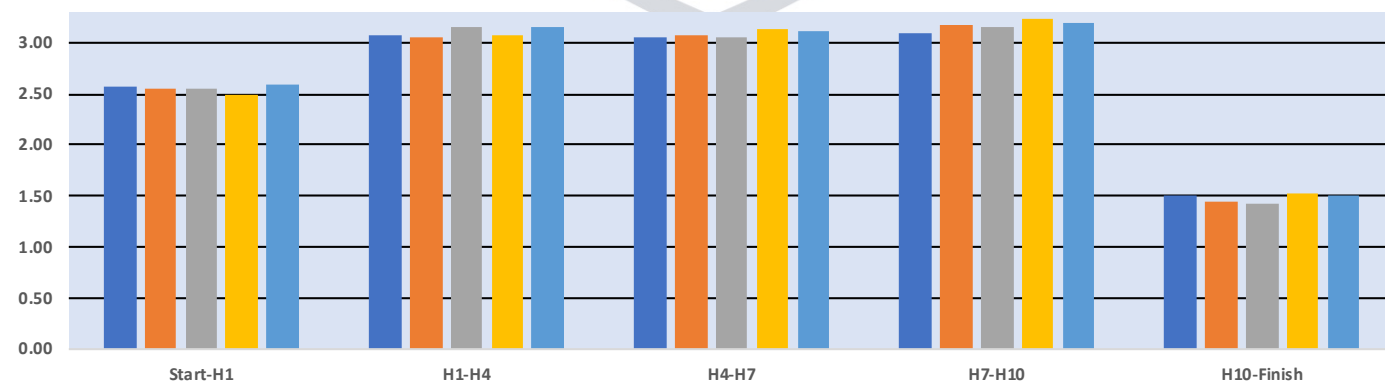
Wind: -0.3 m/s

Heat 1

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Parchment, Hansle (JAM) (1990)	time	2.58	3.63	4.63	5.65	6.63	7.66	8.70	9.73	10.77	11.80		13.30	3 / 1			
	reaction time	0.195													3.07	3.05	3.10
	interval	7 steps	1.05	1.00	1.02	0.98	1.03	1.04	1.03	1.04	1.03	1.50			8.93	8.99	8.85
Llopis, Enrique (ESP) (2000)	time	2.56	3.60	4.60	5.62	6.63	7.68	8.70	9.73	10.80	11.88		13.33	2 / 2			
	reaction time	0.136													3.06	3.08	3.18
	interval	7 steps	1.04	1.00	1.02	1.01	1.05	1.02	1.03	1.07	1.08	1.45			8.96	8.90	8.62
Zhoya, Sasha (FRA) (2002)	time	2.56	3.63	4.70	5.72	6.73	7.75	8.78	9.80	10.88	11.93		13.35	7 / 3			
	reaction time	0.157													3.16	3.06	3.15
	interval	7 steps	1.07	1.07	1.02	1.01	1.02	1.03	1.02	1.08	1.05	1.42			8.68	8.96	8.70
Tinch, Cordell (USA) (2000)	time	2.50	3.55	4.56	5.58	6.60	7.63	8.72	9.78	10.88	11.96		13.49	9 / 4			
	reaction time	0.170													3.08	3.14	3.24
	interval	7 steps	1.05	1.01	1.02	1.02	1.03	1.09	1.06	1.10	1.08	1.53			8.90	8.73	8.46
Alyouha, Yaqoub (KUW) (1993)	time	2.60	3.68	4.72	5.75	6.77	7.80	8.86	9.92	10.96	12.06		13.56	1 / 5			
	reaction time	0.140													3.15	3.11	3.20
	interval	7 steps	1.08	1.04	1.03	1.02	1.03	1.06	1.06	1.04	1.10	1.50			8.70	8.82	8.57
	velocity	5.32	8.70	9.14	8.96	9.33	8.87	8.79	8.87	8.79	8.87	9.35	8.27				
		5.36	8.79	9.14	8.96	9.05	8.70	8.96	8.87	8.54	8.46	9.67	8.25				
		5.36	8.54	8.54	8.96	9.05	8.96	8.87	8.96	8.46	8.70	9.87	8.24				
		5.49	8.70	9.05	8.96	8.96	8.87	8.39	8.62	8.31	8.46	9.16	8.15				
		5.28	8.46	8.79	8.87	8.96	8.87	8.62	8.62	8.79	8.31	9.35	8.11				



Time Intervals (s)



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=W4r-yvIQ5wI&t=72s>

2023 French National Championships (Albi, FRA) (TV Analysis)

110m Hurdles

Date: 2023.07.29

Wind: 2.3 m/s

FINAL

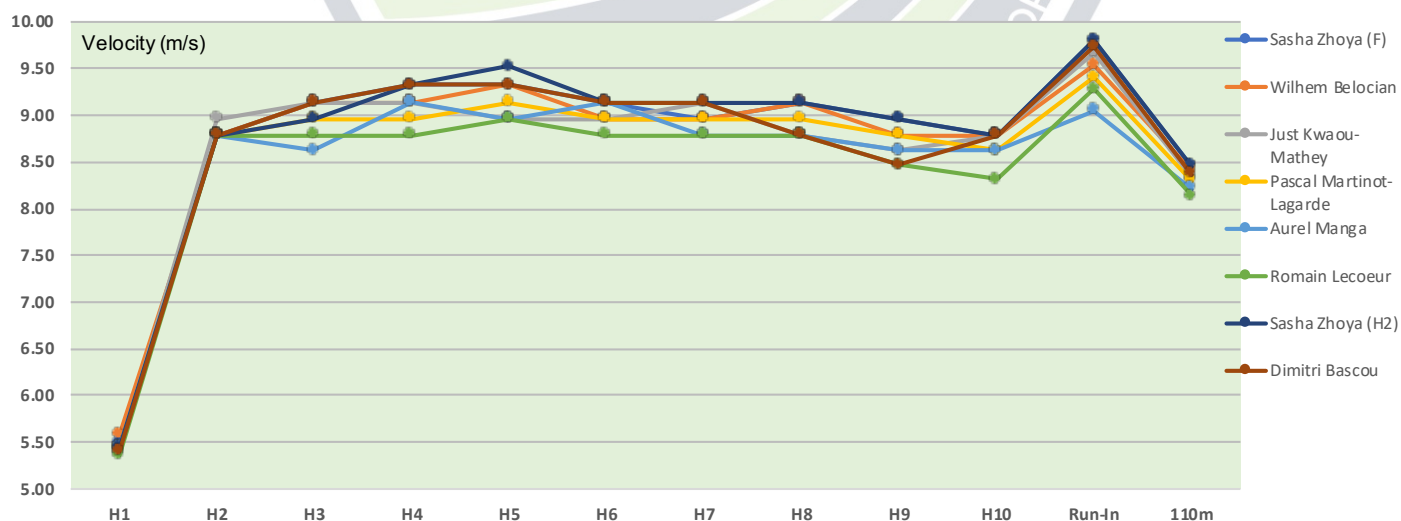
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Zhoya, Sasha (FRA) (2002)	time		2.50	3.54	4.54	5.52	6.50	7.50	8.52	9.52	10.54	11.58		13.01	6 / 1			
	reaction time	0.187											1.43			3.02	3.00	3.06
	interval		7 steps	1.04	1.00	0.98	0.98	1.00	1.02	1.00	1.02	1.04	1.43			9.08	9.14	8.96
Belocian, Wilhem (FRA) (1995)	time		2.46	3.50	4.50	5.50	6.48	7.50	8.52	9.52	10.56	11.60		13.07	5 / 2			
	reaction time	0.168											1.47			3.04	3.02	3.08
	interval		7 steps	1.04	1.00	1.00	0.98	1.02	1.02	1.00	1.04	1.04	1.47			9.02	9.08	8.90
Kwaou-Mathey, Just (FRA) (1999)	time		2.54	3.56	4.56	5.56	6.58	7.60	8.60	9.64	10.70	11.74		13.19	3 / 3			
	reaction time	0.206											1.45			3.02	3.04	3.14
	interval		7 steps	1.02	1.00	1.00	1.02	1.02	1.00	1.04	1.06	1.04	1.45			9.08	9.02	8.73
Martinot-Lagarde, Pascal (FRA) (1991)	time		2.52	3.56	4.58	5.60	6.60	7.62	8.64	9.66	10.70	11.76		13.25	2 / 4			
	reaction time	0.180											1.49			3.08	3.04	3.12
	interval		7 steps	1.04	1.02	1.02	1.00	1.02	1.02	1.02	1.04	1.06	1.49			8.90	9.02	8.79
Manga, Aurel (FRA) (1992)	time		2.52	3.56	4.62	5.62	6.64	7.64	8.68	9.72	10.78	11.84		13.39	7 / 5			
	reaction time	0.166											1.55			3.10	3.06	3.16
	interval		7 steps	1.04	1.06	1.00	1.02	1.00	1.04	1.04	1.06	1.06	1.55			8.85	8.96	8.68
Lecoeur, Romain (FRA) (1997)	time		2.56	3.60	4.64	5.68	6.70	7.74	8.78	9.82	10.90	12.00		13.51	1 / 6			
	reaction time	0.203											1.51			3.12	3.10	3.22
	interval		7 steps	1.04	1.04	1.04	1.02	1.04	1.04	1.04	1.08	1.10	1.51			8.79	8.85	8.52

Date: 2023.07.29

Wind: 5.3 m/s

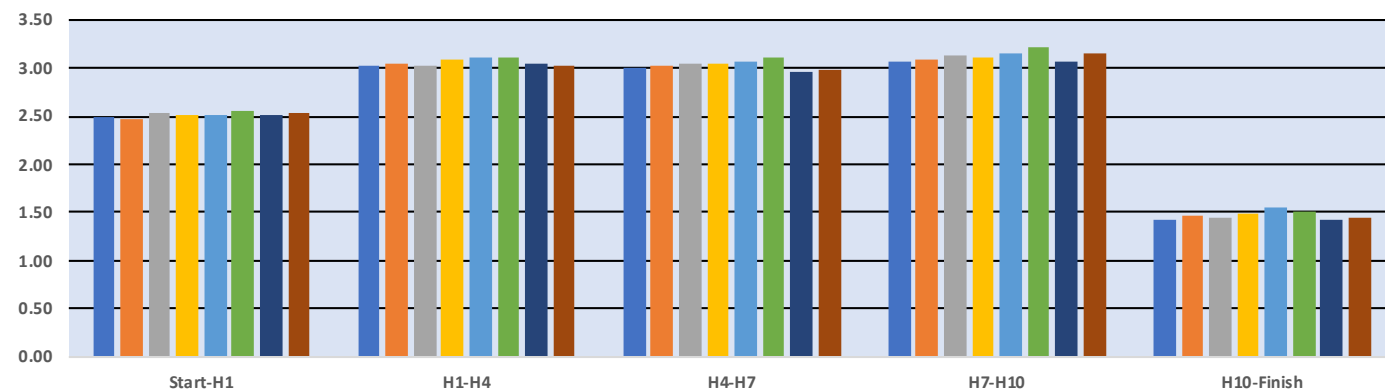
Heat 2

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Zhoya, Sasha (FRA) (2002)	time		2.52	3.56	4.58	5.56	6.52	7.52	8.52	9.52	10.54	11.58		13.01	6 / 1			
	reaction time	0.173											1.43			3.04	2.96	3.06
	interval		7 steps	1.04	1.02	0.98	0.96	1.00	1.00	1.00	1.02	1.04	1.43			9.02	9.26	8.96
Bascou, Dimitri (FRA) (1987)	time		2.54	3.58	4.58	5.56	6.54	7.54	8.54	9.58	10.66	11.70		13.14	3 / 2			
	reaction time	0.162											1.44			3.02	2.98	3.16
	interval		7 steps	1.04	1.00	0.98	0.98	1.00	1.00	1.04	1.08	1.04	1.44			9.08	9.20	8.68



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=naF7BuaQc6o>

2023 London Athletics Meet (London, GBR)

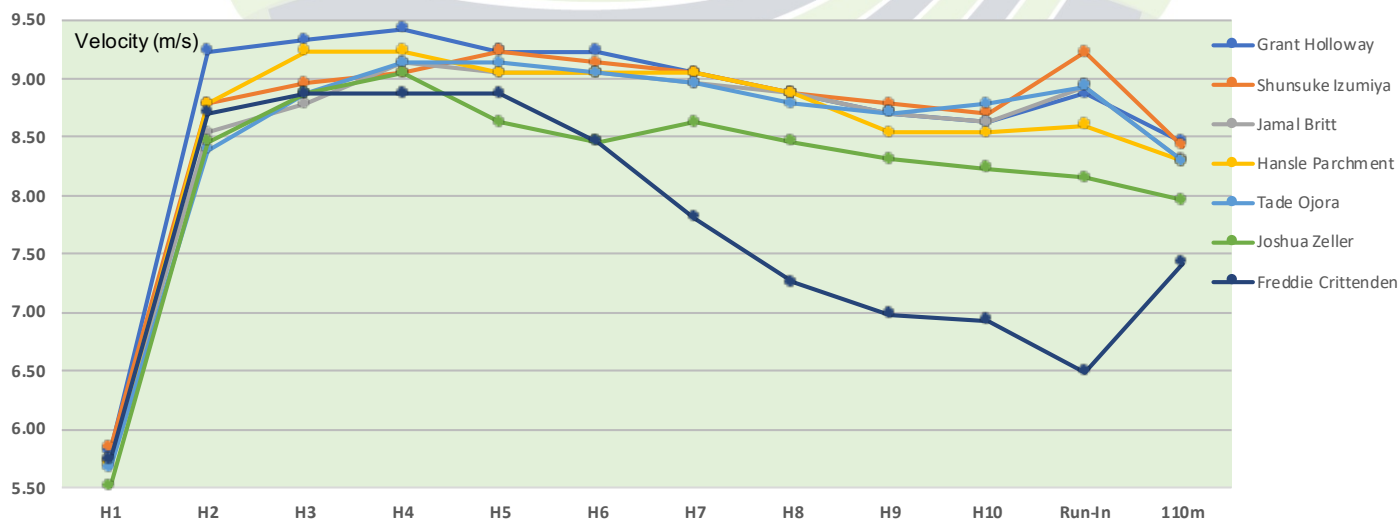
110m Hurdles

Date: 2023.07.23

Wind: 1.3 m/s

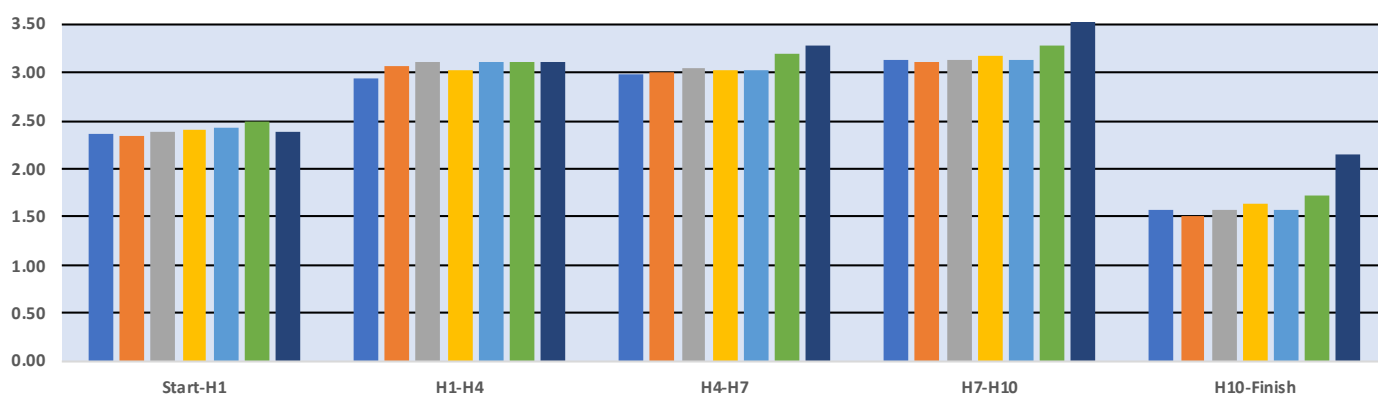
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Holloway, Grant (USA) (1997)	time		2.36	3.35	4.33	5.30	6.29	7.28	8.29	9.32	10.37	11.43		13.01	5 / 1			
	reaction time	0.165														2.94	2.99	3.14
	interval velocity		7 steps	0.99	0.98	0.97	0.99	0.99	1.01	1.03	1.05	1.06	1.58			9.33	9.17	8.73
Izumiya, Shunsuke (JPN) (2000)	time		2.35	3.39	4.41	5.42	6.41	7.41	8.42	9.45	10.49	11.54		13.06	3 / 2			
	reaction time	0.138														3.07	3.00	3.12
	interval velocity		7 steps	1.04	1.02	1.01	0.99	1.00	1.01	1.03	1.04	1.05	1.52			8.93	9.14	8.79
Britt, Jamal (USA) (1998)	time		2.39	3.46	4.50	5.50	6.51	7.52	8.54	9.57	10.62	11.68		13.25	6 / 3			
	reaction time	0.145														3.11	3.04	3.14
	interval velocity		7 steps	1.07	1.04	1.00	1.01	1.01	1.02	1.03	1.05	1.06	1.57			8.82	9.02	8.73
Parchment, Hansle (JAM) (1990)	time		2.41	3.45	4.44	5.43	6.44	7.45	8.46	9.49	10.56	11.63		13.26	4 / 4			
	reaction time	0.135														3.02	3.03	3.17
	interval velocity		7 steps	1.04	0.99	0.99	1.01	1.01	1.01	1.03	1.07	1.07	1.63			9.08	9.05	8.65
Ojora, Tade (GBR) (1999)	time		2.42	3.51	4.54	5.54	6.54	7.55	8.57	9.61	10.66	11.70		13.27	8 / 5			
	reaction time	0.148														3.12	3.03	3.13
	interval velocity		7 steps	1.09	1.03	1.00	1.00	1.01	1.02	1.04	1.05	1.04	1.57			8.79	9.05	8.76
Zeller, Joshua (GBR) (2000)	time		2.49	3.57	4.60	5.61	6.67	7.75	8.81	9.89	10.99	12.10		13.82	1 / 6			
	reaction time	0.144														3.12	3.20	3.29
	interval velocity			1.08	1.03	1.01	1.06	1.08	1.06	1.08	1.10	1.11	1.72			8.79	8.57	8.33
Crittenden, Freddie (USA) (1994)	time		2.39	3.44	4.47	5.50	6.53	7.61	8.78	10.04	11.35	12.67		14.83	2 / 7			
	reaction time	0.132														3.11	3.28	3.89
	interval velocity			1.05	1.03	1.03	1.03	1.08	1.17	1.26	1.31	1.32	2.16			8.82	8.36	7.05
			5.74	8.70	8.87	8.87	8.87	8.46	7.81	7.25	6.98	6.92	6.49	7.42				



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Sun 23 Jul 2023 14:58) - diamond league race analysis

<https://www.omegatiming.com/File/0002030C01020C0101FFFFFFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=NX9GeRods4g>

2023 Kamila Skolimowska Memorial (Silesia, POL)

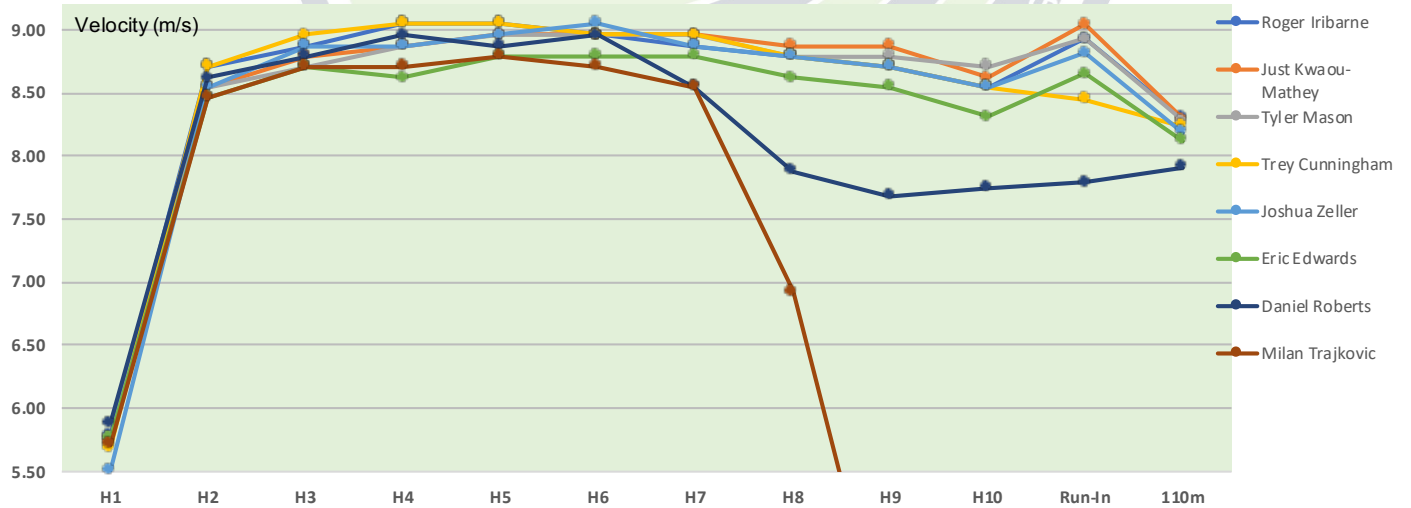
110m Hurdles

Date: 2023.07.16

Wind: 0.3 m/s

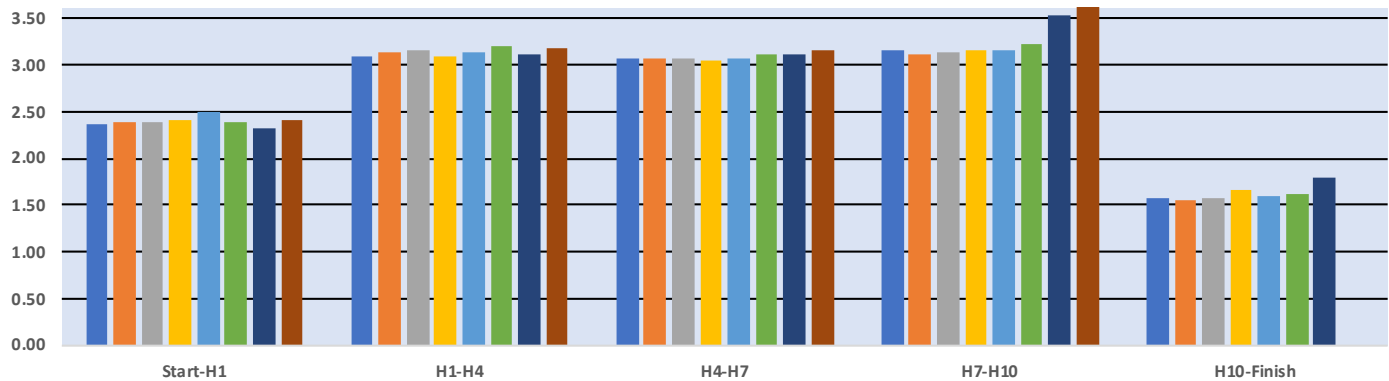
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Iribarne, Roger (CUB) (1996)	time		2.37	3.42	4.45	5.46	6.47	7.49	8.52	9.56	10.61	11.68		13.25	4 / 1			
	reaction time	0.147											1.57			3.09	3.06	3.16
	interval velocity		7 steps	1.05	1.03	1.01	1.01	1.02	1.03	1.04	1.05	1.07	1.57	8.30		8.87	8.96	8.68
Kwaou-Mathey, Just (FRA) (1999)	time		2.39	3.46	4.50	5.53	6.55	7.57	8.59	9.62	10.65	11.71		13.26	7 / 2			
	reaction time	0.157											1.55			3.14	3.06	3.12
	interval velocity		7 steps	5.74	8.54	8.79	8.87	8.96	8.96	8.87	8.87	8.62	9.05	8.30		8.73	8.96	8.79
Mason, Tyler (JAM) (1995)	time		2.38	3.45	4.50	5.53	6.55	7.57	8.59	9.63	10.67	11.72		13.29	5 / 3			
	reaction time	0.138											1.57			3.15	3.06	3.13
	interval velocity		7 steps	5.76	8.54	8.70	8.87	8.96	8.96	8.79	8.79	8.70	8.93	8.28		8.70	8.96	8.76
Cunningham, Trey (USA) (1998)	time		2.41	3.46	4.48	5.49	6.50	7.52	8.54	9.58	10.63	11.70		13.36	3 / 4			
	reaction time	0.147											1.66			3.08	3.05	3.16
	interval velocity		7 steps	5.69	8.70	8.96	9.05	9.05	8.96	8.79	8.70	8.54	8.45	8.23		8.90	8.99	8.68
Zeller, Joshua (GBR) (2000)	time		2.49	3.56	4.59	5.62	6.64	7.65	8.68	9.72	10.77	11.84		13.43	1 / 5			
	reaction time	0.158											1.59			3.13	3.06	3.16
	interval velocity		5.51	8.54	8.87	8.87	8.96	9.05	8.87	8.79	8.70	8.54	8.82	8.19		8.76	8.96	8.68
Edwards, Eric (USA) (2000)	time		2.38	3.46	4.51	5.57	6.61	7.65	8.69	9.75	10.82	11.92		13.54	9 / 6			
	reaction time	0.130											1.62			3.19	3.12	3.23
	interval velocity		5.76	8.46	8.70	8.62	8.79	8.79	8.62	8.54	8.31	8.65	8.12			8.60	8.79	8.49
Roberts, Daniel (USA) (1998)	time		2.33	3.39	4.43	5.45	6.48	7.50	8.57	9.73	10.92	12.10		13.90	6 / 7			
	reaction time	0.159											1.80			3.12	3.12	3.53
	interval velocity		5.89	8.62	8.79	8.96	8.87	8.96	8.54	7.88	7.68	7.75	7.79	7.91		8.79	8.79	7.77
Trajkovic, Milan (CYP) (1992)	time		2.40	3.48	4.53	5.58	6.62	7.67	8.74	10.06	12.38	20.77			8 / --			
	reaction time	0.159														3.18	3.16	12.03
	interval velocity		7 steps	5.72	8.46	8.70	8.70	8.79	8.70	8.54	6.92	3.94	1.09			8.62	8.68	2.28



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Sun 16 Jul 2023 15:53) - diamond league race analysis
<https://www.omegatiming.com/File/0002030A0102040201FFFFFFFFFFFF4D.pdf>

Video: No Video Found

2023 Kamila Skolimowska Memorial (Silesia, POL)

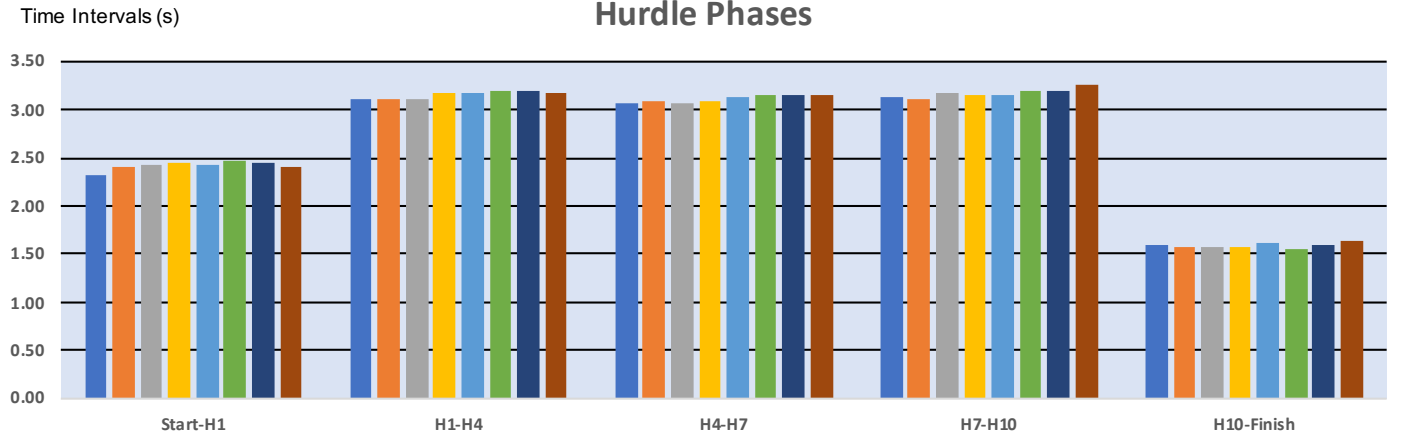
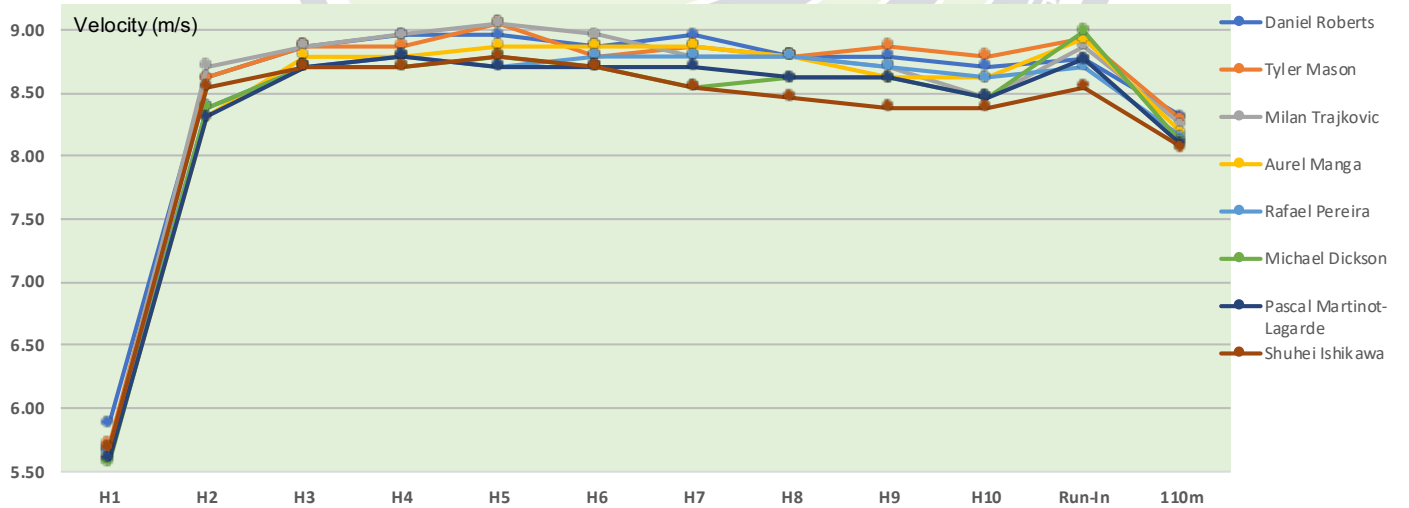
110m Hurdles

Date: 2023.07.16

Wind: -0.2 m/s

Heat 2

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Roberts, Daniel (USA) (1998)	time	2.33	3.39	4.42	5.44	6.46	7.49	8.51	9.55	10.59	11.64		13.24	5 / 1			
	reaction time	0.146													3.11	3.07	3.13
	interval		1.06	1.03	1.02	1.02	1.03	1.02	1.04	1.04	1.05	1.60			8.82	8.93	8.76
Mason, Tyler (JAM) (1995)	time	2.40	3.46	4.49	5.52	6.53	7.57	8.60	9.64	10.67	11.71		13.28	4 / 2			
	reaction time	0.152										1.57			3.12	3.08	3.11
	interval		1.06	1.03	1.03	1.01	1.04	1.03	1.04	1.03	1.04	1.57			8.79	8.90	8.82
Trajkovic, Milan (CYP) (1992)	time	2.42	3.47	4.50	5.52	6.53	7.55	8.59	9.63	10.68	11.76		13.34	9 / 3			
	reaction time	0.160													3.10	3.07	3.17
	interval		1.05	1.03	1.02	1.01	1.02	1.04	1.04	1.05	1.08	1.58			8.85	8.93	8.65
Manga, Aurel (FRA) (1992)	time	2.45	3.55	4.59	5.63	6.66	7.69	8.72	9.76	10.82	11.88		13.45	1 / 4			
	reaction time	0.156										1.57			3.18	3.09	3.16
	interval		1.10	1.04	1.04	1.03	1.03	1.03	1.04	1.06	1.06	1.57			8.62	8.87	8.68
Pereira, Rafael (BRA) (1997)	time	2.43	3.52	4.57	5.61	6.66	7.70	8.74	9.78	10.83	11.89		13.50	7 / 5			
	reaction time	0.136										1.61			3.18	3.13	3.15
	interval		1.09	1.05	1.04	1.05	1.04	1.04	1.04	1.05	1.06	1.61			8.62	8.76	8.70
Dickson, Michael (USA) (1997)	time	2.46	3.55	4.60	5.65	6.69	7.74	8.81	9.87	10.93	12.01		13.57	8 / 6			
	reaction time	0.183													3.19	3.16	3.20
	interval		1.09	1.05	1.05	1.04	1.05	1.07	1.06	1.06	1.08	1.56			8.60	8.68	8.57
Martinot-Lagarde, Pascal (FRA) (1991)	time	2.45	3.55	4.60	5.64	6.69	7.74	8.79	9.85	10.91	11.99		13.59	3 / 7			
	reaction time	0.153										1.60			3.19	3.15	3.20
	interval		1.10	1.05	1.04	1.05	1.05	1.05	1.06	1.06	1.08	1.60			8.60	8.70	8.57
Ishikawa, Shuhei (JPN) (1995)	time	2.41	3.48	4.53	5.58	6.62	7.67	8.74	9.82	10.91	12.00		13.64	2 / 8			
	reaction time	0.133										1.64			3.17	3.16	3.26
	interval		1.07	1.05	1.05	1.04	1.05	1.07	1.08	1.09	1.09	1.64			8.65	8.68	8.41
	velocity		5.69	8.54	8.70	8.70	8.79	8.70	8.54	8.46	8.39	8.39	8.55				



Source: Omega Timing (Sun 16 Jul 2023 14:43) - diamond league race analysis
<https://www.omegatiming.com/File/0002030A0102040102FFFFFFFF4D.pdf>

Video: No Video Found

2023 Kamila Skolimowska Memorial (Silesia, POL)

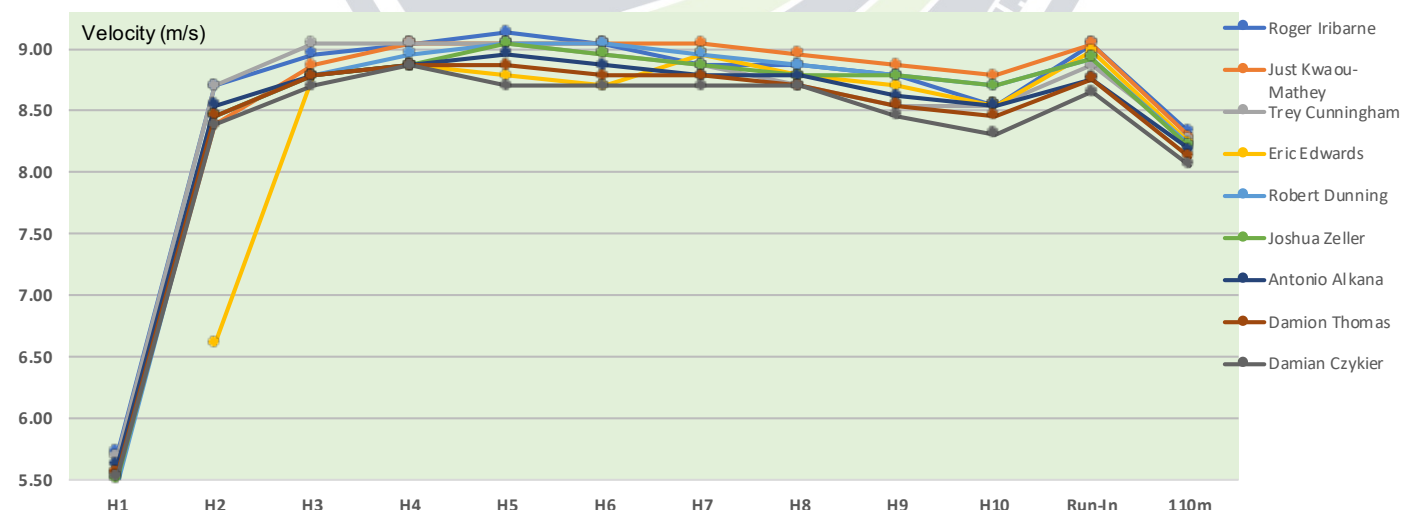
110m Hurdles

Date: 2023.07.16

Wind: 0.3 m/s

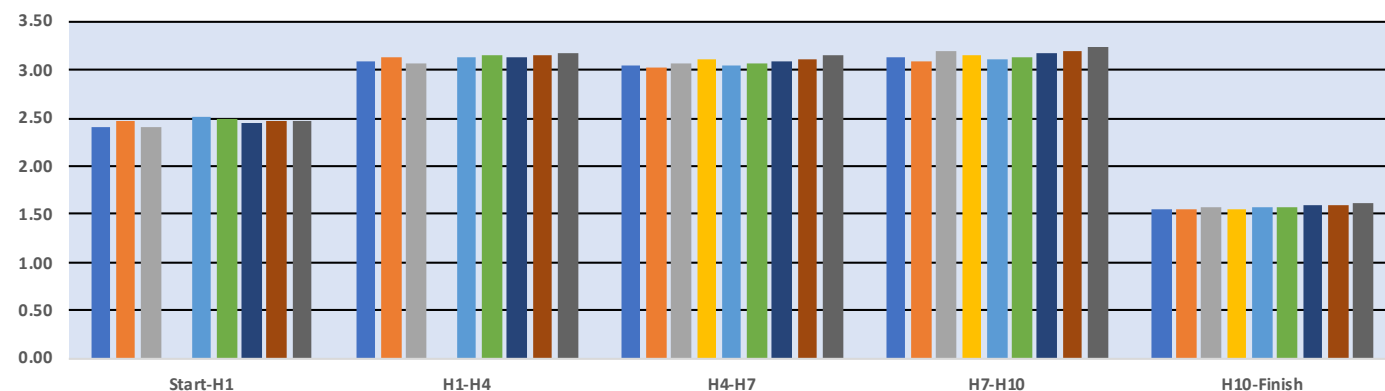
Heat 1

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Iribarne, Roger (CUB) (1996)	time		2.40	3.45	4.47	5.48	6.48	7.49	8.52	9.55	10.59	11.66		13.21	2 / 1			
	reaction time	0.157														3.08	3.04	3.14
	interval velocity		7 steps	1.05	1.02	1.01	1.00	1.01	1.03	1.03	1.04	1.07	1.55	PB		8.90	9.02	8.73
			5.72	8.70	8.96	9.05	9.14	9.05	8.87	8.87	8.79	8.54	9.05	8.33				
Kwaou-Mathey, Just (FRA) (1999)	time		2.47	3.56	4.59	5.60	6.61	7.62	8.63	9.65	10.68	11.72		13.27	6 / 2			
	reaction time	0.169														3.13	3.03	3.09
	interval velocity		7 steps	1.09	1.03	1.01	1.01	1.01	1.01	1.02	1.03	1.04	1.55			8.76	9.05	8.87
			5.55	8.39	8.87	9.05	9.05	9.05	9.05	8.96	8.87	8.79	9.05	8.29				
Cunningham, Trey (USA) (1998)	time		2.41	3.46	4.47	5.48	6.49	7.51	8.54	9.59	10.66	11.73		13.31	5 / 3			
	reaction time	0.153														3.07	3.06	3.19
	interval velocity		7 steps	1.05	1.01	1.01	1.01	1.02	1.03	1.05	1.07	1.07	1.58			8.93	8.96	8.60
			5.69	8.70	9.05	9.05	9.05	8.96	8.87	8.70	8.54	8.54	8.87	8.26				
Edwards, Eric (USA) (2000)	time			3.46	4.50	5.53	6.57	7.62	8.64	9.68	10.73	11.80		13.36	3 / 4			
	reaction time	0.137															3.11	3.16
	interval velocity				1.04	1.03	1.04	1.05	1.02	1.04	1.05	1.07	1.56				8.82	8.68
				6.61	8.79	8.87	8.79	8.70	8.96	8.79	8.70	8.54	8.99	8.23				
Dunning, Robert (USA) (1997)	time		2.51	3.59	4.63	5.65	6.66	7.67	8.69	9.72	10.76	11.81		13.38	4 / 5			
	reaction time	0.140														3.14	3.04	3.12
	interval velocity		7 steps	1.08	1.04	1.02	1.01	1.01	1.02	1.03	1.04	1.05	1.57			8.73	9.02	8.79
			5.47	8.46	8.79	8.96	9.05	9.05	8.96	8.87	8.79	8.70	8.93	8.22				
Zeller, Joshua (GBR) (2000)	time		2.49	3.57	4.61	5.64	6.65	7.67	8.70	9.74	10.78	11.83		13.40	8 / 6			
	reaction time	0.156														3.15	3.06	3.13
	interval velocity			1.08	1.04	1.03	1.01	1.02	1.03	1.04	1.04	1.05	1.57			8.70	8.96	8.76
			5.51	8.46	8.79	8.87	9.05	8.96	8.87	8.79	8.79	8.70	8.93	8.21				
Alkana, Antonio (RSA) (1990)	time		2.44	3.51	4.55	5.58	6.60	7.63	8.67	9.71	10.77	11.84		13.44	1 / 7			
	reaction time	0.132														3.14	3.09	3.17
	interval velocity			1.07	1.04	1.03	1.02	1.03	1.04	1.04	1.06	1.07	1.60			8.73	8.87	8.65
			5.62	8.54	8.79	8.87	8.96	8.87	8.79	8.79	8.62	8.54	8.76	8.18				
Thomas, Damion (JAM) (1999)	time		2.47	3.55	4.59	5.62	6.65	7.69	8.73	9.78	10.85	11.93		13.53	9 / 8			
	reaction time	0.147														3.15	3.11	3.20
	interval velocity		7 steps	1.08	1.04	1.03	1.03	1.04	1.04	1.05	1.07	1.08	1.60			8.70	8.82	8.57
			5.55	8.46	8.79	8.87	8.87	8.79	8.79	8.70	8.54	8.46	8.76	8.13				
Czykier, Damian (POL) (1992)	time		2.48	3.57	4.62	5.65	6.70	7.75	8.80	9.85	10.93	12.03		13.65	7 / 9			
	reaction time	0.154														3.17	3.15	3.23
	interval velocity		7 steps	1.09	1.05	1.03	1.05	1.05	1.05	1.05	1.08	1.10	1.62			8.65	8.70	8.49
			5.53	8.39	8.70	8.87	8.70	8.70	8.70	8.70	8.46	8.31	8.65	8.06				



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Sun 16 Jul 2023 14:42) - diamond league race analysis

<https://www.omegatiming.com/File/0002030A0102040101FFFFFFFFFFFF4D.pdf>

Video: No Video Found

2023 USATF National Championships (Eugene, OR) (TV Analysis)

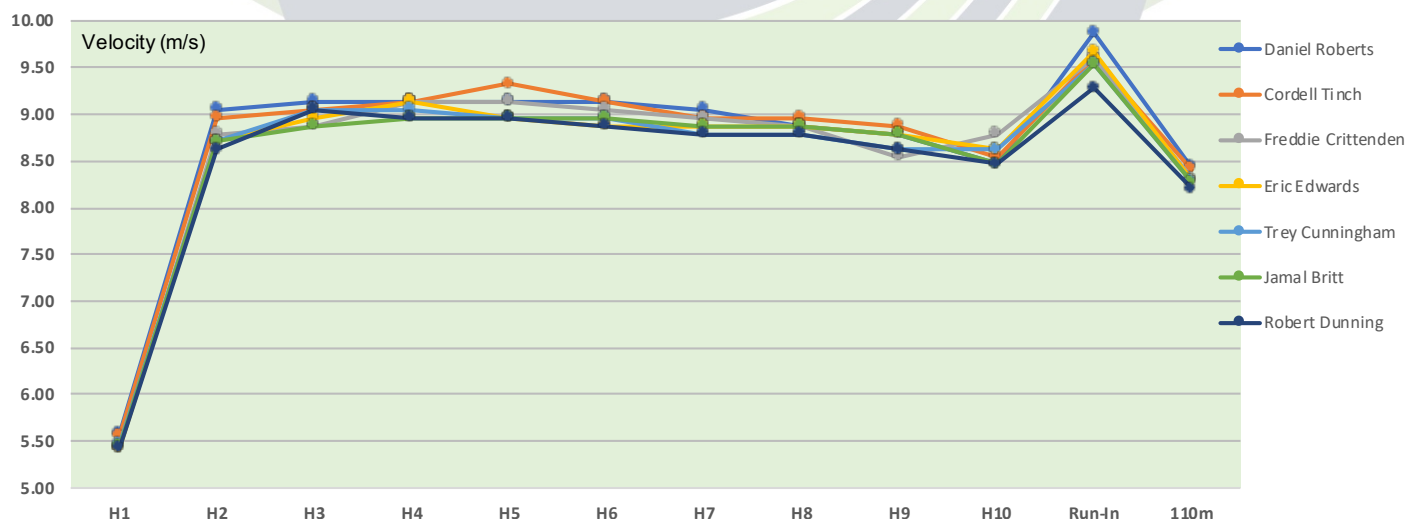
110m Hurdles

Date: 2023.07.09

Wind: -0.2 m/s

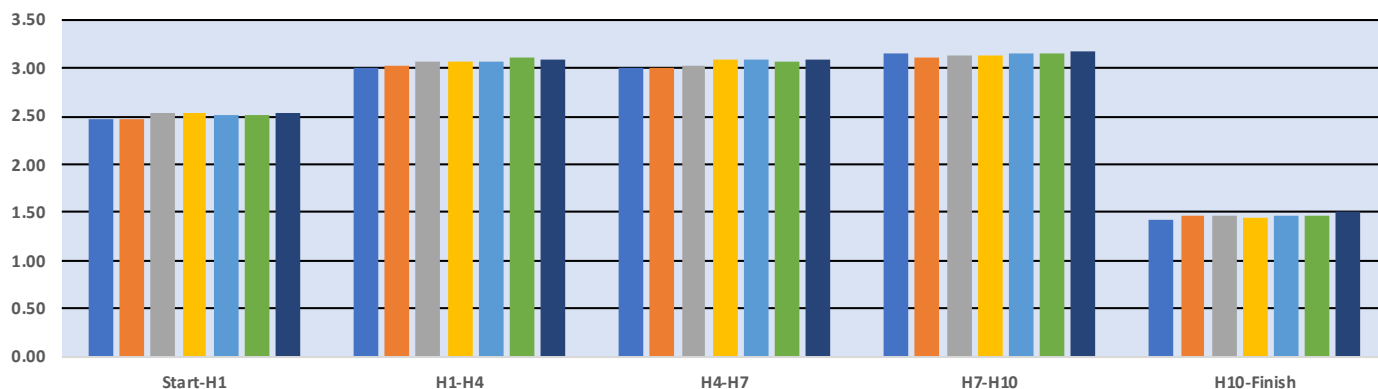
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Roberts, Daniel (USA) (1998)	time	2.46	3.47	4.47	5.47	6.47	7.47	8.48	9.51	10.55	11.63		13.05	6 / 1			
	reaction time														3.01	3.01	3.15
	interval		1.01	1.00	1.00	1.00	1.00	1.01	1.03	1.04	1.08	1.42			9.11	9.11	8.70
Tinch, Cordell (USA) (2000)	time	2.47	3.49	4.50	5.50	6.48	7.48	8.50	9.52	10.55	11.62		13.08	3 / 2			
	reaction time														3.03	3.00	3.12
	interval	7 steps	1.02	1.01	1.00	0.98	1.00	1.02	1.02	1.03	1.07	1.46			9.05	9.14	8.79
Crittenden, Freddie (USA) (1994)	time	2.53	3.57	4.60	5.60	6.60	7.61	8.63	9.66	10.73	11.77		13.23	7 / 3			
	reaction time														3.07	3.03	3.14
	interval		1.04	1.03	1.00	1.00	1.01	1.02	1.03	1.07	1.04	1.46			8.93	9.05	8.73
Edwards, Eric (USA) (2000)	time	2.53	3.58	4.60	5.60	6.62	7.65	8.68	9.71	10.75	11.81		13.26	1 / 4			
	reaction time														3.07	3.08	3.13
	interval		1.05	1.02	1.00	1.02	1.03	1.03	1.04	1.06	1.06	1.45			8.93	8.90	8.76
Cunningham, Trey (USA) (1998)	time	2.51	3.56	4.57	5.58	6.60	7.62	8.66	9.70	10.76	11.82		13.29	4 / 5			
	reaction time														3.07	3.08	3.16
	interval	7 steps	1.05	1.01	1.01	1.02	1.02	1.04	1.04	1.06	1.06	1.47			8.93	8.90	8.68
Britt, Jamal (USA) (1998)	time	2.52	3.57	4.60	5.62	6.64	7.66	8.69	9.72	10.76	11.84		13.31	8 / 6			
	reaction time														3.10	3.07	3.15
	interval	7 steps	1.05	1.03	1.02	1.02	1.02	1.03	1.03	1.04	1.08	1.47			8.85	8.93	8.70
Dunning, Robert (USA) (1997)	time	2.53	3.59	4.60	5.62	6.64	7.67	8.71	9.75	10.81	11.89		13.40	2 / 7			
	reaction time														3.09	3.09	3.18
	interval	7 steps	1.06	1.01	1.02	1.02	1.03	1.04	1.04	1.06	1.08	1.51			8.87	8.87	8.62
	velocity	5.47	8.70	9.05	9.05	8.96	8.96	8.79	8.79	8.62	8.62	9.54	8.28				
	velocity	5.42	8.70	9.05	9.05	8.96	8.96	8.87	8.87	8.79	8.46	9.28	8.21				
	velocity	5.42	8.70	9.05	9.05	8.96	8.96	8.87	8.79	8.79	8.62	8.46	9.28	8.21			



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=NUzI-Bexx7b4>

2023 Jamaican National Championships (Kingston, JAM) (TV Analysis)

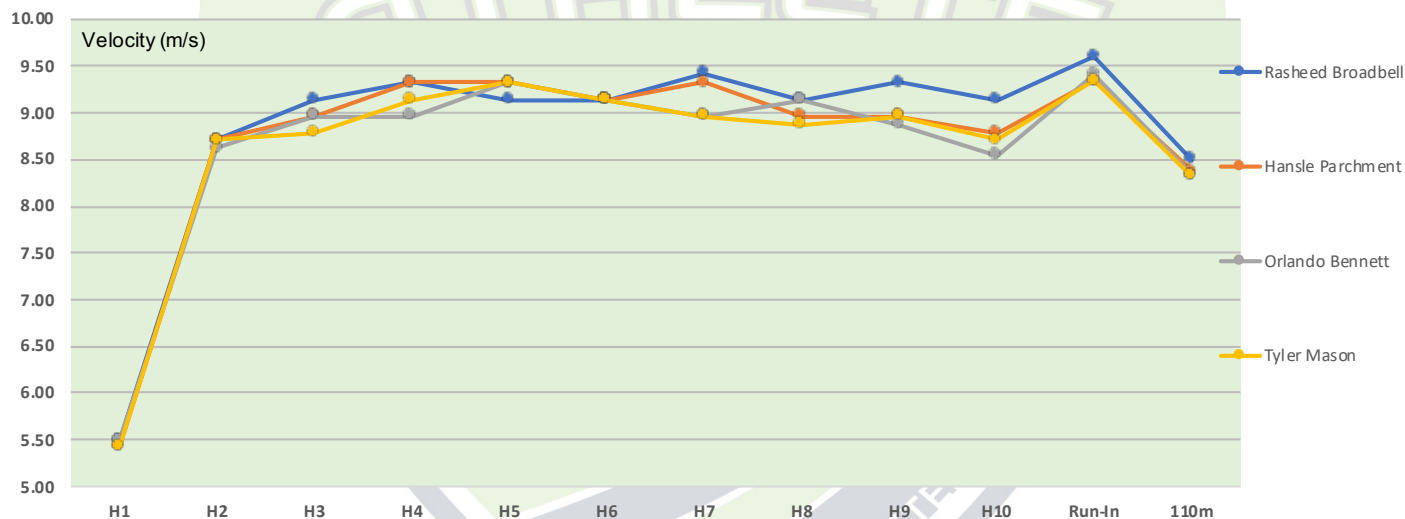
110m Hurdles

Date: 2023.07.09

Wind: 0.7 m/s

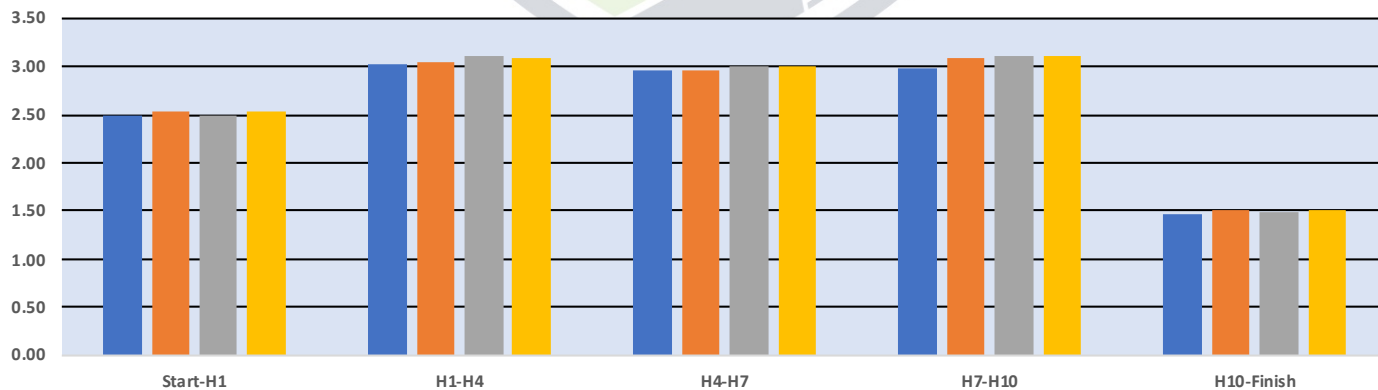
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Broadbell, Rasheed (JAM) (2000)	time	2.50	3.55	4.55	5.53	6.53	7.53	8.50	9.50	10.48	11.48		12.94	3 / 1			
	reaction time														3.03	2.97	2.98
	interval	7 steps	1.05	1.00	0.98	1.00	1.00	0.97	1.00	0.98	1.00	1.46	PB		9.05	9.23	9.20
Parchment, Hansle (JAM) (1990)	time	2.53	3.58	4.60	5.58	6.56	7.56	8.54	9.56	10.58	11.62		13.12	4 / 2			
	reaction time														3.05	2.96	3.08
	interval	7 steps	1.05	1.02	0.98	0.98	1.00	0.98	1.02	1.02	1.04	1.50			8.99	9.26	8.90
Bennett, Orlando (JAM) (1999)	time	2.50	3.56	4.58	5.60	6.58	7.58	8.60	9.60	10.63	11.70		13.19	6 / 3			
	reaction time														3.10	3.00	3.10
	interval	5.49	8.62	8.96	8.96	9.33	9.14	8.96	9.14	8.87	8.54	9.41	8.34		8.85	9.14	8.85
Mason, Tyler (JAM) (1995)	time	2.53	3.58	4.62	5.62	6.60	7.60	8.62	9.65	10.67	11.72		13.22	5 / 4			
	reaction time														3.09	3.00	3.10
	interval	7 steps	1.05	1.04	1.00	0.98	1.00	1.02	1.03	1.02	1.05	1.50			8.87	9.14	8.85
	velocity	5.42	8.70	8.79	9.14	9.33	9.14	8.96	8.87	8.96	8.70	9.35	8.32				



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=AccCvbSf3eg>

2023 Athletissima (Lausanne, SUI)

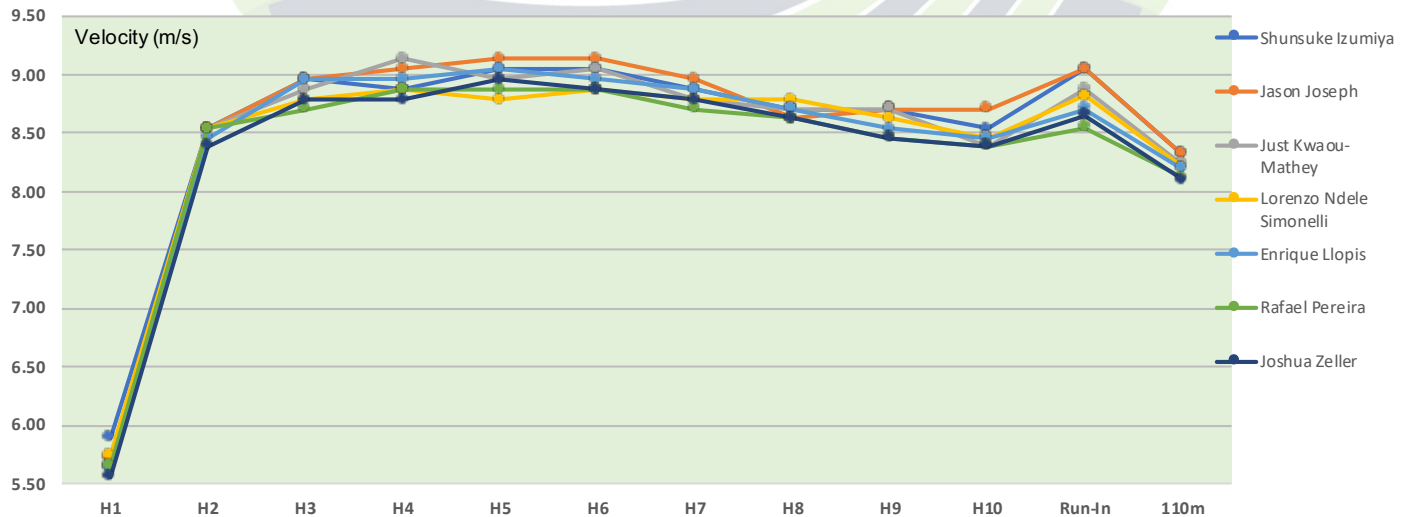
110m Hurdles

Date: 2023.06.30

Wind: -1.0 m/s

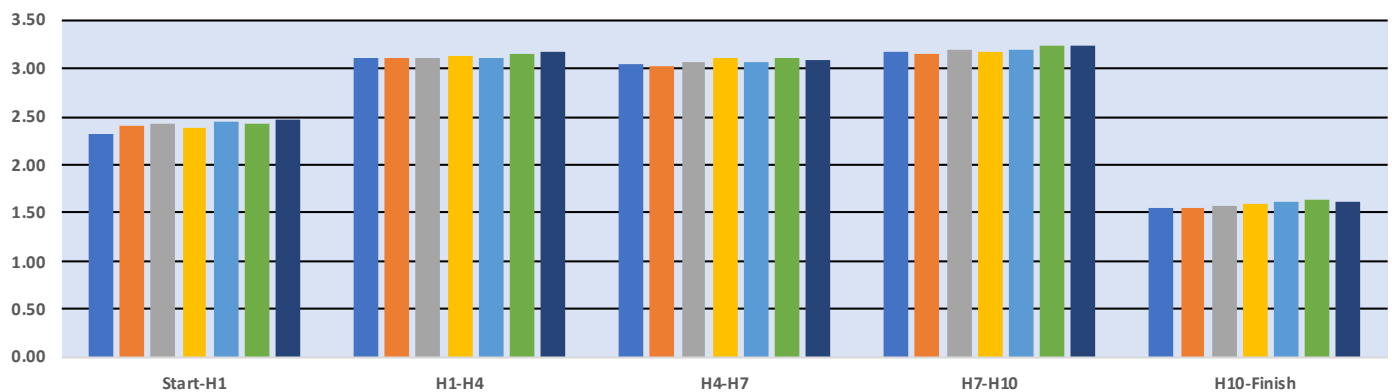
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Izumiya, Shunsuke (JPN) (2000)	time		2.33	3.40	4.42	5.45	6.46	7.47	8.50	9.55	10.60	11.67		13.22	4 / 1			
	reaction time	0.101											1.55			3.12	3.05	3.17
	interval velocity		7 steps	1.07	1.02	1.03	1.01	1.01	1.03	1.05	1.05	1.07	1.05	8.32		8.79	8.99	8.65
Joseph, Jason (SUI) (1998)	time		2.40	3.47	4.49	5.50	6.50	7.50	8.52	9.58	10.63	11.68		13.23	5 / 2			
	reaction time	0.153											1.55			3.10	3.02	3.16
	interval velocity		7 steps	1.07	1.02	1.01	1.00	1.00	1.02	1.06	1.05	1.05	1.05	8.31		8.85	9.08	8.68
Kwaou-Mathey, Just (FRA) (1999)	time		2.43	3.50	4.53	5.53	6.55	7.56	8.60	9.65	10.70	11.79		13.37	3 / 3			
	reaction time	0.134											1.58			3.10	3.07	3.19
	interval velocity		7 steps	1.07	1.03	1.00	1.02	1.01	1.04	1.05	1.05	1.09	1.58	8.23		8.85	8.93	8.60
Simonelli, Lorenzo Ndele (ITA) (2002)	time		2.39	3.46	4.50	5.53	6.57	7.60	8.64	9.68	10.74	11.82		13.41	1 / 4			
	reaction time	0.136											1.59			3.14	3.11	3.18
	interval velocity		7 steps	1.07	1.04	1.03	1.04	1.03	1.04	1.04	1.06	1.08	1.59	8.20		8.73	8.82	8.62
Llopis, Enrique (ESP) (2000)	time		2.44	3.52	4.54	5.56	6.57	7.59	8.62	9.67	10.74	11.82		13.43	7 / 5			
	reaction time	0.135											1.61			3.12	3.06	3.20
	interval velocity		7 steps	1.08	1.02	1.02	1.01	1.02	1.03	1.05	1.07	1.08	1.61	8.19		8.79	8.96	8.57
Pereira, Rafael (BRA) (1997)	time		2.43	3.50	4.55	5.58	6.61	7.64	8.69	9.75	10.83	11.92		13.56	2 / 6			
	reaction time	0.153											1.64			3.15	3.11	3.23
	interval velocity		7 steps	1.07	1.05	1.03	1.03	1.03	1.05	1.06	1.08	1.09	1.64	8.11		8.70	8.82	8.49
Zeller, Joshua (GBR) (2000)	time		2.47	3.56	4.60	5.64	6.66	7.69	8.73	9.79	10.87	11.96		13.58	8 / 7			
	reaction time	0.153											1.62			3.17	3.09	3.23
	interval velocity		7 steps	1.09	1.04	1.04	1.02	1.03	1.04	1.06	1.08	1.09	1.62	8.10		8.65	8.87	8.49



Time Intervals (s)

Hurdle Phases

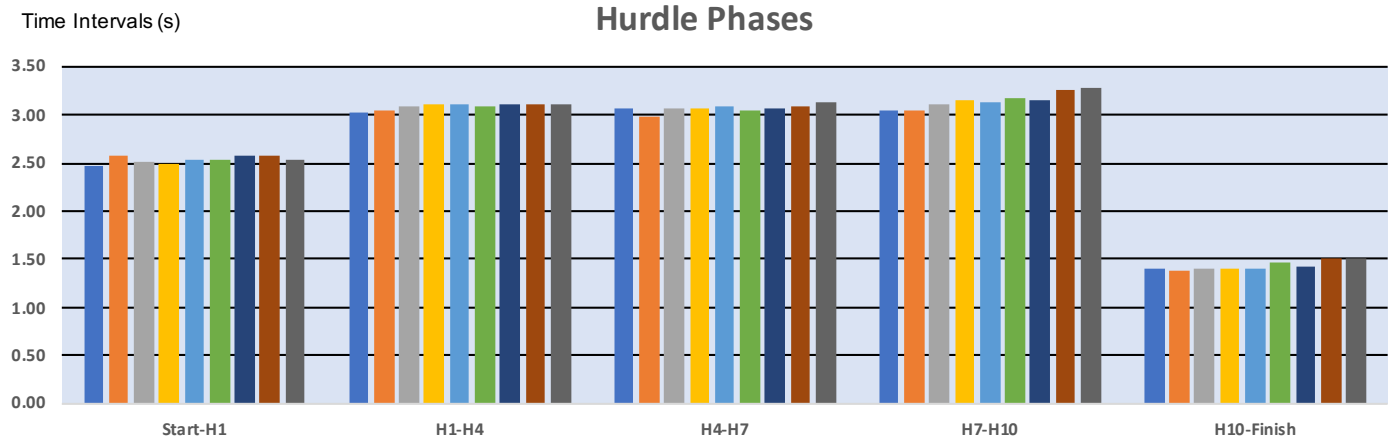
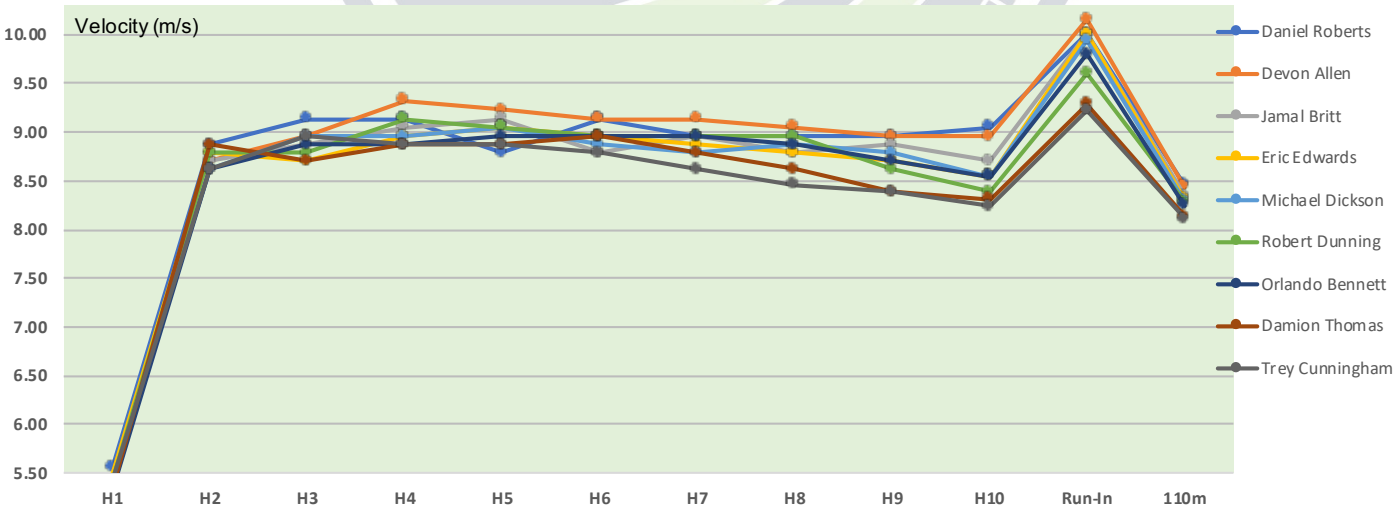


Source: Omega Timing (Fri 30 Jun 2023 20:23) - diamond league race analysis

<https://www.omegatiming.com/File/000203080102070101FFFFFFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=E-FSK01c-4Q>

2023 USATF New York City Grand Prix (Randalls Island, NY) (TV Analysis)

110m Hurdles		Date: 2023.06.24		Wind: 1.6 m/s										FINAL			
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Roberts, Daniel (USA) (1998)	time	2.47	3.50	4.50	5.50	6.54	7.54	8.56	9.58	10.60	11.61		13.01	3 / 1	3.03	3.06	3.05
	reaction time	0.159										1.40					
	interval		1.03	1.00	1.00	1.04	1.00	1.02	1.02	1.02	1.01	1.40					
Allen, Devon (USA) (1994)	time	2.57	3.62	4.64	5.62	6.61	7.61	8.61	9.62	10.64	11.66		13.04	5 / 2	3.05	2.99	3.05
	reaction time	0.173										1.38					
	interval	7 steps	1.05	1.02	0.98	0.99	1.00	1.00	1.01	1.02	1.02	1.38					
Britt, Jamal (USA) (1998)	time	2.52	3.57	4.60	5.61	6.61	7.65	8.67	9.71	10.74	11.79		13.19	7 / 3	3.09	3.06	3.12
	reaction time	0.169										1.40					
	interval	7 steps	1.05	1.03	1.01	1.00	1.04	1.02	1.04	1.03	1.05	1.40					
Edwards, Eric (USA) (2000)	time	2.50	3.54	4.59	5.61	6.62	7.64	8.67	9.71	10.76	11.83		13.23	8 / 4	3.11	3.06	3.16
	reaction time	0.127										1.40					
	interval		1.04	1.05	1.02	1.01	1.02	1.03	1.04	1.05	1.07	1.40					
Dickson, Michael (USA) (1997)	time	2.53	3.59	4.61	5.63	6.64	7.67	8.71	9.74	10.78	11.85		13.26	1 / 5	3.10	3.08	3.14
	reaction time	0.212										1.41					
	interval	7 steps	1.06	1.02	1.02	1.01	1.03	1.04	1.03	1.04	1.07	1.41					
Dunning, Robert (USA) (1997)	time	2.53	3.57	4.61	5.61	6.62	7.64	8.66	9.68	10.74	11.83		13.29	6 / 6	3.08	3.05	3.17
	reaction time	0.181										1.46					
	interval	7 steps	1.04	1.04	1.00	1.01	1.02	1.02	1.02	1.06	1.09	1.46					
Bennett, Orlando (JAM) (1999)	time	2.58	3.64	4.67	5.70	6.72	7.74	8.76	9.79	10.84	11.91		13.34	2 / 7	3.12	3.06	3.15
	reaction time	0.150										1.43					
	interval		1.06	1.03	1.03	1.02	1.02	1.02	1.03	1.05	1.07	1.43					
Thomas, Damion (JAM) (1999)	time	2.57	3.60	4.65	5.68	6.71	7.73	8.77	9.83	10.92	12.02		13.53	9 / 8	3.11	3.09	3.25
	reaction time	0.163										1.51					
	interval	7 steps	1.03	1.05	1.03	1.03	1.02	1.04	1.06	1.09	1.10	1.51					
Cunningham, Trey (USA) (1998)	time	2.53	3.59	4.61	5.64	6.67	7.71	8.77	9.85	10.94	12.05		13.57	4 / 9	3.11	3.13	3.28
	reaction time	0.157										1.52					
	interval	7 steps	1.06	1.02	1.03	1.03	1.04	1.06	1.08	1.09	1.11	1.52					
	velocity	5.34	8.87	8.70	8.87	8.87	8.96	8.79	8.62	8.39	8.31	9.28	8.13		8.82	8.87	8.44
	velocity	5.42	8.62	8.96	8.87	8.87	8.79	8.62	8.46	8.39	8.23	9.22	8.11		8.82	8.76	8.36



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.youtube.com/watch?v=eQerqfEUJic>

2023 NCAA Championships (Austin, TX) (TV Analysis)

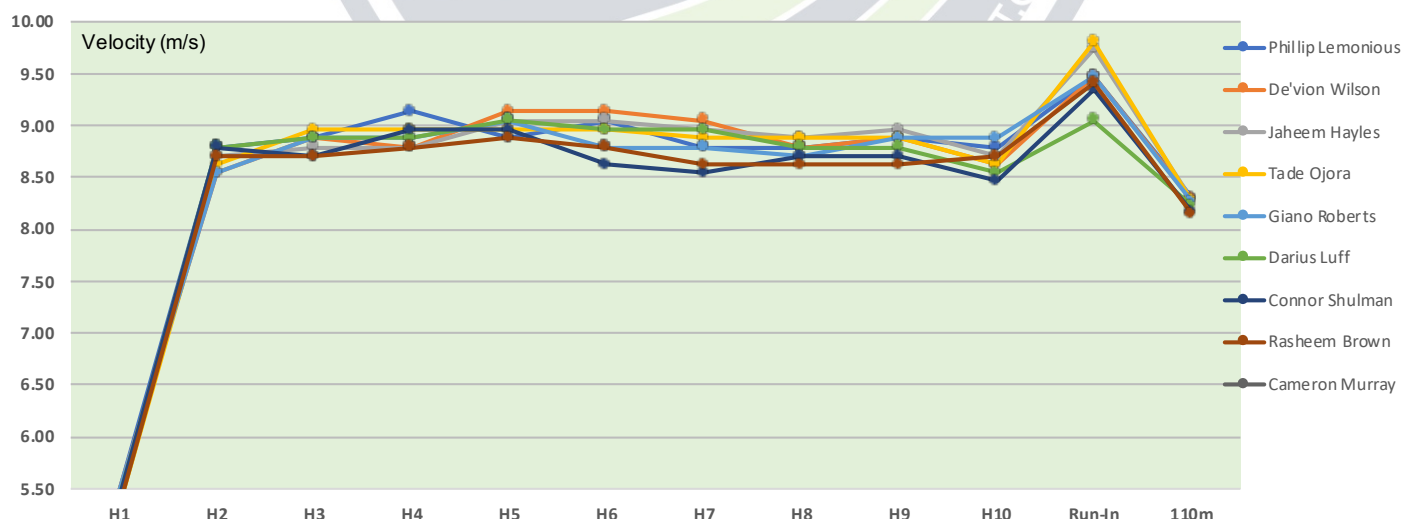
110m Hurdles

Date: 2023.06.09

Wind: 1.8 m/s

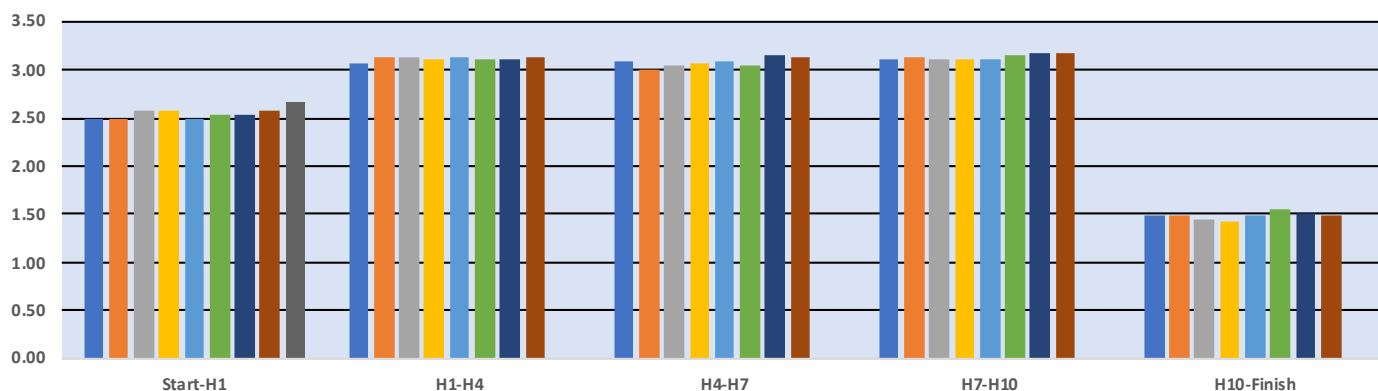
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Lemonious, Phillip (JAM) (1998)	time	2.50	3.54	4.57	5.57	6.60	7.61	8.65	9.69	10.72	11.76		13.24	5 / 1			
	reaction time																
	interval	7 steps	1.04	1.03	1.00	1.03	1.01	1.04	1.04	1.03	1.04	1.48			3.07	3.08	3.11
	velocity	5.49	8.79	8.87	9.14	8.87	9.05	8.79	8.79	8.87	8.79	9.47	8.31		8.93	8.90	8.82
Wilson, De'vion (USA) (2000)	time	2.50	3.57	4.60	5.64	6.64	7.64	8.65	9.69	10.72	11.78		13.26	2 / 2			
	reaction time																
	interval	7 steps	1.07	1.03	1.04	1.00	1.00	1.01	1.04	1.03	1.06	1.48	PB		3.14	3.01	3.13
	velocity	5.49	8.54	8.87	8.79	9.14	9.14	9.05	8.79	8.87	8.62	9.47	8.30		8.73	9.11	8.76
Hayles, Jaheem (JAM) (2001)	time	2.57	3.62	4.66	5.70	6.71	7.72	8.74	9.77	10.79	11.84		13.28	9 / 3			
	reaction time																
	interval		1.05	1.04	1.04	1.01	1.01	1.02	1.03	1.02	1.05	1.44	PB		3.13	3.04	3.10
	velocity	5.34	8.70	8.79	8.79	9.05	9.05	8.96	8.87	8.96	8.70	9.74	8.28		8.76	9.02	8.85
Ojora, Tade (GBR) (1999)	time	2.57	3.63	4.65	5.67	6.69	7.71	8.74	9.77	10.80	11.86		13.29	3 / 4			
	reaction time																
	interval	7 steps	1.06	1.02	1.02	1.02	1.02	1.03	1.03	1.03	1.06	1.43	PB		3.10	3.07	3.12
	velocity	5.34	8.62	8.96	8.96	8.96	8.96	8.87	8.87	8.87	8.62	9.80	8.28		8.85	8.93	8.79
Roberts, Giano (JAM) (2000)	time	2.50	3.57	4.60	5.63	6.64	7.68	8.72	9.77	10.80	11.83		13.31	7 / 5			
	reaction time																
	interval		1.07	1.03	1.03	1.01	1.04	1.04	1.05	1.03	1.03	1.48	PB		3.13	3.09	3.11
	velocity	5.49	8.54	8.87	8.87	9.05	8.79	8.79	8.70	8.87	8.87	9.47	8.26		8.76	8.87	8.82
Luff, Darius (USA) (2001)	time	2.53	3.57	4.60	5.63	6.64	7.66	8.68	9.72	10.76	11.83		13.38	8 / 6			
	reaction time																
	interval		1.04	1.03	1.03	1.01	1.02	1.02	1.04	1.04	1.07	1.55			3.10	3.05	3.15
	velocity	5.42	8.79	8.87	8.87	9.05	8.96	8.96	8.79	8.79	8.54	9.05	8.22		8.85	8.99	8.70
Shulman, Connor (USA) (2001)	time	2.53	3.57	4.62	5.64	6.66	7.72	8.79	9.84	10.89	11.97		13.47	6 / 7			
	reaction time																
	interval	7 steps	1.04	1.05	1.02	1.02	1.06	1.07	1.05	1.05	1.08	1.50			3.11	3.15	3.18
	velocity	5.42	8.79	8.70	8.96	8.96	8.62	8.54	8.70	8.70	8.46	9.35	8.17		8.82	8.70	8.62
Brown, Rasheem (CAY) (2000)	time	2.57	3.62	4.67	5.71	6.74	7.78	8.84	9.90	10.96	12.01		13.50	1 / 8			
	reaction time																
	interval		1.05	1.05	1.04	1.03	1.04	1.06	1.06	1.06	1.05	1.49	PB		3.14	3.13	3.17
	velocity	5.34	8.70	8.70	8.79	8.87	8.79	8.62	8.62	8.62	8.70	9.41	8.15		8.73	8.76	8.65
Murray, Cameron (USA) (1999)	time	2.67											dnf	4 / --			
	reaction time																
	interval	7 steps															
	velocity	5.14															



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=J5i-ZfGDFF>

2023 Meeting de Paris (Paris, FRA)

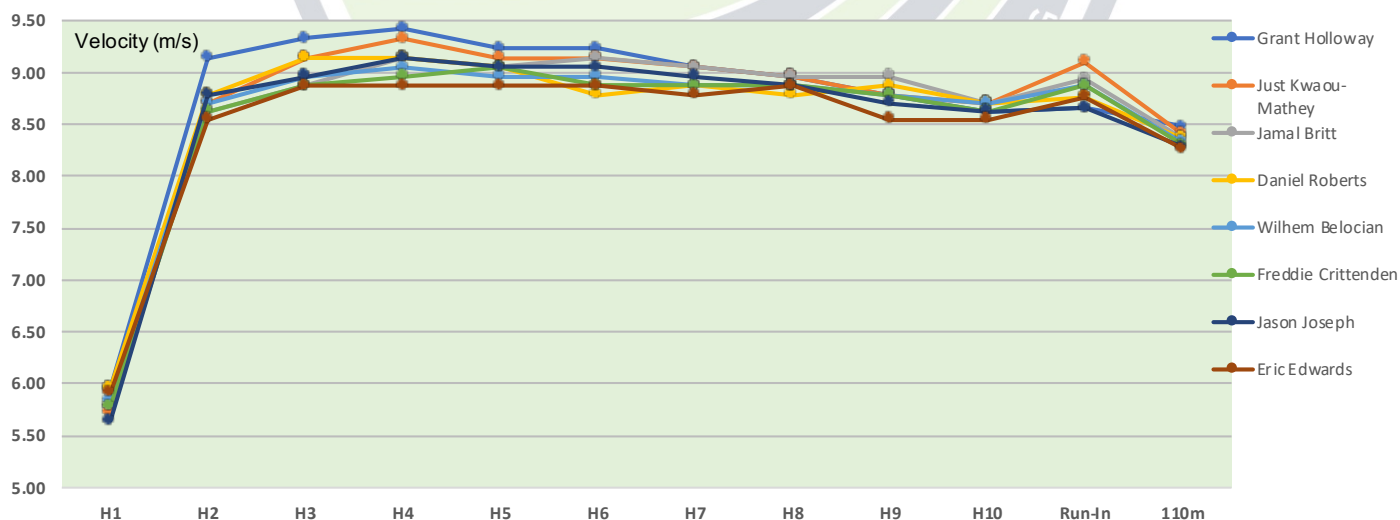
110m Hurdles

Date: 2023.06.09

Wind: -0.5 m/s

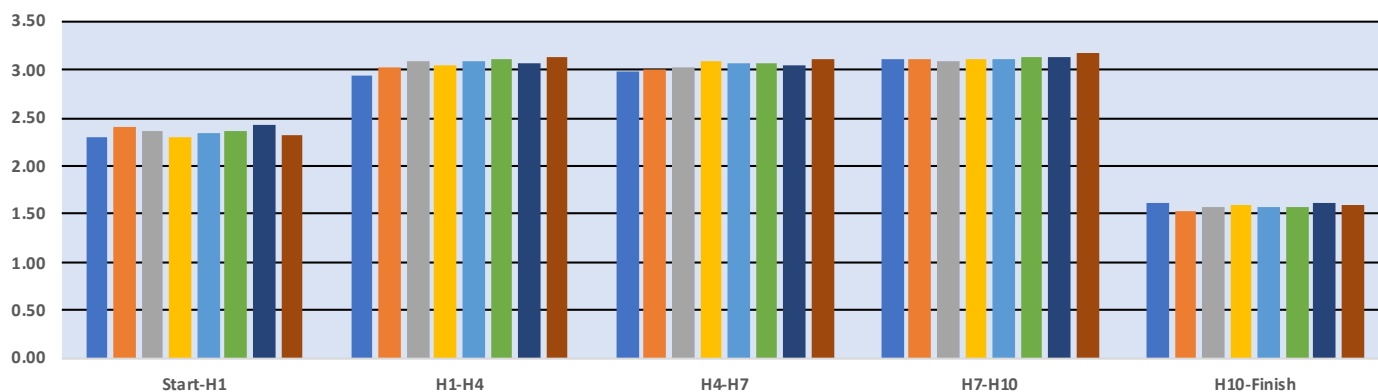
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Holloway, Grant (USA) (1997)	time	2.30	3.30	4.28	5.25	6.24	7.23	8.24	9.26	10.30	11.36		12.98	6 / 1			
	reaction time	0.157													2.95	2.99	3.12
	interval		7 steps	1.00	0.98	0.97	0.99	0.99	1.01	1.02	1.04	1.06	1.62		9.29	9.17	8.79
	velocity	5.97	9.14	9.33	9.42	9.23	9.23	9.05	8.96	8.79	8.62	8.65	8.47				
Kwaou-Mathey, Just (FRA) (1999)	time	2.40	3.45	4.45	5.43	6.43	7.43	8.44	9.46	10.50	11.55		13.09	7 / 2			
	reaction time	0.171													3.03	3.01	3.11
	interval		7 steps	1.05	1.00	1.00	1.00	1.01	1.02	1.04	1.05	1.54			9.05	9.11	8.82
	velocity	5.72	8.70	9.14	9.33	9.14	9.14	9.05	8.96	8.79	8.70	9.10	8.40				
Britt, Jamal (USA) (1998)	time	2.37	3.43	4.46	5.46	6.47	7.47	8.48	9.50	10.52	11.57		13.14	5 / 3			
	reaction time	0.141													3.09	3.02	3.09
	interval		7 steps	1.06	1.03	1.00	1.01	1.00	1.01	1.02	1.02	1.05	1.57		8.87	9.08	8.87
	velocity	5.79	8.62	8.87	9.14	9.05	9.14	9.05	8.96	8.96	8.70	8.93	8.37				
Roberts, Daniel (USA) (1998)	time	2.30	3.34	4.34	5.34	6.35	7.39	8.42	9.46	10.49	11.54		13.14	4 / 3			
	reaction time	0.154													3.04	3.08	3.12
	interval		1.04	1.00	1.00	1.01	1.04	1.03	1.04	1.03	1.05	1.60			9.02	8.90	8.79
	velocity	5.97	8.79	9.14	9.14	9.05	8.79	8.87	8.79	8.87	8.70	8.76	8.37				
Belocian, Wilhem (FRA) (1995)	time	2.35	3.40	4.42	5.43	6.45	7.47	8.50	9.53	10.57	11.62		13.20	8 / 5			
	reaction time	0.142													3.08	3.07	3.12
	interval		1.05	1.02	1.01	1.02	1.02	1.03	1.03	1.04	1.05	1.58			8.90	8.93	8.79
	velocity	5.84	8.70	8.96	9.05	8.96	8.96	8.87	8.87	8.79	8.70	8.87	8.33				
Crittenden, Freddie (USA) (1994)	time	2.37	3.43	4.46	5.48	6.49	7.52	8.55	9.58	10.62	11.68		13.26	2 / 6			
	reaction time	0.136													3.11	3.07	3.13
	interval		1.06	1.03	1.02	1.01	1.03	1.03	1.03	1.04	1.06	1.58			8.82	8.93	8.76
	velocity	5.79	8.62	8.87	8.96	9.05	8.87	8.87	8.87	8.79	8.62	8.87	8.30				
Joseph, Jason (SUI) (1998)	time	2.43	3.47	4.49	5.49	6.50	7.51	8.53	9.56	10.61	11.67		13.29	3 / 7			
	reaction time	0.195													3.06	3.04	3.14
	interval		7 steps	1.04	1.02	1.00	1.01	1.02	1.03	1.05	1.06	1.62			8.96	9.02	8.73
	velocity	5.65	8.79	8.96	9.14	9.05	9.05	8.96	8.87	8.70	8.62	8.65	8.28				
Edwards, Eric (USA) (2000)	time	2.32	3.39	4.42	5.45	6.48	7.51	8.55	9.58	10.65	11.72		13.32	1 / 8			
	reaction time	0.130													3.13	3.10	3.17
	interval		1.07	1.03	1.03	1.03	1.03	1.04	1.03	1.07	1.07	1.60			8.76	8.85	8.65
	velocity	5.91	8.54	8.87	8.87	8.87	8.87	8.79	8.87	8.54	8.54	8.76	8.26				



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Fri 9 Jun 2023 22:02) - diamond league race analysis

<https://www.omegatiming.com/File/000203060101050201FFFFFFFFFFFFF4D.pdf>Video: https://www.youtube.com/watch?v=lr_NsqvV0-I

2023 Meeting de Paris (Paris, FRA)

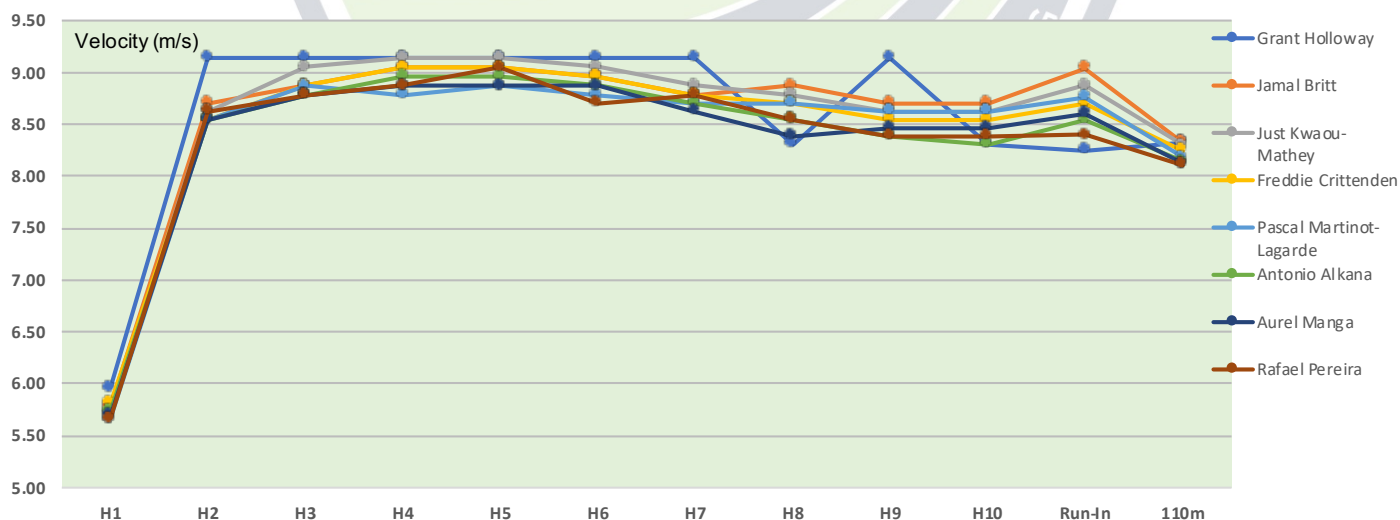
110m Hurdles

Date: 2023.06.09

Wind: -0.6 m/s

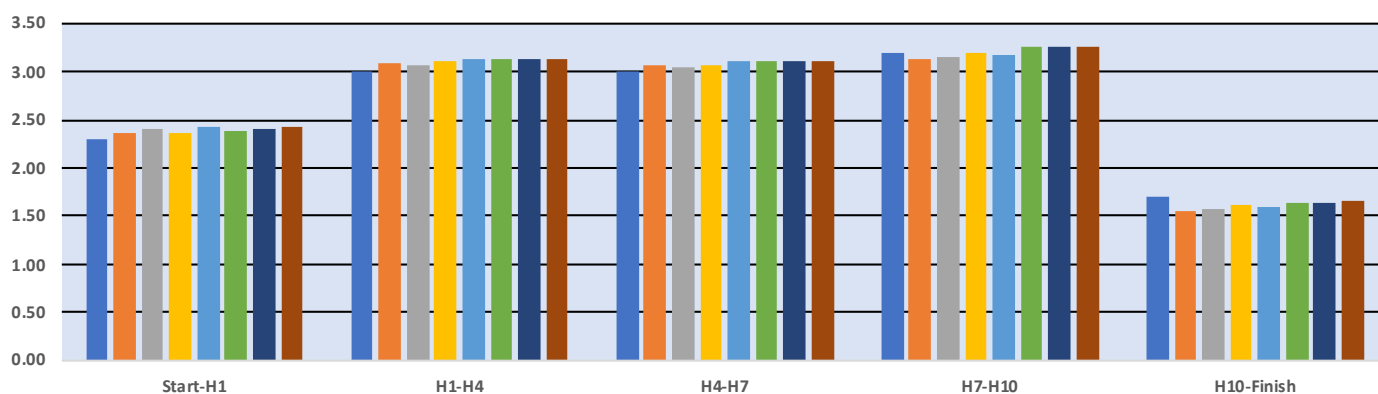
Heat 2

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Holloway, Grant (USA) (1997)	time		2.30	3.30	4.30	5.30	6.30	7.30	8.30	9.40	10.40	11.50		13.20	6 / 1			
	reaction time	0.147											1.70			3.00	3.00	3.20
	interval velocity		7 steps	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.10	1.10	8.25	8.33		9.14	9.14	8.57
Britt, Jamal (USA) (1998)	time		2.37	3.42	4.45	5.46	6.47	7.49	8.53	9.56	10.61	11.66		13.21	4 / 2			
	reaction time	0.136											1.55			3.09	3.07	3.13
	interval velocity		7 steps	1.05	1.03	1.01	1.01	1.02	1.04	1.03	1.05	1.05	9.05	8.33		8.87	8.93	8.76
Kwaou-Mathey, Just (FRA) (1999)	time		2.40	3.46	4.47	5.47	6.47	7.48	8.51	9.55	10.61	11.67		13.25	5 / 3			
	reaction time	0.171											1.58			3.07	3.04	3.16
	interval velocity		7 steps	1.06	1.01	1.00	1.00	1.01	1.03	1.04	1.06	1.06	8.87	8.30		8.93	9.02	8.68
Crittenden, Freddie (USA) (1994)	time		2.36	3.43	4.46	5.47	6.48	7.50	8.54	9.59	10.66	11.73		13.34	7 / 4			
	reaction time	0.136											1.61			3.11	3.07	3.19
	interval velocity			1.07	1.03	1.01	1.01	1.02	1.04	1.05	1.07	1.07	8.71	8.25		8.82	8.93	8.60
Martinot-Lagarde, Pascal (FRA) (1991)	time		2.42	3.49	4.52	5.56	6.59	7.63	8.68	9.73	10.79	11.85		13.45	3 / 5			
	reaction time	0.156											1.60			3.14	3.12	3.17
	interval velocity		7 steps	1.07	1.03	1.04	1.03	1.04	1.05	1.05	1.06	1.06	8.76	8.18		8.73	8.79	8.65
Alkana, Antonio (RSA) (1990)	time		2.39	3.46	4.50	5.52	6.54	7.57	8.62	9.69	10.78	11.88		13.52	2 / 6			
	reaction time	0.114											1.64			3.13	3.10	3.26
	interval velocity			1.07	1.04	1.02	1.02	1.03	1.05	1.07	1.09	1.10	8.55	8.14		8.76	8.85	8.41
Manga, Aurel (FRA) (1992)	time		2.41	3.48	4.52	5.55	6.58	7.61	8.67	9.76	10.84	11.92		13.55	1 / 7			
	reaction time	0.163											1.63			3.14	3.12	3.25
	interval velocity		7 steps	1.07	1.04	1.03	1.03	1.03	1.06	1.09	1.08	1.08	8.60	8.12		8.73	8.79	8.44
Pereira, Rafael (BRA) (1997)	time		2.42	3.48	4.52	5.55	6.56	7.61	8.65	9.72	10.81	11.90		13.57	8 / 8			
	reaction time	0.149											1.67			3.13	3.10	3.25
	interval velocity			1.06	1.04	1.03	1.01	1.05	1.04	1.07	1.09	1.09	8.40	8.11		8.76	8.85	8.44



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Fri 9 Jun 2023 20:31) - diamond league race analysis

<https://www.omegatiming.com/File/000203060101050102FFFFFFFFF4D.pdf>

Video: No Video Found

2023 Meeting de Paris (Paris, FRA)

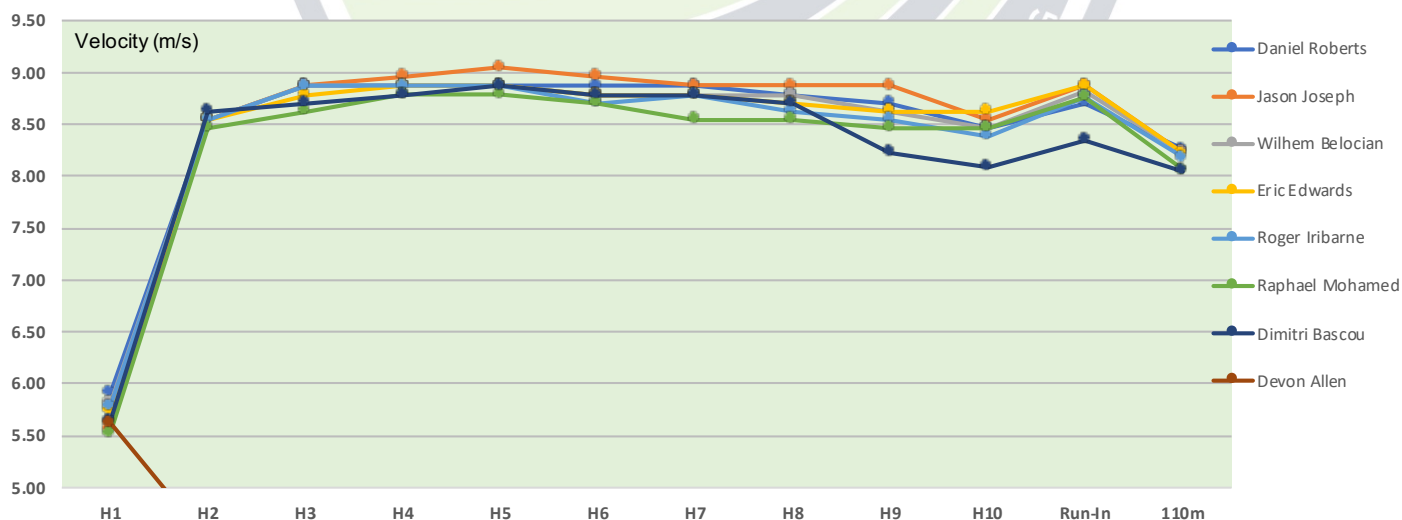
110m Hurdles

Date: 2023.06.09

Wind: -2.0 m/s

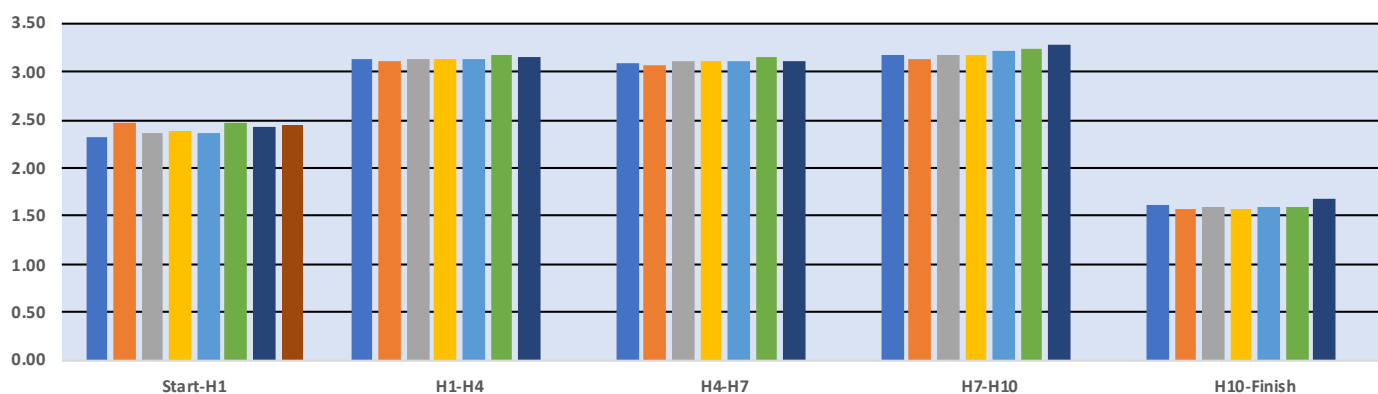
Heat 1

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Roberts, Daniel (USA) (1998)	time	2.32	3.39	4.42	5.45	6.48	7.51	8.54	9.58	10.63	11.71		13.32	3 / 1			
	reaction time	0.153													3.13	3.09	3.17
	interval		1.07	1.03	1.03	1.03	1.03	1.03	1.04	1.05	1.08	1.61			8.76	8.87	8.65
Joseph, Jason (SUI) (1998)	time	2.47	3.54	4.57	5.59	6.60	7.62	8.65	9.68	10.71	11.78		13.36	4 / 2			
	reaction time	0.201	7 steps												3.12	3.06	3.13
	interval		1.07	1.03	1.02	1.01	1.02	1.03	1.03	1.03	1.07	1.58			8.79	8.96	8.76
Belocian, Wilhem (FRA) (1995)	time	2.36	3.43	4.46	5.49	6.52	7.56	8.60	9.64	10.70	11.78		13.37	6 / 3			
	reaction time	0.129													3.13	3.11	3.18
	interval		1.07	1.03	1.03	1.03	1.04	1.04	1.04	1.06	1.08	1.59			8.76	8.82	8.62
Edwards, Eric (USA) (2000)	time	2.39	3.46	4.50	5.53	6.56	7.60	8.64	9.69	10.75	11.81		13.39	2 / 4			
	reaction time	0.149													3.14	3.11	3.17
	interval		1.07	1.04	1.03	1.03	1.04	1.04	1.05	1.06	1.06	1.58			8.73	8.82	8.65
Iribarne, Roger (CUB) (1996)	time	2.37	3.44	4.47	5.50	6.53	7.58	8.62	9.68	10.75	11.84		13.44	7 / 5			
	reaction time	0.152	7 steps												3.13	3.12	3.22
	interval		1.07	1.03	1.03	1.03	1.05	1.04	1.06	1.07	1.09	1.60			8.76	8.79	8.52
Mohamed, Raphael (FRA) (1998)	time	2.48	3.56	4.62	5.66	6.70	7.75	8.82	9.89	10.97	12.05		13.65	1 / 6			
	reaction time	0.165	7 steps												3.18	3.16	3.23
	interval		1.08	1.06	1.04	1.04	1.05	1.07	1.07	1.08	1.08	1.60			8.62	8.68	8.49
Bascou, Dimitri (FRA) (1987)	time	2.43	3.49	4.54	5.58	6.61	7.65	8.69	9.74	10.85	11.98		13.66	8 / 7			
	reaction time	0.162	7 steps												3.15	3.11	3.29
	interval		1.06	1.05	1.04	1.03	1.04	1.04	1.05	1.11	1.13	1.68			8.70	8.82	8.33
Allen, Devon (USA) (1994)	time	2.44	4.48										dnf	5 / --			
	reaction time	0.140	7 steps														
	interval		2.04														
	velocity	5.62	4.48														



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Fri 9 Jun 2023 20:30) - diamond league race analysis

<https://www.omegatiming.com/File/000203060101050101FFFFFFFFFFFF4D.pdf>

Video: No Video Found

2023 FBK Games (Hengelo, NED) (TV Analysis)

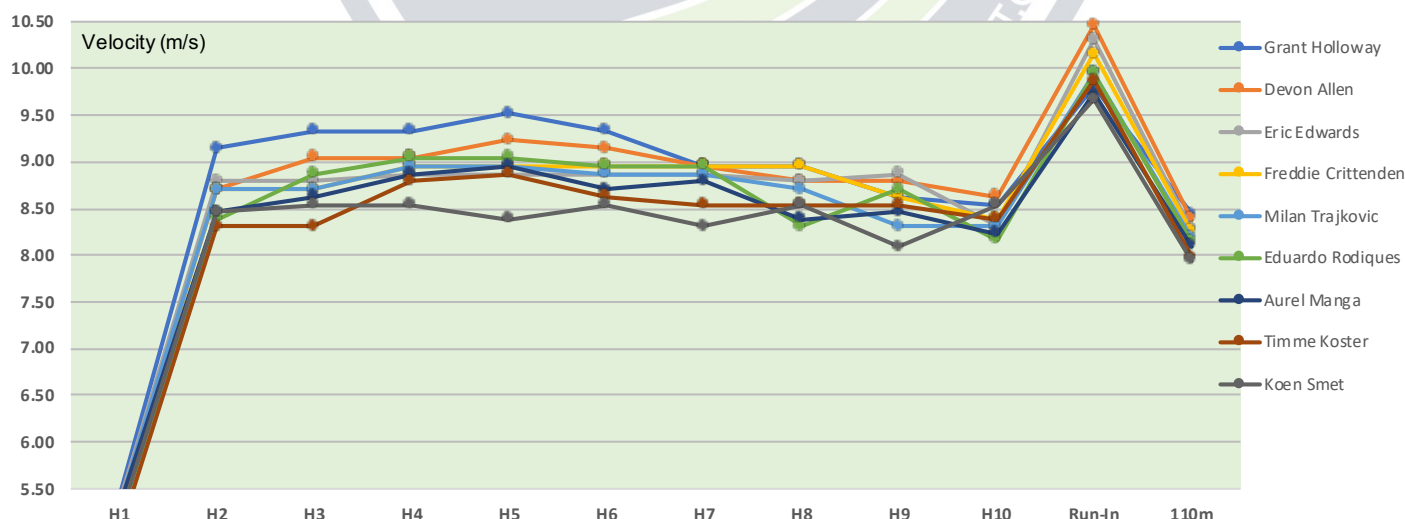
110m Hurdles

Date: 2023.06.04

Wind: 0.4 m/s

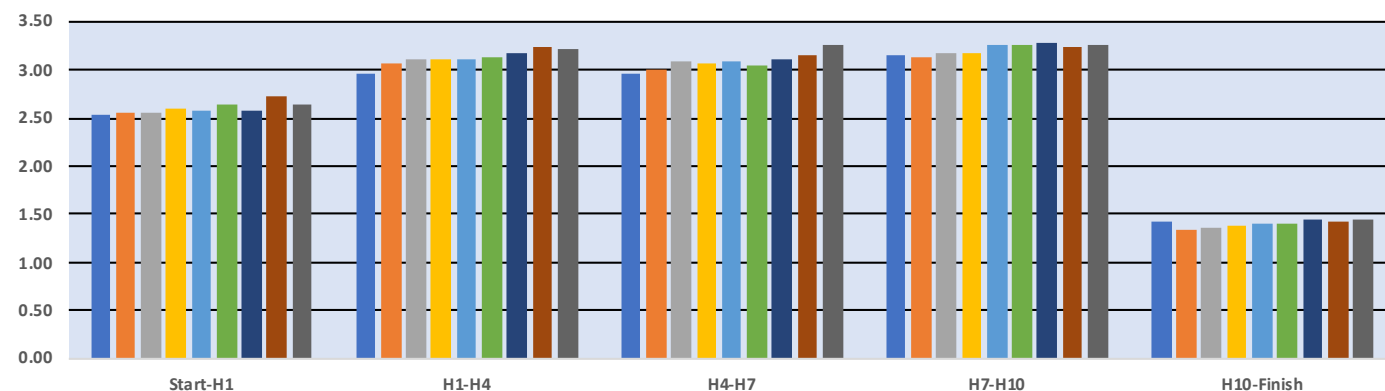
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Holloway, Grant (USA) (1997)	time		2.53	3.53	4.51	5.49	6.45	7.43	8.45	9.47	10.53	11.60		13.03	6 / 1			
	reaction time	0.187														2.96	2.96	3.15
	interval		7 steps	1.00	0.98	0.98	0.96	0.98	1.02	1.02	1.06	1.07	1.43			9.26	9.26	8.70
Allen, Devon (USA) (1994)	time		2.56	3.61	4.62	5.63	6.62	7.62	8.64	9.68	10.72	11.78		13.12	5 / 2			
	reaction time	0.137														3.07	3.01	3.14
	interval		7 steps	1.05	1.01	1.01	0.99	1.00	1.02	1.04	1.04	1.06	1.34			8.93	9.11	8.73
Edwards, Eric (USA) (2000)	time		2.56	3.60	4.64	5.67	6.70	7.73	8.76	9.80	10.83	11.93		13.29	3 / 3			
	reaction time	0.129														3.11	3.09	3.17
	interval		7 steps	1.04	1.04	1.03	1.03	1.03	1.03	1.04	1.03	1.10	1.36			8.82	8.87	8.65
Crittenden, Freddie (USA) (1994)	time		2.60	3.65	4.70	5.72	6.74	7.76	8.78	9.80	10.86	11.95		13.33	4 / 4			
	reaction time	0.145														3.12	3.06	3.17
	interval		7 steps	1.05	1.05	1.02	1.02	1.02	1.02	1.06	1.06	1.09	1.38			8.79	8.96	8.65
Trajkovic, Milan (CYP) (1992)	time		2.58	3.63	4.68	5.70	6.72	7.75	8.78	9.83	10.93	12.03		13.44	2 / 5			
	reaction time	0.117														3.12	3.08	3.25
	interval		7 steps	1.05	1.05	1.02	1.02	1.03	1.03	1.05	1.10	1.10	1.41			8.79	8.90	8.44
Rodrigues, Eduardo (BRA) (1995)	time		2.65	3.74	4.77	5.78	6.79	7.81	8.83	9.93	10.98	12.10		13.51	7 / 6			
	reaction time	0.149														3.13	3.05	3.27
	interval		7 steps	1.09	1.03	1.01	1.01	1.02	1.02	1.10	1.05	1.12	1.41			8.76	8.99	8.39
Manga, Aurel (FRA) (1992)	time		2.58	3.66	4.72	5.75	6.77	7.82	8.86	9.95	11.03	12.14		13.58	8 / 7			
	reaction time	0.151														3.17	3.11	3.28
	interval		7 steps	1.08	1.06	1.03	1.02	1.05	1.04	1.09	1.08	1.11	1.44			8.65	8.82	8.36
Koster, Timme (NED) (2002)	time		2.73	3.83	4.93	5.97	7.00	8.06	9.13	10.20	11.27	12.36		13.78	1 / 8			
	reaction time	0.157														3.24	3.16	3.23
	interval		7 steps	1.10	1.10	1.04	1.03	1.06	1.07	1.07	1.07	1.09	1.42			8.46	8.68	8.49
Smet, Koen (NED) (1992)	time		2.65	3.73	4.80	5.87	6.96	8.03	9.13	10.20	11.33	12.40		13.85	9 / 9			
	reaction time	0.147														3.22	3.26	3.27
	interval		7 steps	1.08	1.07	1.07	1.09	1.07	1.10	1.07	1.13	1.07	1.45			8.52	8.41	8.39
	velocity		5.18	8.46	8.54	8.54	8.39	8.54	8.31	8.54	8.09	8.54	9.67	7.94				



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=s1ydEfroTlQ>

2023 Golden Gala Pietro Mennea (Firenze, ITA) (TV Analysis)

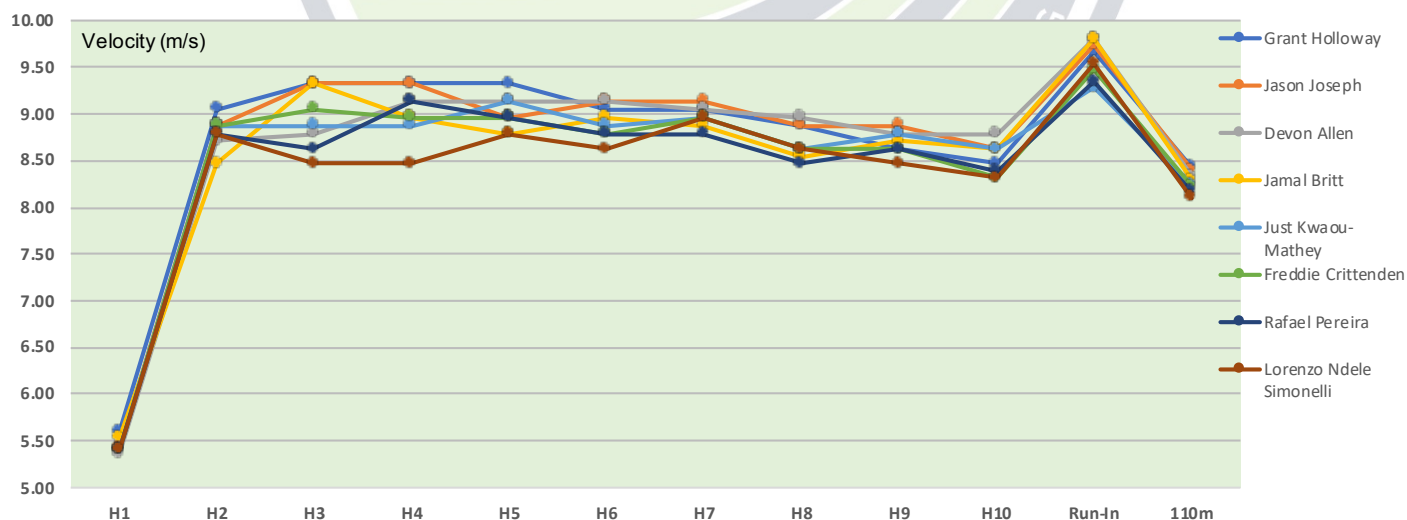
110m Hurdles

Date: 2023.06.02

Wind: -0.2 m/s

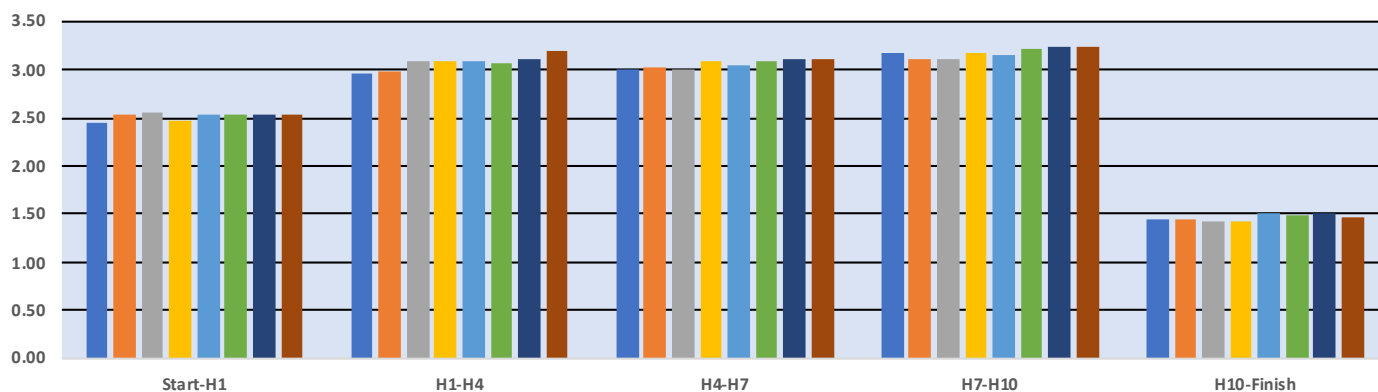
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Holloway, Grant (USA) (1997)	time		2.45	3.46	4.44	5.42	6.40	7.41	8.42	9.45	10.51	11.59		13.04	6 / 1			
	reaction time	0.152											1.45			2.97	3.00	3.17
	interval velocity		7 steps	1.01	0.98	0.98	0.98	1.01	1.01	1.03	1.06	1.08	1.45	8.44		9.23	9.14	8.65
Joseph, Jason (SUI) (1998)	time		2.53	3.56	4.54	5.52	6.54	7.54	8.54	9.57	10.60	11.66		13.10	3 / 2			
	reaction time	0.164											1.44			2.99	3.02	3.12
	interval velocity		7 steps	1.03	0.98	0.98	1.02	1.00	1.00	1.03	1.03	1.06	1.44	8.40		9.17	9.08	8.79
Allen, Devon (USA) (1994)	time		2.56	3.61	4.65	5.65	6.65	7.65	8.66	9.68	10.72	11.76		13.19	5 / 3			
	reaction time	0.136											1.43			3.09	3.01	3.10
	interval velocity		7 steps	1.05	1.04	1.00	1.00	1.00	1.01	1.02	1.04	1.04	1.43	8.34		8.87	9.11	8.85
Britt, Jamal (USA) (1998)	time		2.48	3.56	4.54	5.56	6.60	7.62	8.65	9.72	10.77	11.83		13.26	7 / 4			
	reaction time	0.134											1.43			3.08	3.09	3.18
	interval velocity		7 steps	1.08	0.98	1.02	1.04	1.02	1.03	1.07	1.05	1.06	1.43	8.30		8.90	8.87	8.62
Kwaou-Mathey, Just (FRA) (1999)	time		2.54	3.57	4.60	5.63	6.63	7.66	8.68	9.74	10.78	11.84		13.35	1 / 5			
	reaction time	0.161											1.51			3.09	3.05	3.16
	interval velocity		7 steps	1.03	1.03	1.03	1.00	1.03	1.02	1.06	1.04	1.06	1.51	8.24		8.87	8.99	8.68
Crittenden, Freddie (USA) (1994)	time		2.54	3.57	4.58	5.60	6.62	7.66	8.68	9.74	10.80	11.90		13.38	4 / 6			
	reaction time	0.132											1.48			3.06	3.08	3.22
	interval velocity			1.03	1.01	1.02	1.02	1.04	1.02	1.06	1.06	1.10	1.48	8.22		8.96	8.90	8.52
Pereira, Rafael (BRA) (1997)	time		2.54	3.58	4.64	5.64	6.66	7.70	8.74	9.82	10.88	11.97		13.47	2 / 7			
	reaction time	0.145											1.50			3.10	3.10	3.23
	interval velocity			1.04	1.06	1.00	1.02	1.04	1.04	1.08	1.06	1.09	1.50	8.17		8.85	8.85	8.49
Simonelli, Lorenzo Ndele (ITA) (2002)	time		2.54	3.58	4.66	5.74	6.78	7.84	8.86	9.92	11.00	12.10		13.57	8 / 8			
	reaction time	0.153											1.47			3.20	3.12	3.24
	interval velocity		7 steps	1.04	1.08	1.08	1.04	1.06	1.02	1.06	1.08	1.10	1.47	8.11		8.57	8.79	8.46



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=0onLK-sv6YQ>

2023 Meeting International Mohammed VI d'Athlétisme (Rabat, MAR)

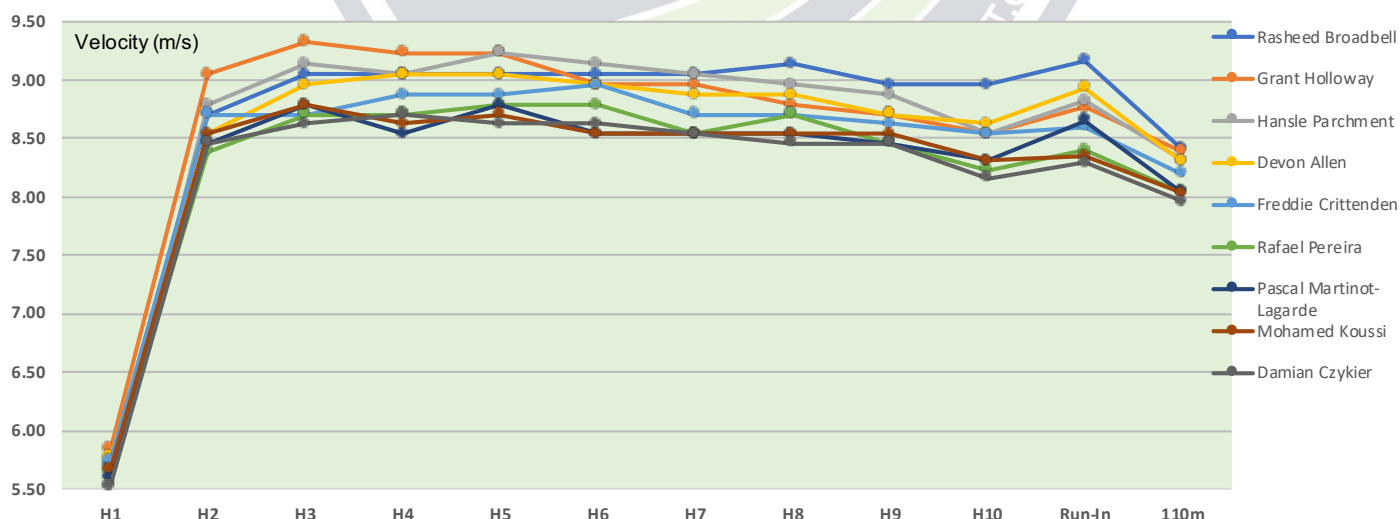
110m Hurdles

Date: 2023.05.28

Wind: -1.3 m/s

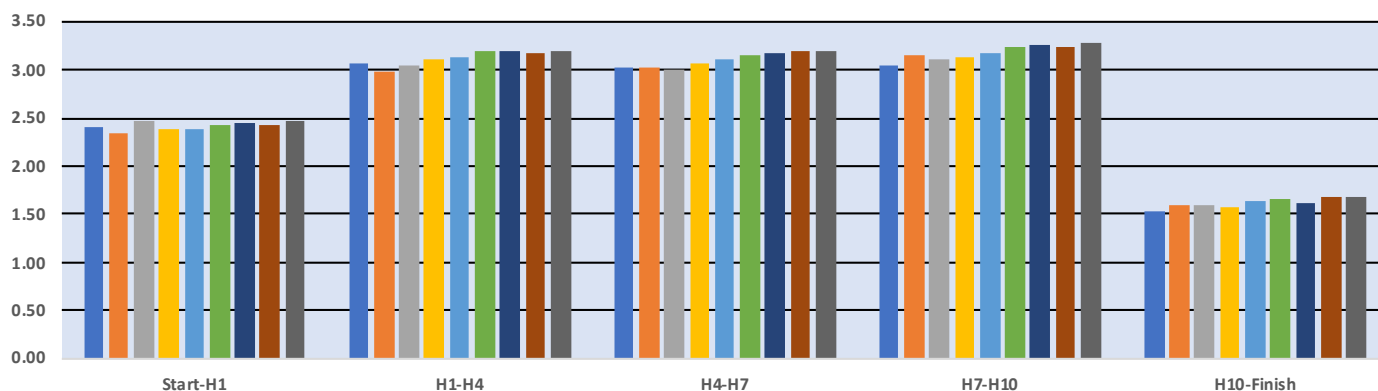
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Broadbell, Rasheed (JAM) (2000)	time	2.41	3.46	4.47	5.48	6.49	7.50	8.51	9.51	10.53	11.55		13.08	5 / 1			
	reaction time	0.161													3.07	3.03	3.04
	interval velocity	7 steps	1.05	1.01	1.01	1.01	1.01	1.01	1.00	1.02	1.02	1.53			8.93	9.05	9.02
Holloway, Grant (USA) (1997)	time	2.35	3.36	4.34	5.33	6.32	7.34	8.36	9.40	10.45	11.52		13.12	6 / 2			
	reaction time	0.177													2.98	3.03	3.16
	interval velocity	7 steps	1.01	0.98	0.99	0.99	1.02	1.02	1.04	1.05	1.07	1.60			9.20	9.05	8.68
Parchment, Hansle (JAM) (1990)	time	2.48	3.52	4.52	5.53	6.52	7.52	8.53	9.55	10.58	11.65		13.24	4 / 3			
	reaction time	0.157													3.05	3.00	3.12
	interval velocity	7 steps	1.04	1.00	1.01	0.99	1.00	1.01	1.02	1.03	1.07	1.59			8.99	9.14	8.79
Allen, Devon (USA) (1994)	time	2.38	3.45	4.47	5.48	6.49	7.51	8.54	9.57	10.62	11.68		13.25	3 / 4			
	reaction time	0.152													3.10	3.06	3.14
	interval velocity	7 steps	1.07	1.02	1.01	1.01	1.02	1.03	1.03	1.05	1.06	1.57			8.85	8.96	8.73
Crittenden, Freddie (USA) (1994)	time	2.39	3.44	4.49	5.52	6.55	7.57	8.62	9.67	10.73	11.80		13.43	7 / 5			
	reaction time	0.166													3.13	3.10	3.18
	interval velocity	7 steps	1.05	1.05	1.03	1.03	1.02	1.05	1.05	1.06	1.07	1.63			8.76	8.85	8.62
Pereira, Rafael (BRA) (1997)	time	2.43	3.52	4.57	5.62	6.66	7.70	8.77	9.82	10.90	12.01		13.68	8 / 6			
	reaction time	0.165													3.19	3.15	3.24
	interval velocity	7 steps	1.09	1.05	1.05	1.04	1.04	1.07	1.05	1.08	1.11	1.67			8.60	8.70	8.46
Martinot-Lagarde, Pascal (FRA) (1991)	time	2.45	3.53	4.57	5.64	6.68	7.75	8.82	9.89	10.97	12.07		13.69	2 / 7			
	reaction time	0.183													3.19	3.18	3.25
	interval velocity	7 steps	1.08	1.04	1.07	1.04	1.07	1.07	1.07	1.08	1.10	1.62			8.60	8.62	8.44
Koussi, Mohamed (MAR) (1994)	time	2.42	3.49	4.53	5.59	6.64	7.71	8.78	9.85	10.92	12.02		13.70	1 / 8			
	reaction time	0.141													3.17	3.19	3.24
	interval velocity	7 steps	1.07	1.04	1.06	1.05	1.07	1.07	1.07	1.07	1.10	1.68			8.65	8.60	8.46
Czykier, Damian (POL) (1992)	time	2.48	3.56	4.62	5.67	6.73	7.79	8.86	9.94	11.02	12.14		13.83	9 / 9			
	reaction time	0.193													3.19	3.19	3.28
	interval velocity	7 steps	1.08	1.06	1.05	1.06	1.06	1.07	1.08	1.08	1.12	1.69			8.60	8.60	8.36



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Sun 28 May 2023 19:39) - diamond league race analysis

<https://www.omegaitiming.com/File/000203040102070101FFFFFFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=..lCmbbEMMdWl>

2023 USATF Bermuda Grand Prix (Devonshire, BER) (TV Analysis)

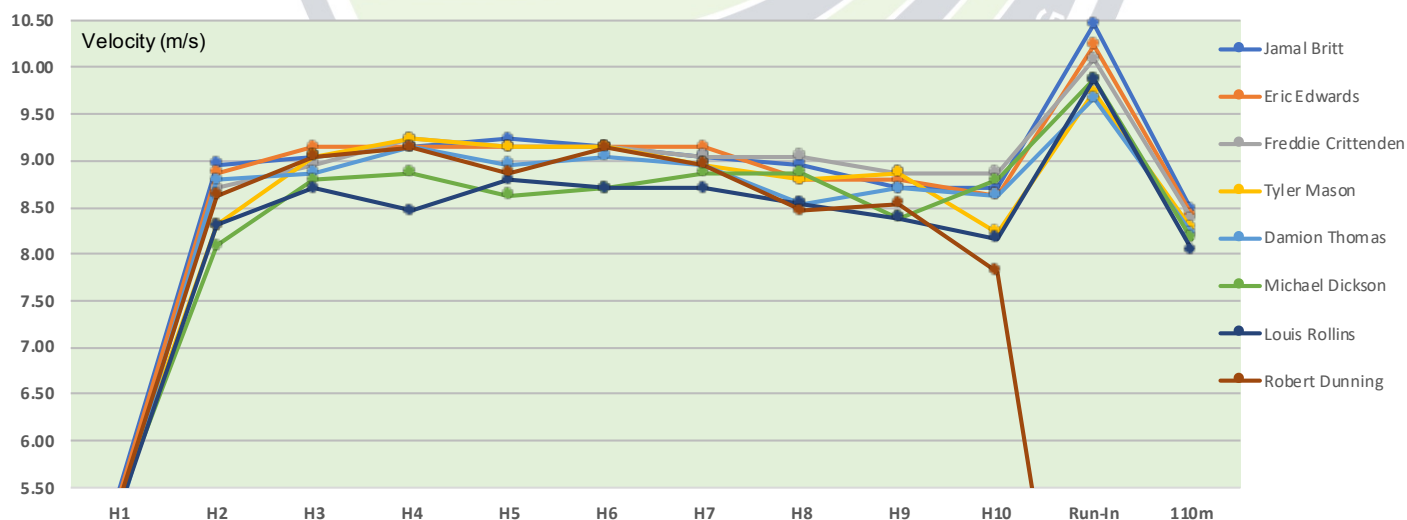
110m Hurdles

Date: 2023.05.21

Wind: 4.0 m/s

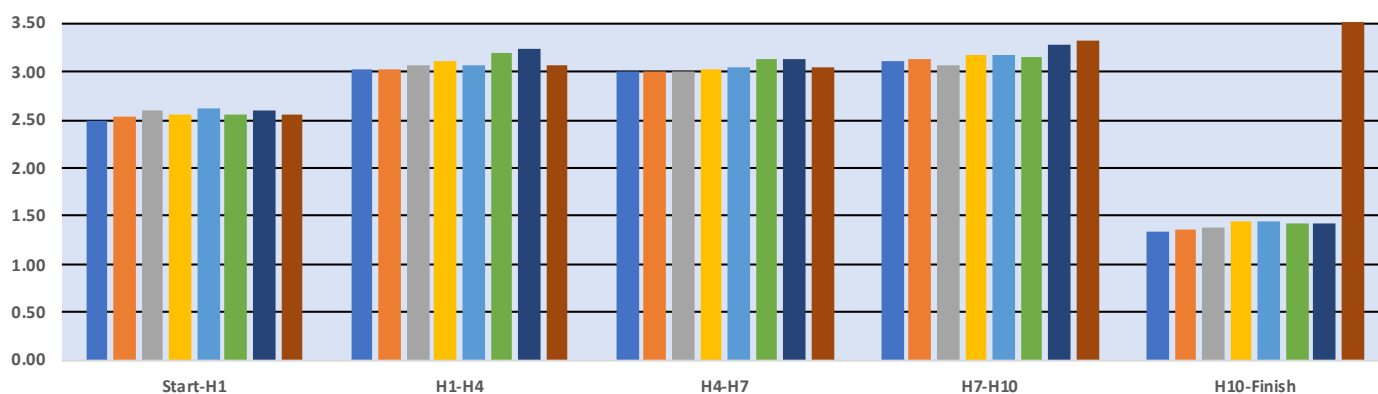
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Britt, Jamal (USA) (1998)	time		2.50	3.52	4.53	5.53	6.52	7.52	8.53	9.55	10.60	11.65		12.99	6 / 1			
	reaction time	0.124											1.34			3.03	3.00	3.12
	interval		7 steps	1.02	1.01	1.00	0.99	1.00	1.01	1.02	1.05	1.05	1.34			9.05	9.14	8.79
Edwards, Eric (USA) (2000)	time		2.53	3.56	4.56	5.56	6.56	7.56	8.56	9.60	10.64	11.70		13.07	2 / 2			
	reaction time	0.122											1.37			3.03	3.00	3.14
	interval		5.42	8.87	9.14	9.14	9.14	9.14	9.14	8.79	8.79	8.62	10.23	8.42		9.05	9.14	8.73
Crittenden, Freddie (USA) (1994)	time		2.60	3.65	4.67	5.66	6.66	7.66	8.67	9.68	10.71	11.74		13.13	4 / 3			
	reaction time	0.162											1.39			3.06	3.01	3.07
	interval		5.28	8.70	8.96	9.23	9.14	9.14	9.05	9.05	8.87	8.87	10.09	8.38		8.96	9.11	8.93
Mason, Tyler (JAM) (1995)	time		2.56	3.66	4.67	5.66	6.66	7.66	8.68	9.72	10.75	11.86		13.30	3 / 4			
	reaction time	0.155											1.44			3.10	3.02	3.18
	interval		5.36	8.31	9.05	9.23	9.14	9.14	8.96	8.79	8.87	8.23	9.74	8.27		8.85	9.08	8.62
Thomas, Damion (JAM) (1999)	time		2.63	3.67	4.70	5.70	6.72	7.73	8.75	9.82	10.87	11.93		13.38	8 / 5			
	reaction time	0.166											1.45			3.07	3.05	3.18
	interval		5.22	8.79	8.87	9.14	8.96	9.05	8.96	8.54	8.70	8.62	9.67	8.22		8.93	8.99	8.62
Dickson, Michael (USA) (1997)	time		2.56	3.69	4.73	5.76	6.82	7.87	8.90	9.93	11.02	12.06		13.48	7 / 6			
	reaction time	0.190											1.42			3.20	3.14	3.16
	interval		5.36	8.09	8.79	8.87	8.62	8.70	8.87	8.87	8.39	8.79	9.87	8.16		8.57	8.73	8.68
Rollins, Louis (USA) (1996)	time		2.60	3.70	4.75	5.83	6.87	7.92	8.97	10.04	11.13	12.25		13.67	1 / 7			
	reaction time	0.179											1.42			3.23	3.14	3.28
	interval		5.28	8.31	8.70	8.46	8.79	8.70	8.70	8.54	8.39	8.16	9.87	8.05		8.49	8.73	8.36
Dunning, Robert (USA) (1997)	time		2.56	3.62	4.63	5.63	6.66	7.66	8.68	9.76	10.83	12.00		22.28	5 / 8			
	reaction time	0.152											1.36			3.07	3.05	3.32
	interval		5.36	8.62	9.05	9.14	8.87	9.14	8.96	8.46	8.54	7.81	10.28	4.94		8.93	8.99	8.26



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=84HALcmTowc>

2023 NCAA Division II National Championships (Pueblo, CO) (Altitude) (TV Analysis)

110m Hurdles

Date: 2023.05.27

Wind: 6.0 m/s

FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Tinch, Cordell (USA) (2000)	time	2.50	3.50	4.50	5.48	6.46	7.44	8.41	9.43	10.43	11.46		12.87	5 / 1			
	reaction time														2.98	2.93	3.05
	interval	7 steps	1.00	1.00	0.98	0.98	0.98	0.97	1.02	1.00	1.03	1.41			9.20	9.36	8.99
	velocity	5.49	9.14	9.14	9.33	9.33	9.33	9.42	8.96	9.14	8.87	9.94	8.55				

2023 Trackwired Arkansas Grand Prix (Fayetteville, AR) (TV Analysis)

Date: 2023.05.23

Wind: 1.3 m/s

FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Tinch, Cordell (USA) (2000)	time	2.46	3.50	4.50	5.50	6.48	7.46	8.43	9.47	10.47	11.49		12.96	5 / 1			
	reaction time														3.04	2.93	3.06
	interval	7 steps	1.04	1.00	1.00	0.98	0.98	0.97	1.04	1.00	1.02	1.47			9.02	9.36	8.96
	velocity	5.58	8.79	9.14	9.14	9.33	9.33	9.42	8.79	9.14	8.96	9.54	8.49				
Ojora, Tade (GBR) (1999)	time	2.58	3.65	4.67	5.69	6.69	7.69	8.67	9.70	10.76	11.82		13.26	6 / 2			
	reaction time														3.11	2.98	3.15
	interval	7 steps	1.07	1.02	1.02	1.00	1.00	0.98	1.03	1.06	1.06	1.44			8.82	9.20	8.70
	velocity	5.32	8.54	8.96	8.96	9.14	9.14	9.33	8.87	8.62	8.62	9.74	8.30				

2023 MIAA Championships (Jefferson City, MO) (TV Analysis)

Date: 2023.05.07

Wind: 3.0 m/s

FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Tinch, Cordell (USA) (2000)	time	2.40	3.40	4.40	5.37	6.34	7.31	8.34	9.34	10.36	11.40		12.97	4 / 1			
	reaction time														2.97	2.97	3.06
	interval	7 steps	1.00	1.00	0.97	0.97	0.97	1.03	1.00	1.02	1.04	1.57			9.23	9.23	8.96
	velocity	5.72	9.14	9.14	9.42	9.42	9.42	8.87	9.14	8.96	8.79	8.93	8.48				

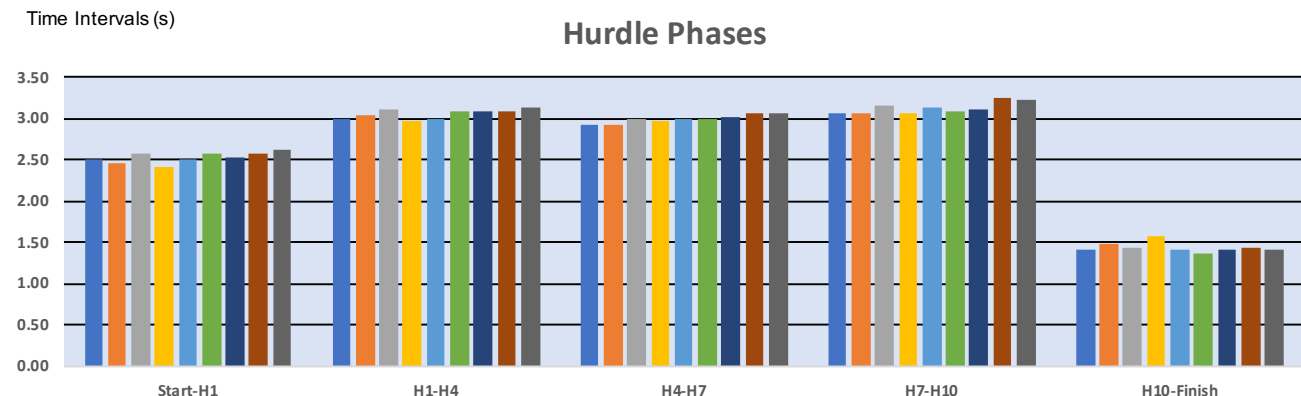
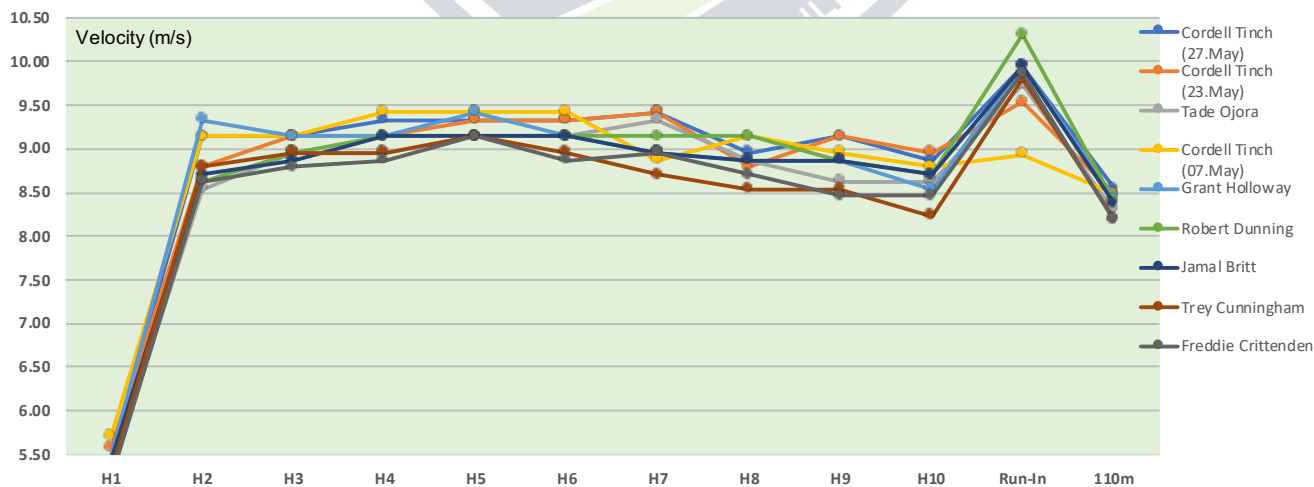
2023 Adidas Atlanta City Games (Atlanta, GA) (street) (TV Analysis)

Date: 2023.05.05

Wind: 0.0 m/s

FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Holloway, Grant (USA) (1997)	time	2.50	3.48	4.48	5.48	6.45	7.45	8.47	9.50	10.53	11.60		13.01	3 / 1			
	reaction time	0.181													2.98	2.99	3.13
	interval	7 steps	0.98	1.00	1.00	0.97	1.00	1.02	1.03	1.03	1.07	1.41			9.20	9.17	8.76
	velocity	5.49	9.33	9.14	9.14	9.42	9.14	8.96	8.87	8.87	8.54	9.94	8.46				
Dunning, Robert (USA) (1997)	time	2.57	3.63	4.65	5.65	6.65	7.65	8.65	9.65	10.68	11.73		13.09	1 / 2			
	reaction time	0.187													3.08	3.00	3.08
	interval	7 steps	1.06	1.02	1.00	1.00	1.00	1.00	1.00	1.03	1.05	1.36			8.90	9.14	8.90
	velocity	5.34	8.62	8.96	9.14	9.14	9.14	9.14	9.14	8.87	8.70	10.31	8.40				
Britt, Jamal (USA) (1998)	time	2.52	3.57	4.60	5.60	6.60	7.60	8.62	9.65	10.68	11.73		13.14	4 / 3			
	reaction time	0.188													3.08	3.02	3.11
	interval	7 steps	1.05	1.03	1.00	1.00	1.00	1.02	1.03	1.03	1.05	1.41			8.90	9.08	8.82
	velocity	5.44	8.70	8.87	9.14	9.14	9.14	8.96	8.87	8.87	8.70	9.94	8.37				
Cunningham, Trey (USA) (1998)	time	2.58	3.62	4.64	5.66	6.66	7.68	8.73	9.80	10.87	11.98		13.41	2 / 4			
	reaction time	0.174													3.08	3.07	3.25
	interval	7 steps	1.04	1.02	1.02	1.00	1.02	1.05	1.07	1.07	1.11	1.43			8.90	8.93	8.44
	velocity	5.32	8.79	8.96	8.96	9.14	8.96	8.70	8.54	8.54	8.23	9.80	8.20				
Crittenden, Freddie (USA) (1994)	time	2.62	3.68	4.72	5.75	6.75	7.78	8.80	9.85	10.93	12.01		13.43	5 / 5			
	reaction time	0.159													3.13	3.05	3.21
	interval		1.06	1.04	1.03	1.00	1.03	1.02	1.05	1.08	1.08	1.42			8.76	8.99	8.54
	velocity		5.24	8.62	8.79	8.87	9.14	8.87	8.70	8.46	8.46	9.87	8.19				



NCAA Division II National Championships
 Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 30fps
 Timing From: Gun Flash
 Source: <https://www.youtube.com/watch?v=4nMb81C6e24&t=3s>

Trackwired Arkansas Grand Prix
 Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 30fps
 Timing From: First Movenet
 Source: https://www.youtube.com/watch?v=RmydIBb_7C0

MIAA Championships
 Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 30fps
 Timing From: First Movenet
 Source: <https://www.youtube.com/shorts/jr107IX7SQg>

Adidas Atlanta City Games
 Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 30fps
 Timing From: Gun Flash
 Source: <https://www.youtube.com/watch?v=Nlrczyol0eY>

Women's 100m Hurdles

2023 Top 10 Times - Women's 100m Hurdles

Camacho-Quinn, Jasmine (PUR) (1996)	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 USATF Bermuda Grand Prix (Devonshire, BER) (TV Analysis)																
date 21-May time	2.50	3.52	4.46	5.40	6.32	7.25	8.19	9.13	10.10	11.06						
reaction time	0.153	interval	1.02	0.94	0.92	0.93	0.94	0.94	0.97	0.96	1.11				2.90	2.87
wind 3.5 m/s velocity	5.20	8.33	9.04	9.04	9.24	9.14	9.04	9.04	8.76	8.85	9.46	8.22			8.79	8.89
Harrison, Kendra (USA) (1992)	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Heat 3 - 2023 World Athletics Championships (Budapest, HUN) (TV Analysis)																
date 22-Aug time	2.50	3.47	4.44	5.39	6.31	7.26	8.21	9.15	10.12	11.11						
reaction time	0.132	interval	0.97	0.97	0.95	0.92	0.95	0.94	0.97	0.99	1.13				2.89	2.90
wind -0.2 m/s velocity	5.20	8.76	8.76	8.95	9.24	8.95	8.95	9.04	8.76	8.59	9.29	8.17			8.82	8.79
Nugent, Ackera (JAM) (2002)	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 NCAA Championships (Austin, TX) (TV Analysis)																
date 10-Jun time	2.44	3.42	4.39	5.32	6.27	7.20	8.15	9.10	10.09	11.08						
reaction time		interval	0.98	0.97	0.93	0.95	0.93	0.95	0.95	0.99	1.17				2.88	2.93
wind 3.8 m/s velocity	5.33	8.67	8.76	9.14	8.95	9.14	8.95	8.95	8.59	8.59	8.97	8.16			8.85	8.70
Camacho-Quinn, Jasmine (PUR) (1996)	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 UNF East Coast Relays (Jacksonville, FL) (TV Analysis)																
date 29-Apr time	2.56	3.60	4.56	5.50	6.43	7.35	8.30	9.25	10.20	11.20						
reaction time		interval	1.04	0.96	0.94	0.93	0.92	0.95	0.95	1.00	1.09				2.94	2.90
wind 3.2 m/s velocity	5.08	8.17	8.85	9.04	9.14	9.24	8.95	8.95	8.95	8.50	9.63	8.14			8.67	8.79
Harrison, Kendra (USA) (1992)	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 USATF New York City Grand Prix (Randalls Island, NY) (TV Analysis)																
date 24-Jun time	2.53	3.57	4.52	5.45	6.40	7.34	8.28	9.24	10.21	11.20						
reaction time	0.151	interval	1.04	0.95	0.93	0.95	0.94	0.94	0.96	0.97	1.09				2.92	2.92
wind 2.8 m/s velocity	5.14	8.17	8.95	9.14	8.95	9.04	9.04	8.85	8.76	8.59	9.63	8.14			8.73	8.73
Johnson, Alaysha (USA) (1996)	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 USATF New York City Grand Prix (Randalls Island, NY) (TV Analysis)																
date 24-Jun time	2.55	3.57	4.53	5.47	6.42	7.34	8.29	9.27	10.24	11.22						
reaction time	0.206	interval	1.02	0.96	0.94	0.95	0.92	0.95	0.98	0.97	1.08				2.92	2.93
wind 2.8 m/s velocity	5.10	8.33	8.85	9.04	8.95	9.24	8.95	8.67	8.76	8.67	9.72	8.13			8.73	8.70
Ali, Nia (USA) (1988)	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 Herculis Meeting International d'Athlétisme (Monaco, MON)																
date 21-Jul time	2.40	3.42	4.39	5.35	6.30	7.25	8.20	9.15	10.13	11.11						
reaction time	0.153	interval	1.02	0.97	0.96	0.95	0.95	0.95	0.95	0.98	1.19				2.95	2.91
wind 0.6 m/s velocity	5.42	8.33	8.76	8.85	8.95	8.95	8.95	8.95	8.67	8.67	8.82	8.13			8.64	8.76
Armstrong, Alia (USA) (2000)	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Heat 1 - 2023 SEC Championships (Baton Rouge, LA)																
date 12-May time																
reaction time		interval														
wind 2.2 m/s velocity																
Camacho-Quinn, Jasmine (PUR) (1996)	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 USATF Los Angeles Grand Prix (Westwood, CA) (TV Analysis)																
date 27-May time	2.50	3.52	4.50	5.44	6.38	7.32	8.28	9.24	10.19	11.16						
reaction time	0.158	interval	1.02	0.98	0.94	0.94	0.96	0.96	0.95	0.97	1.15				2.94	2.88
wind -0.2 m/s velocity	5.20	8.33	8.67	9.04	9.04	9.04	8.85	8.85	8.95	8.76	9.13	8.12			8.67	8.85
Harrison, Kendra (USA) (1992)	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 Herculis Meeting International d'Athlétisme (Monaco, MON)																
date 21-Jul time	2.42	3.44	4.42	5.36	6.30	7.24	8.18	9.13	10.10	11.09						
reaction time	0.165	interval	1.02	0.98	0.94	0.94	0.94	0.95	0.97	0.99	1.22				2.94	2.91
wind 0.6 m/s velocity	5.37	8.33	8.67	9.04	9.04	9.04	9.04	8.95	8.76	8.59	8.61	8.12			8.67	8.76
Russell, Masai (USA)	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 NCAA Championships (Austin, TX) (TV Analysis)																
date 10-Jun time	2.44	3.44	4.47	5.45	6.40	7.35	8.30	9.26	10.22	11.20						
reaction time		interval	1.00	1.03	0.98	0.95	0.95	0.95	0.96	0.96	1.12				3.01	2.90
wind 3.8 m/s velocity	5.33	8.50	8.25	8.67	8.95	8.95	8.95	8.85	8.85	8.67	9.37	8.12			8.47	8.79
Williams, Danielle (JAM) (1992)	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 USATF New York City Grand Prix (Randalls Island, NY) (TV Analysis)																
date 24-Jun time	2.47	3.50	4.46	5.42	6.37	7.31	8.26	9.22	10.21	11.21						
reaction time	0.331	interval	1.03	0.96	0.96	0.95	0.94	0.95	0.96	0.99	1.12				2.95	2.95
wind 2.8 m/s velocity	5.26	8.25	8.85	8.85	8.95	9.04	8.95	8.85	8.59	8.50	9.38	8.11			8.64	8.64
Harrison, Kendra (USA) (1992)	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Semi-Final 1 - 2023 World Athletics Championships (Budapest, HUN)																
date 23-Aug time	2.50	3.48	4.45	5.39	6.32	7.25	8.21	9.18	10.15	11.15						
reaction time	0.142	interval	0.98	0.97	0.94	0.93	0.96	0.97	0.97	1.00	1.18				2.89	2.94
wind 0.5 m/s velocity	5.20	8.67	8.76	9.04	9.14	9.14	8.85	8.76	8.76	8.50	8.90	8.11			8.82	8.67
Amusan, Tobi (NGR) (1997)	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 Prefontaine Classic (Eugene, OR)																
date 17-Sep time	2.42	3.44	4.41	5.37	6.30	7.24	8.18	9.14	10.10	11.09						
reaction time	0.134	interval	1.02	0.97	0.96	0.93	0.94	0.96	0.96	0.99	1.24				2.95	2.91
wind 1.8 m/s velocity	5.37	8.33	8.76	8.85	9.14	9.04	9.04	8.85	8.85	8.59	8.47	8.11			8.64	8.76

2023 Prefontaine Classic (Eugene, OR)

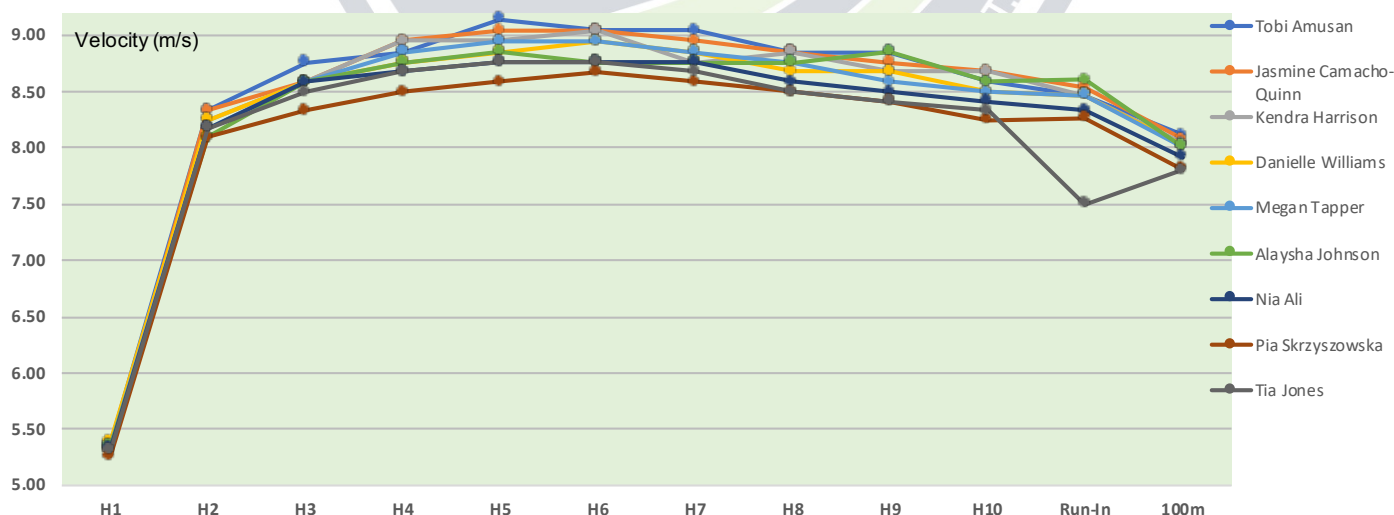
100m Hurdles

Date: 2023.09.17

Wind: 1.8 m/s

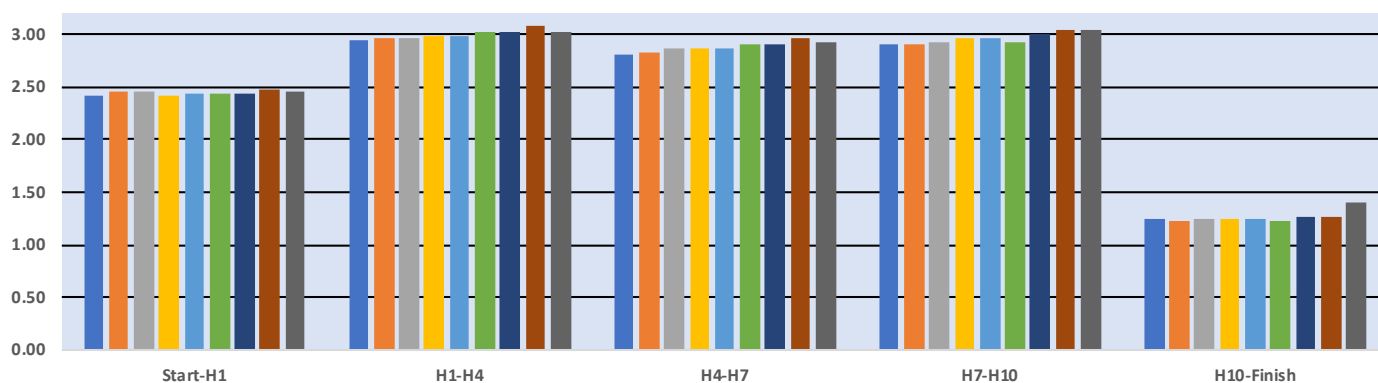
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Amusan, Tobi (NGR) (1997)	time	2.42	3.44	4.41	5.37	6.30	7.24	8.18	9.14	10.10	11.09		12.33	4 / 1			
	reaction time	0.134										1.24			2.95	2.81	2.91
	interval velocity		1.02	0.97	0.96	0.93	0.94	0.94	0.96	0.96	0.99	1.24			8.64	9.07	8.76
Camacho-Quinn, Jasmine (PUR) (199)	time	2.45	3.47	4.46	5.41	6.35	7.29	8.24	9.20	10.17	11.15		12.38	5 / 2			
	reaction time	0.140										1.23			2.96	2.83	2.91
	interval velocity		1.02	0.99	0.95	0.94	0.94	0.95	0.96	0.97	0.98	1.23			8.61	9.01	8.76
Harrison, Kendra (USA) (1992)	time	2.45	3.48	4.47	5.42	6.37	7.31	8.28	9.24	10.22	11.20		12.44	6 / 3			
	reaction time	0.166										1.24			2.97	2.86	2.92
	interval velocity		1.03	0.99	0.95	0.95	0.94	0.97	0.96	0.98	0.98	1.24			8.59	8.92	8.73
Williams, Danielle (JAM) (1992)	time	2.41	3.44	4.43	5.40	6.36	7.31	8.27	9.25	10.23	11.23		12.47	3 / 4			
	reaction time	0.140										1.24			2.99	2.87	2.96
	interval velocity		1.03	0.99	0.97	0.96	0.95	0.96	0.98	0.98	1.00	1.24			8.53	8.89	8.61
Tapper, Megan (JAM) (1994)	time	2.43	3.47	4.46	5.42	6.37	7.32	8.28	9.25	10.24	11.24		12.48	9 / 5			
	reaction time	0.148										1.24			2.99	2.86	2.96
	interval velocity		1.04	0.99	0.96	0.95	0.95	0.96	0.97	0.99	1.00	1.24			8.53	8.92	8.61
Johnson, Alaysha (USA) (1996)	time	2.43	3.48	4.47	5.44	6.40	7.37	8.34	9.31	10.27	11.26		12.48	7 / 6			
	reaction time	0.152										1.22			3.01	2.90	2.92
	interval velocity		1.05	0.99	0.97	0.96	0.97	0.97	0.97	0.96	0.99	1.22			8.47	8.79	8.73
Ali, Nia (USA) (1988)	time	2.44	3.48	4.47	5.45	6.42	7.39	8.36	9.35	10.35	11.36		12.62	2 / 7			
	reaction time	0.153										1.26			3.01	2.91	3.00
	interval velocity		1.04	0.99	0.98	0.97	0.97	0.97	0.99	1.00	1.01	1.26			8.47	8.76	8.50
Skrzysowska, Pia (POL) (2001)	time	2.47	3.52	4.54	5.54	6.53	7.51	8.50	9.50	10.51	11.54		12.81	1 / 8			
	reaction time	0.140										1.27			3.07	2.96	3.04
	interval velocity		1.05	1.02	1.00	0.99	0.98	0.99	1.00	1.01	1.03	1.27			8.31	8.61	8.39
Jones, Tia (USA) (2000)	time	2.45	3.49	4.49	5.47	6.44	7.41	8.39	9.39	10.40	11.42		12.82	8 / 9			
	reaction time	0.140										1.40			3.02	2.92	3.03
	interval velocity		1.04	1.00	0.98	0.97	0.97	0.98	1.00	1.01	1.02	1.40			8.44	8.73	8.42



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Sun 17 Sep 2023 14:08) - diamond league race analysis

<https://www.omegatiming.com/File/000203100101100101FFFFFFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=3FicMlUJs9k>

2023 Xiamen Diamond League (Xiamen, CHN)

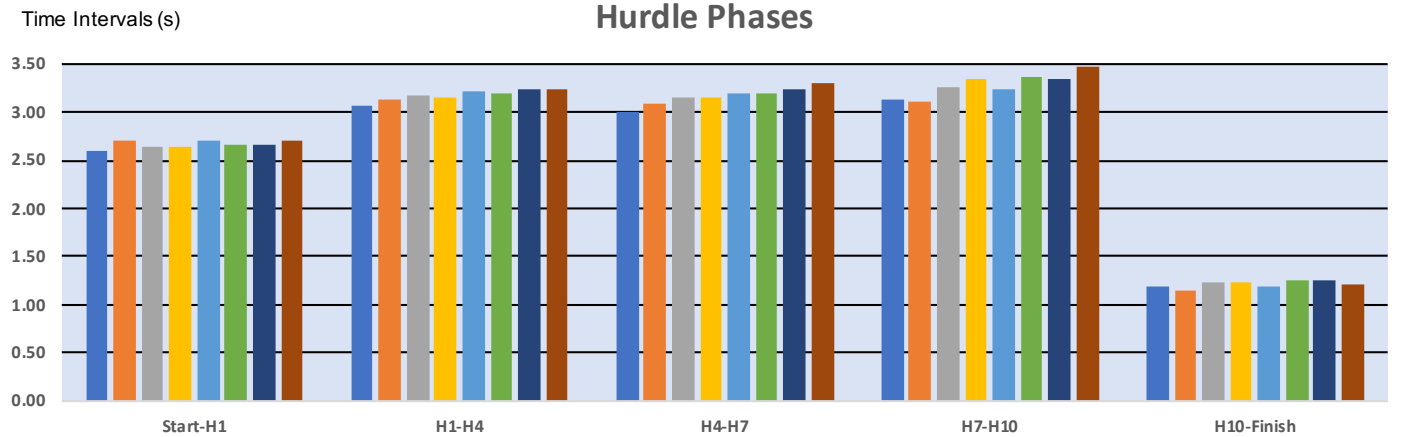
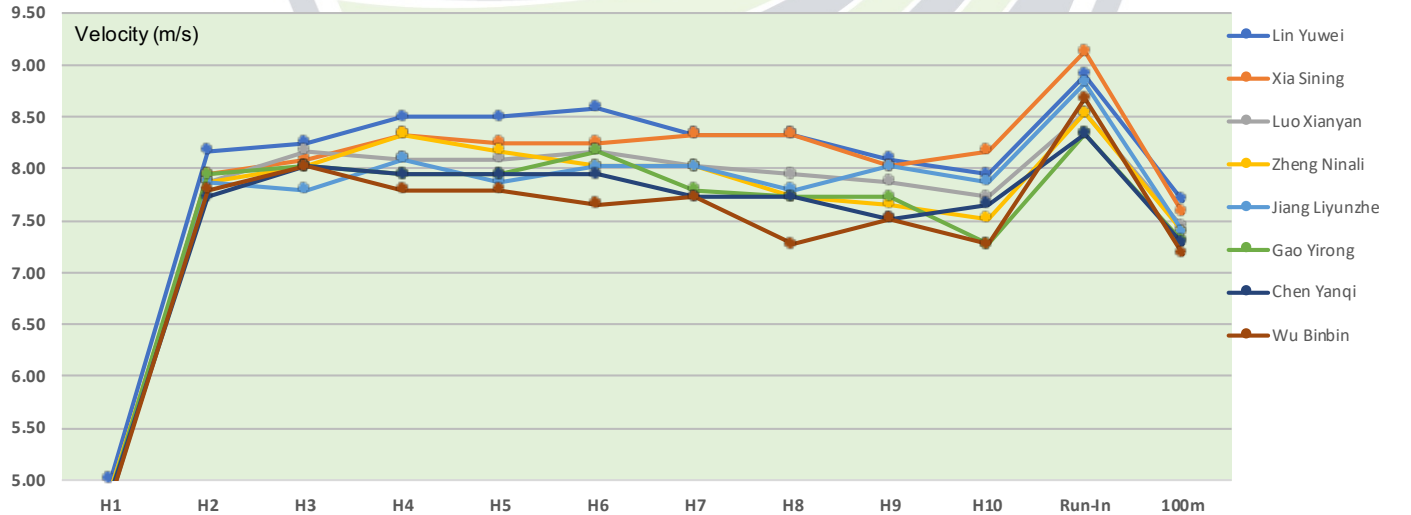
100m Hurdles

Date: 2023.09.02

Wind: 0.1 m/s

National FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Lin Yuwei (CHN) (1999)	time		2.60	3.64	4.67	5.67	6.67	7.66	8.68	9.70	10.75	11.82		13.00	5 / 1			
	reaction time	0.139		1.04	1.03	1.00	1.00	0.99	1.02	1.02	1.05	1.07	1.18			3.07	3.01	3.14
	interval velocity		5.00	8.17	8.25	8.50	8.50	8.59	8.33	8.33	8.10	7.94	8.90	7.69		8.31	8.47	8.12
Xia Sining (CHN) (2003)	time		2.70	3.77	4.82	5.84	6.87	7.90	8.92	9.94	11.00	12.04		13.19	6 / 2			
	reaction time	0.158		1.07	1.05	1.02	1.03	1.03	1.02	1.02	1.06	1.04	1.15			3.14	3.08	3.12
	interval velocity		4.81	7.94	8.10	8.33	8.25	8.25	8.33	8.33	8.02	8.17	9.13	7.58		8.12	8.28	8.17
Luo Xianyan (CHN) (1997)	time		2.65	3.73	4.77	5.82	6.87	7.91	8.97	10.04	11.12	12.22		13.45	7 / 3			
	reaction time	0.158		1.08	1.04	1.05	1.05	1.04	1.06	1.07	1.08	1.10	1.23			3.17	3.15	3.25
	interval velocity		4.91	7.87	8.17	8.10	8.10	8.17	8.02	7.94	7.87	7.73	8.54	7.43		8.04	8.10	7.85
Zheng Ninali (CHN) (1998)	time		2.65	3.73	4.79	5.81	6.85	7.91	8.97	10.07	11.18	12.31		13.54	2 / 4			
	reaction time	0.169		1.08	1.06	1.02	1.04	1.06	1.06	1.10	1.11	1.13	1.23			3.16	3.16	3.34
	interval velocity		4.91	7.87	8.02	8.33	8.17	8.02	8.02	7.73	7.66	7.52	8.54	7.39		8.07	8.07	7.63
Jiang Liyunzhe (CHN) (2002)	time		2.70	3.78	4.87	5.92	7.00	8.06	9.12	10.21	11.27	12.35		13.54	4 / 5			
	reaction time	0.155		1.08	1.09	1.05	1.08	1.06	1.06	1.09	1.06	1.08	1.19			3.22	3.20	3.23
	interval velocity		4.81	7.87	7.80	8.10	7.87	8.02	8.02	7.80	8.02	7.87	8.82	7.39		7.92	7.97	7.89
Gao Yirong (CHN) (2004)	time		2.67	3.74	4.80	5.87	6.94	7.98	9.07	10.17	11.27	12.44		13.70	8 / 6			
	reaction time	0.161		1.07	1.06	1.07	1.07	1.04	1.09	1.10	1.10	1.17	1.26			3.20	3.20	3.37
	interval velocity		4.87	7.94	8.02	7.94	7.94	8.17	7.80	7.73	7.73	7.26	8.33	7.30		7.97	7.97	7.57
Chen Yanqi (CHN) (2006)	time		2.67	3.77	4.83	5.90	6.97	8.04	9.14	10.24	11.37	12.48		13.74	9 / 7			
	reaction time	0.154		1.10	1.06	1.07	1.07	1.07	1.10	1.10	1.13	1.11	1.26	PB		3.23	3.24	3.34
	interval velocity		4.87	7.73	8.02	7.94	7.94	7.94	7.73	7.73	7.52	7.66	8.33	7.28		7.89	7.87	7.63
Wu Binbin (CHN) (2006)	time		2.70	3.79	4.85	5.94	7.03	8.14	9.24	10.41	11.54	12.71		13.92	3 / 8			
	reaction time	0.159		1.09	1.06	1.09	1.09	1.11	1.10	1.17	1.13	1.17	1.21			3.24	3.30	3.47
	interval velocity		4.81	7.80	8.02	7.80	7.80	7.66	7.73	7.26	7.52	7.26	8.68	7.18		7.87	7.73	7.35



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1080 @ 30fps
Timing From: First Movement
Sources: Video from Coach

100m Hurdles

Date: 2023.08.31

Wind: -0.2 m/s

FINAL

Velocity (m/s)

Sprinter	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m
Danielle Williams	5.50	8.25	8.60	8.75	8.70	8.85	8.60	8.55	8.30	8.30	8.45	7.90
Alaysha Johnson	5.30	8.20	8.65	8.85	8.85	8.85	8.75	8.45	8.50	8.40	8.60	7.90
Kendra Harrison	5.30	8.10	8.15	8.60	8.60	8.60	8.40	8.35	8.10	7.80	7.40	7.65
Tia Jones	5.30	8.25	8.70	8.75	8.85	8.85	8.75	8.55	8.45	8.40	8.30	7.90
Megan Tapper	5.50	8.25	8.60	8.70	8.70	8.85	8.60	8.55	8.30	8.30	8.45	7.90
Ditaji Kambundji	5.30	8.20	8.60	8.70	8.70	8.75	8.65	8.40	8.25	8.05	8.20	7.85
Nia Ali	5.30	8.20	8.45	8.65	8.65	8.65	8.65	8.45	8.30	8.15	8.25	7.85
Devynne Charlton	5.30	8.20	8.40	8.60	8.65	8.65	8.65	8.45	8.30	8.10	8.30	7.85
Pia Skrzyszowska	5.30	8.10	8.15	8.60	8.60	8.60	8.40	8.35	8.10	7.80	7.40	7.65

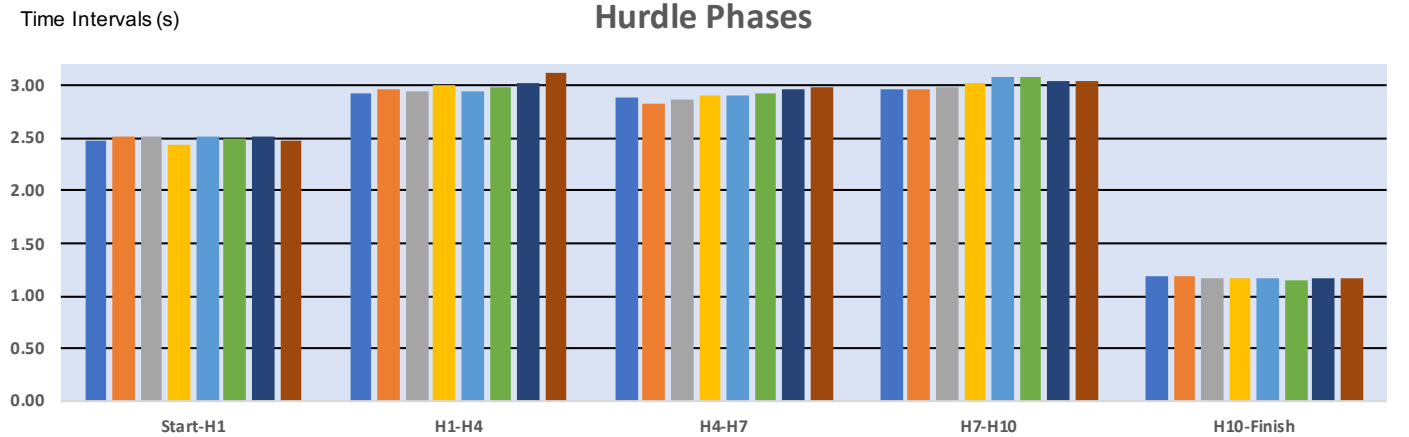
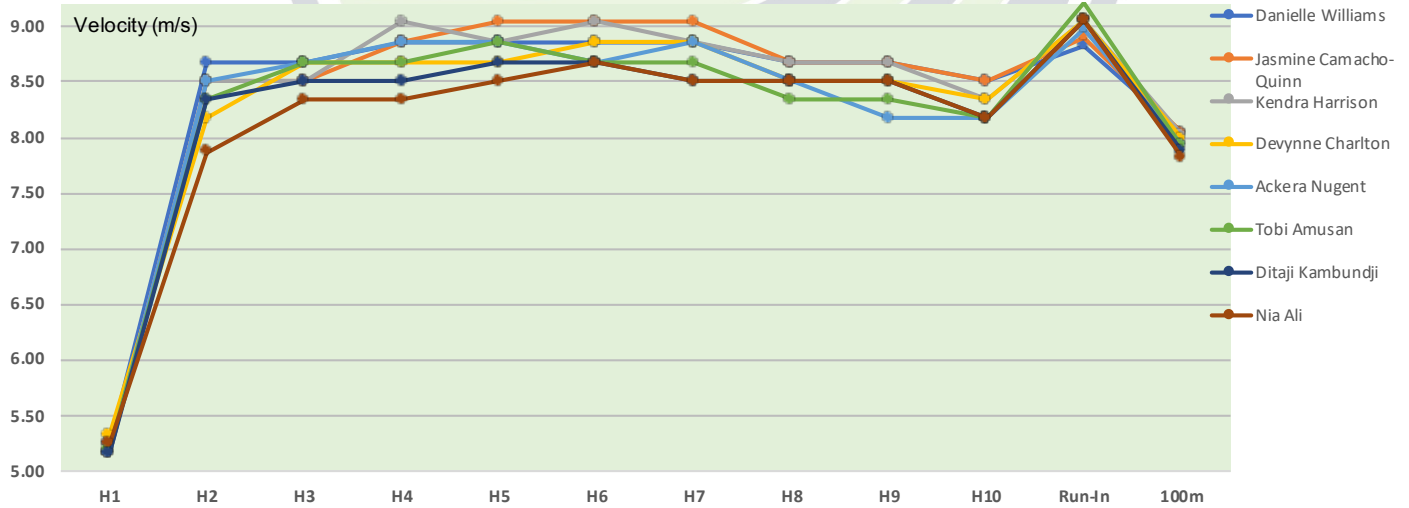
Hurdle Phases



Biomechanical Analysis

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

100m Hurdles		Date: 2023.08.24		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
Williams, Danielle (JAM) (1992)	time		2.48	3.46	4.44	5.40	6.36	7.32	8.28	9.26	10.24	11.24		12.43	2 / 1				
	reaction time	0.132												1.19			2.92	2.88	2.96
	interval			0.98	0.98	0.96	0.96	0.96	0.96	0.98	0.98	1.00	1.19			8.73	8.85	8.61	
Camacho-Quinn, Jasmine (PUR) (199)	time		2.52	3.52	4.52	5.48	6.42	7.36	8.30	9.28	10.26	11.26		12.44	7 / 2				
	reaction time	0.164											1.18			2.96	2.82	2.96	
	interval			1.00	1.00	0.96	0.94	0.94	0.94	0.98	0.98	1.00	1.18			8.61	9.04	8.61	
Harrison, Kendra (USA) (1992)	time		2.52	3.52	4.52	5.46	6.42	7.36	8.32	9.30	10.28	11.30		12.46	4 / 3				
	reaction time	0.155											1.16			2.94	2.86	2.98	
	interval			1.00	1.00	0.94	0.96	0.94	0.96	0.98	0.98	1.02	1.16			8.67	8.92	8.56	
Charlton, Devynne (BAH) (1995)	time		2.44	3.48	4.46	5.44	6.42	7.38	8.34	9.34	10.34	11.36		12.52	6 / 4				
	reaction time	0.149											1.16			3.00	2.90	3.02	
	interval			1.04	0.98	0.98	0.98	0.96	0.96	1.00	1.00	1.02	1.16			8.50	8.79	8.44	
Nugent, Ackera (JAM) (2002)	time		2.52	3.52	4.50	5.46	6.42	7.40	8.36	9.36	10.40	11.44		12.61	8 / 5				
	reaction time	0.135											1.17			2.94	2.90	3.08	
	interval			1.00	0.98	0.96	0.96	0.98	0.96	1.00	1.04	1.04	1.17			8.67	8.79	8.28	
Amusan, Tobi (NGR) (1997)	time		2.50	3.52	4.50	5.48	6.44	7.42	8.40	9.42	10.44	11.48		12.62	5 / 6				
	reaction time	0.152											1.14			2.98	2.92	3.08	
	interval			1.02	0.98	0.98	0.96	0.98	0.98	1.02	1.02	1.04	1.14			8.56	8.73	8.28	
Kambundji, Ditaji (SUI) (2002)	time		2.52	3.54	4.54	5.54	6.52	7.50	8.50	9.50	10.50	11.54		12.70	9 / 7				
	reaction time	0.140											1.16			3.02	2.96	3.04	
	interval			1.02	1.00	1.00	0.98	0.98	1.00	1.00	1.00	1.04	1.16			8.44	8.61	8.39	
Ali, Nia (USA) (1988)	time		2.48	3.56	4.58	5.60	6.60	7.58	8.58	9.58	10.58	11.62		12.78	3 / 8				
	reaction time	0.159											1.16			3.12	2.98	3.04	
	interval			1.08	1.02	1.02	1.00	0.98	1.00	1.00	1.00	1.04	1.16			8.17	8.56	8.39	



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.youtube.com/watch?v=ZP37H2mcdkI>

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

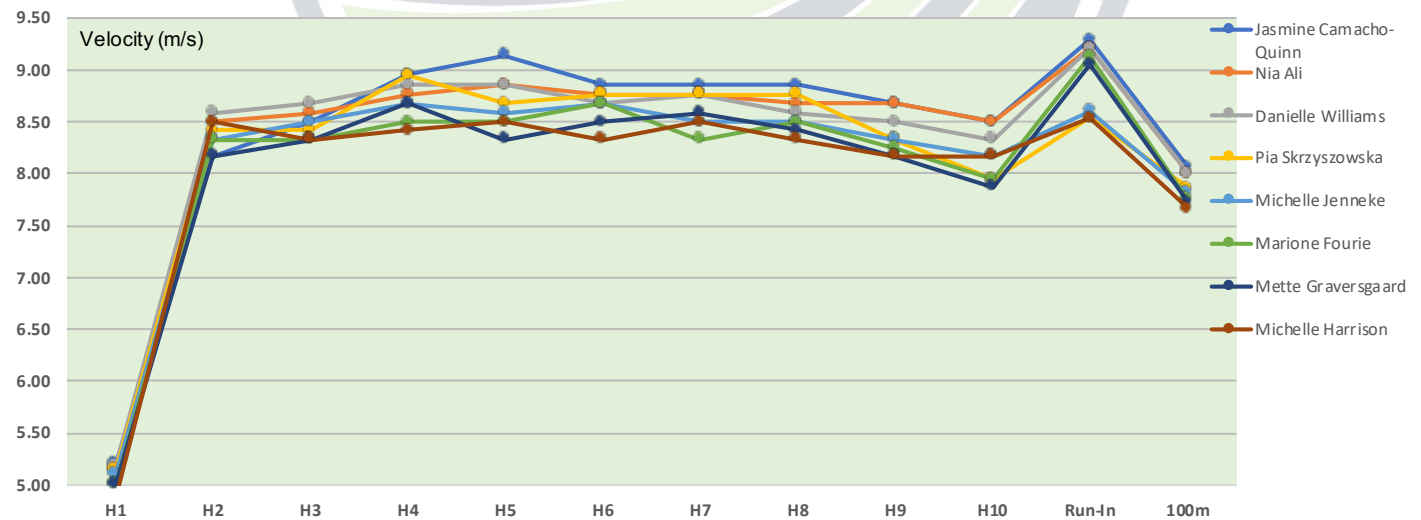
100m Hurdles

Date: 2023.08.23

Wind: -0.4 m/s

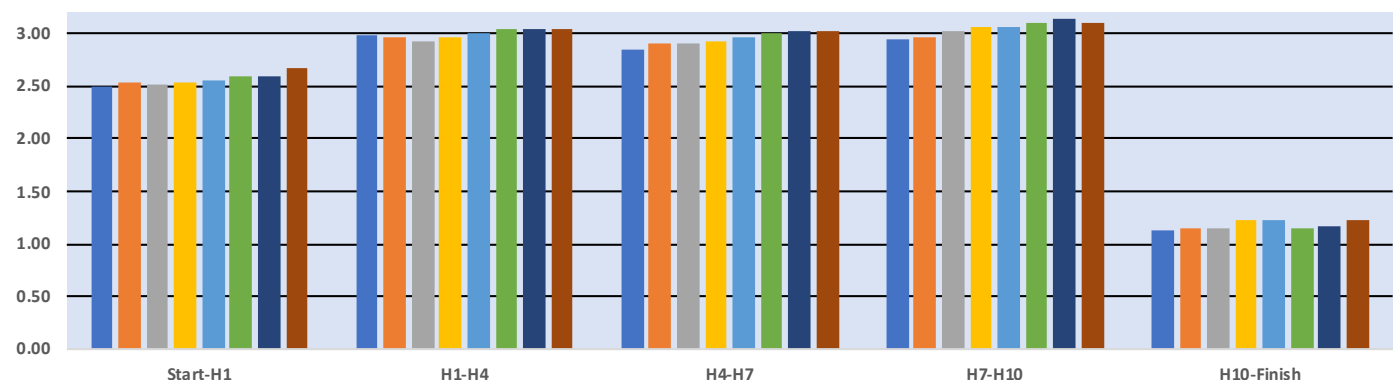
Semi-Final 3

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Camacho-Quinn, Jasmine (PUR) (199)	time		2.50	3.54	4.54	5.49	6.42	7.38	8.34	9.30	10.28	11.28		12.41	5 / 1			
	reaction time	0.138											1.13			2.99	2.85	2.94
	interval			1.04	1.00	0.95	0.93	0.96	0.96	0.96	0.98	1.00	1.13			8.53	8.95	8.67
	velocity		5.20	8.17	8.50	8.95	9.14	8.85	8.85	8.85	8.67	8.50	9.29	8.06				
Ali, Nia (USA) (1988)	time		2.53	3.53	4.52	5.49	6.45	7.42	8.39	9.37	10.35	11.35		12.49	6 / 2			
	reaction time	0.156											1.14			2.96	2.90	2.96
	interval			1.00	0.99	0.97	0.96	0.97	0.97	0.98	0.98	1.00	1.14			8.61	8.79	8.61
	velocity		5.14	8.50	8.59	8.76	8.85	8.76	8.76	8.67	8.67	8.50	9.21	8.01				
Williams, Danielle (JAM) (1992)	time		2.51	3.50	4.48	5.44	6.40	7.38	8.35	9.34	10.34	11.36		12.50	4 / 3			
	reaction time	0.133											1.14			2.93	2.91	3.01
	interval			0.99	0.98	0.96	0.96	0.98	0.97	0.99	1.00	1.02	1.14			8.70	8.76	8.47
	velocity		5.18	8.59	8.67	8.85	8.85	8.67	8.76	8.59	8.50	8.33	9.21	8.00				
Skrzysowska, Pia (POL) (2001)	time		2.53	3.54	4.55	5.50	6.48	7.45	8.42	9.39	10.41	11.48		12.71	7 / 4			
	reaction time	0.136											1.23			2.97	2.92	3.06
	interval			1.01	1.01	0.95	0.98	0.97	0.97	0.97	1.02	1.07	1.23			8.59	8.73	8.33
	velocity		5.14	8.42	8.42	8.95	8.67	8.76	8.76	8.76	8.33	7.94	8.54	7.87				
Jenneke, Michelle (AUS) (1993)	time		2.55	3.57	4.57	5.55	6.54	7.52	8.52	9.52	10.54	11.58		12.80	3 / 5			
	reaction time	0.146											1.22			3.00	2.97	3.06
	interval			1.02	1.00	0.98	0.99	0.98	1.00	1.00	1.02	1.04	1.22			8.50	8.59	8.33
	velocity		5.10	8.33	8.50	8.67	8.59	8.67	8.50	8.50	8.33	8.17	8.61	7.81				
Fourie, Marione (RSA) (2002)	time		2.60	3.62	4.64	5.64	6.64	7.62	8.64	9.64	10.67	11.74		12.89	8 / 6			
	reaction time	0.158											1.15			3.04	3.00	3.10
	interval			1.02	1.02	1.00	1.00	0.98	1.02	1.00	1.03	1.07	1.15			8.39	8.50	8.23
	velocity		5.00	8.33	8.33	8.50	8.50	8.67	8.33	8.50	8.25	7.94	9.13	7.76				
Graversgaard, Mette (DEN) (1995)	time		2.60	3.64	4.66	5.64	6.66	7.66	8.65	9.66	10.70	11.78		12.94	9 / 7			
	reaction time	0.163											1.16			3.04	3.01	3.13
	interval			1.04	1.02	0.98	1.02	1.00	0.99	1.01	1.04	1.08	1.16			8.39	8.47	8.15
	velocity		5.00	8.17	8.33	8.67	8.33	8.50	8.59	8.42	8.17	7.87	9.05	7.73				
Harrison, Michelle (CAN) (1992)	time		2.67	3.67	4.69	5.70	6.70	7.72	8.72	9.74	10.78	11.82		13.05	2 / 8			
	reaction time	0.158											1.23			3.03	3.02	3.10
	interval			1.00	1.02	1.01	1.00	1.02	1.00	1.02	1.04	1.04	1.23			8.42	8.44	8.23
	velocity		4.87	8.50	8.33	8.42	8.50	8.33	8.50	8.33	8.17	8.17	8.54	7.66				



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=Dl7mFHJLP8>

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

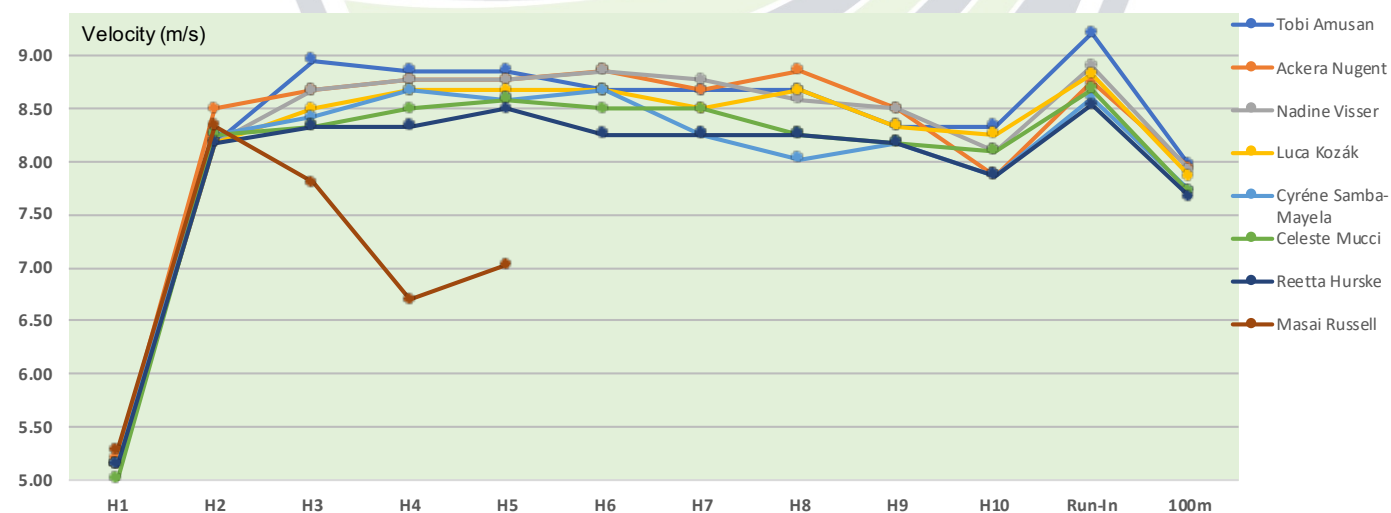
100m Hurdles

Date: 2023.08.23

Wind: -0.7 m/s

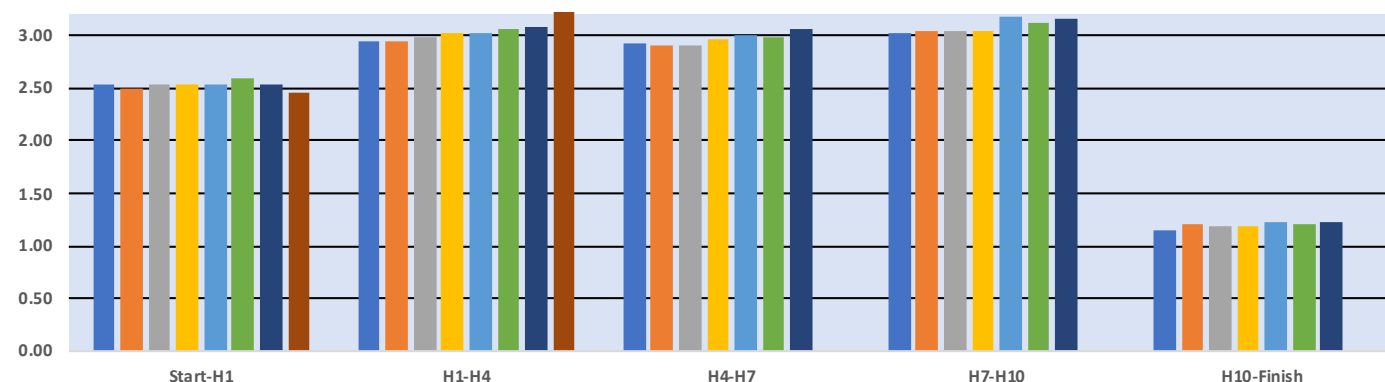
Semi-Final 2

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Amusan, Tobi (NGR) (1997)	time		2.53	3.57	4.52	5.48	6.44	7.42	8.40	9.38	10.40	11.42		12.56	7 / 1			
	reaction time	0.155											1.14			2.95	2.92	3.02
	interval velocity		5.14	8.17	8.95	8.85	8.85	8.67	8.67	8.67	8.33	8.33	9.21	7.96		8.64	8.73	8.44
Nugent, Ackera (JAM) (2002)	time		2.50	3.50	4.48	5.45	6.42	7.38	8.36	9.32	10.32	11.40		12.60	5 / 2			
	reaction time	0.130											1.20			2.95	2.91	3.04
	interval velocity		5.20	8.50	8.67	8.76	8.76	8.85	8.67	8.85	8.50	7.87	8.75	7.94		8.64	8.76	8.39
Visser, Nadine (NED) (1995)	time		2.53	3.57	4.55	5.52	6.49	7.45	8.42	9.41	10.41	11.46		12.64	6 / 3			
	reaction time	0.131											1.18			2.99	2.90	3.04
	interval velocity		5.14	8.17	8.67	8.76	8.76	8.85	8.76	8.59	8.50	8.10	8.90	7.91		8.53	8.79	8.39
Kozák, Luca (HUN) (1996)	time		2.53	3.57	4.57	5.55	6.53	7.51	8.51	9.49	10.51	11.54		12.73	3 / 4			
	reaction time	0.142											1.19			3.02	2.96	3.03
	interval velocity		5.14	8.17	8.50	8.67	8.67	8.67	8.50	8.67	8.33	8.25	8.82	7.86		8.44	8.61	8.42
Samba-Mayela, Cyréna (FRA) (2000)	time		2.53	3.56	4.57	5.55	6.54	7.52	8.55	9.61	10.65	11.73		12.95	8 / 5			
	reaction time	0.170											1.22			3.02	3.00	3.18
	interval velocity		5.14	8.25	8.42	8.67	8.59	8.67	8.25	8.02	8.17	7.87	8.61	7.72		8.44	8.50	8.02
Mucci, Celeste (AUS) (1999)	time		2.60	3.63	4.65	5.65	6.64	7.64	8.64	9.67	10.71	11.76		12.97	2 / 6			
	reaction time	0.175											1.21			3.05	2.99	3.12
	interval velocity		5.00	8.25	8.33	8.50	8.59	8.50	8.50	8.25	8.17	8.10	8.68	7.71		8.36	8.53	8.17
Hurske, Reetta (FIN) (1995)	time		2.53	3.57	4.59	5.61	6.61	7.64	8.67	9.70	10.74	11.82		13.05	9 / 7			
	reaction time	0.137											1.23			3.08	3.06	3.15
	interval velocity		5.14	8.17	8.33	8.33	8.50	8.25	8.25	8.25	8.17	7.87	8.54	7.66		8.28	8.33	8.10
Russell, Masai (USA) (2000)	time		2.46	3.48	4.57	5.84	7.05							dnf	4 / --			
	reaction time	0.152														3.38		
	interval velocity		5.28	8.33	7.80	6.69	7.02									7.54		



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=QbrXXJQ-IDY>

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

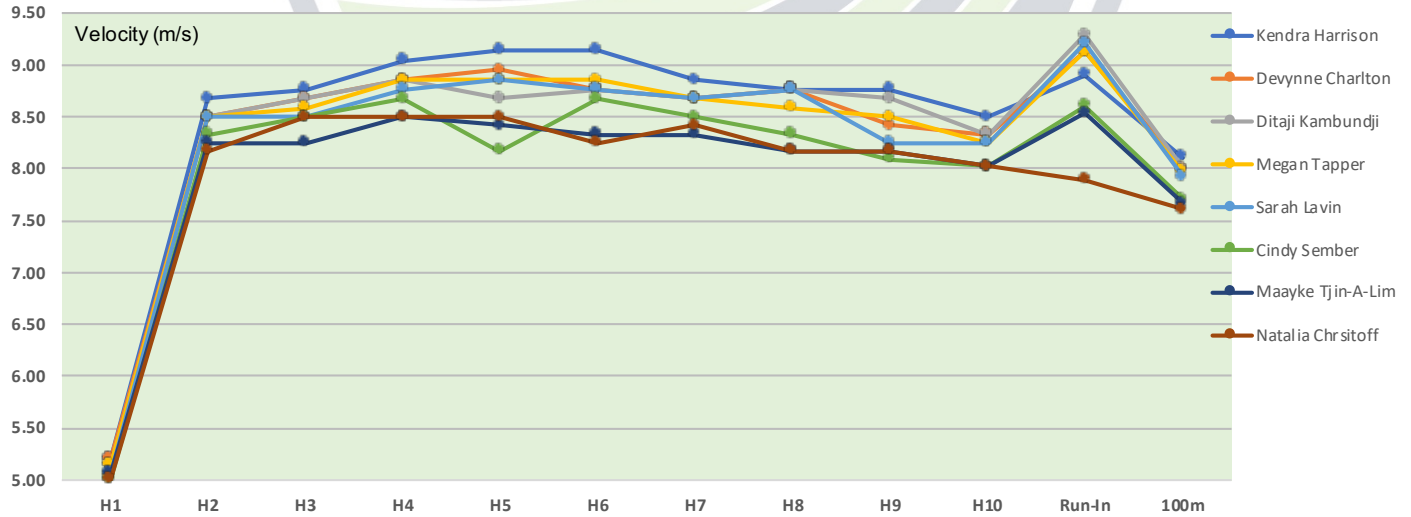
100m Hurdles

Date: 2023.08.23

Wind: 0.5 m/s

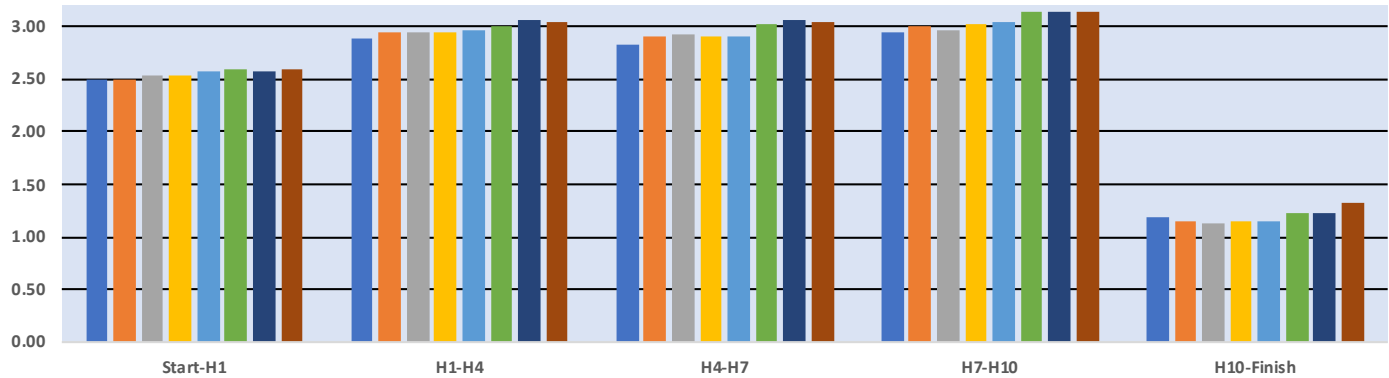
Semi-Final 1

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Harrison, Kendra (USA) (1992)	time	2.50	3.48	4.45	5.39	6.32	7.25	8.21	9.18	10.15	11.15		12.33	7 / 1			
	reaction time	0.142										1.18			2.89	2.82	2.94
	interval velocity		0.98	0.97	0.94	0.93	0.93	0.96	0.97	0.97	1.00	1.18			8.82	9.04	8.67
Charlton, Devynne (BAH) (1995)	time	2.50	3.50	4.48	5.44	6.39	7.36	8.34	9.31	10.32	11.34		12.49	6 / 2			
	reaction time	0.177										1.15			2.94	2.90	3.00
	interval velocity		1.00	0.98	0.96	0.95	0.97	0.98	0.97	1.01	1.02	1.15			8.67	8.79	8.50
Kambundji, Ditaji (SUI) (2002)	time	2.53	3.53	4.51	5.47	6.45	7.42	8.40	9.37	10.35	11.37		12.50	3 / 3			
	reaction time	0.141										1.13			2.94	2.93	2.97
	interval velocity		1.00	0.98	0.96	0.98	0.97	0.98	0.97	0.98	1.02	1.13			8.67	8.70	8.59
Tapper, Megan (JAM) (1994)	time	2.53	3.53	4.52	5.48	6.44	7.40	8.38	9.37	10.37	11.40		12.55	5 / 4			
	reaction time	0.162										1.15			2.95	2.90	3.02
	interval velocity		1.00	0.99	0.96	0.96	0.96	0.98	0.99	1.00	1.03	1.15			8.64	8.79	8.44
Lavin, Sarah (IRL) (1994)	time	2.57	3.57	4.57	5.54	6.50	7.47	8.45	9.42	10.45	11.48		12.62	4 / 5			
	reaction time	0.139										1.14	NR		2.97	2.91	3.03
	interval velocity		1.00	1.00	0.97	0.96	0.97	0.98	0.97	1.03	1.03	1.14	7.92		8.59	8.76	8.42
Sember, Cindy (GBR) (1994)	time	2.60	3.62	4.62	5.60	6.64	7.62	8.62	9.64	10.69	11.75		12.97	8 / 6			
	reaction time	0.167										1.22			3.00	3.02	3.13
	interval velocity		1.02	1.00	0.98	1.04	0.98	1.00	1.02	1.05	1.06	1.22			8.50	8.44	8.15
Tjin-A-Lim, Maayke (NED) (1998)	time	2.57	3.60	4.63	5.63	6.64	7.66	8.68	9.72	10.76	11.82		13.05	2 / 7			
	reaction time	0.135										1.23			3.06	3.05	3.14
	interval velocity		1.03	1.03	1.00	1.01	1.02	1.02	1.04	1.04	1.06	1.23			8.33	8.36	8.12
Christofi, Natalia (CYP) (1997)	time	2.60	3.64	4.64	5.64	6.64	7.67	8.68	9.72	10.76	11.82		13.15	9 / 8			
	reaction time	0.155										1.33			3.04	3.04	3.14
	interval velocity		1.04	1.00	1.00	1.00	1.03	1.01	1.04	1.04	1.06	1.33			8.39	8.39	8.12



Time Intervals (s)

Hurdle Phases

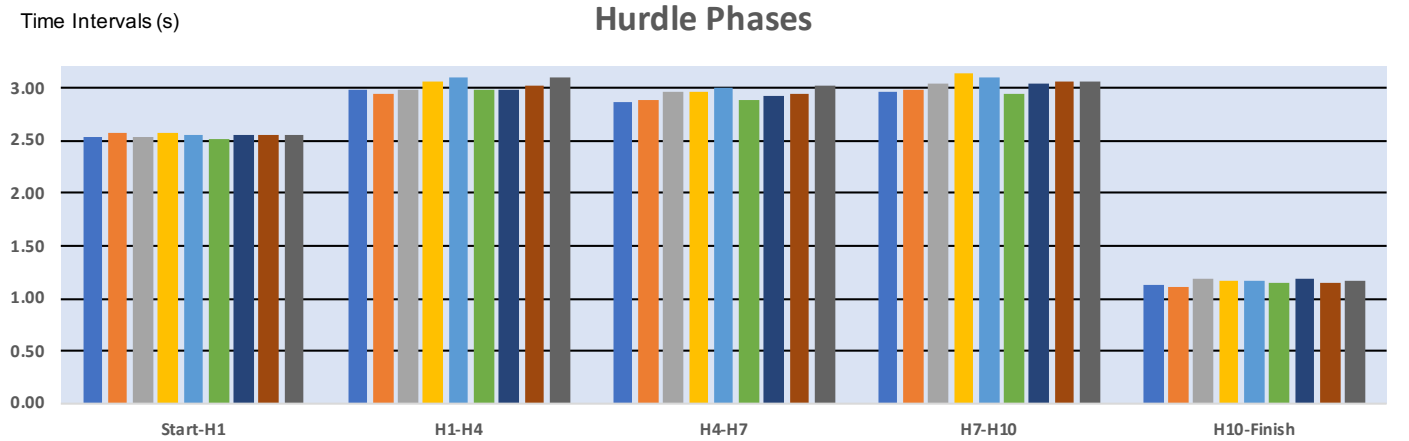
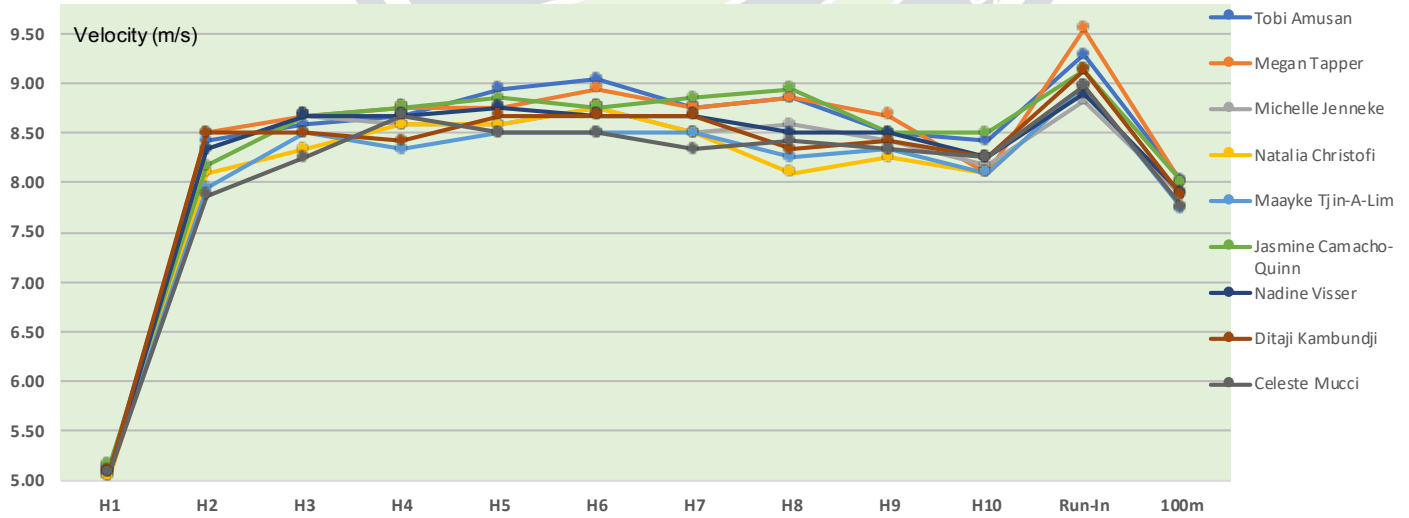


Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.youtube.com/watch?v=fdoMsTTIQIQ>

Biomechanical Analysis

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

100m Hurdles				Date: 2023.08.22				Wind: 0.4 m/s				Heat 5									
				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10		
Amusan, Tobi (NGR) (1997)	time		2.54	3.55	4.54	5.52	6.47	7.41	8.38	9.34	10.34	11.35		12.48	4 / 1						
	reaction time	0.149															2.98	2.86	2.97		
	interval		1.01	0.99	0.98	0.95	0.94	0.97	0.96	1.00	1.01	1.01	1.13				8.56	8.92	8.59		
Tapper, Megan (JAM) (1994)	time		2.58	3.58	4.56	5.53	6.50	7.45	8.42	9.38	10.36	11.41		12.51	3 / 2						
	reaction time	0.168															2.95	2.89	2.99		
	interval		1.00	0.98	0.97	0.97	0.95	0.97	0.96	0.98	1.05	1.10					8.64	8.82	8.53		
Jenneke, Michelle (AUS) (1993)	time		2.53	3.55	4.53	5.52	6.51	7.48	8.48	9.47	10.48	11.52		12.71	5 / 3						
	reaction time	0.156															2.99	2.96	3.04		
	interval		1.02	0.98	0.99	0.99	0.97	1.00	0.99	1.01	1.04	1.19					8.53	8.61	8.39		
Christofi, Natalia (CYP) (1997)	time		2.58	3.63	4.65	5.64	6.63	7.60	8.60	9.65	10.68	11.73		12.90	7 / 4						
	reaction time	0.147															3.06	2.96	3.13		
	interval		1.05	1.02	0.99	0.99	0.97	1.00	1.05	1.03	1.05	1.17					8.33	8.61	8.15		
Tjin-A-Lim, Maayke (NED) (1998)	time		2.56	3.63	4.63	5.65	6.65	7.65	8.65	9.68	10.70	11.75		12.92	2 / 5						
	reaction time	0.155															3.09	3.00	3.10		
	interval		1.07	1.00	1.02	1.00	1.00	1.00	1.03	1.02	1.05	1.17					8.25	8.50	8.23		
				Date: 2023.08.22				Wind: 0.0 m/s				Heat 4									
				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10		
Camacho-Quinn, Jasmine (PUR) (199	time		2.52	3.56	4.54	5.51	6.47	7.44	8.40	9.35	10.35	11.35		12.50	9 / 1						
	reaction time	0.160															2.99	2.89	2.95		
	interval		1.04	0.98	0.97	0.96	0.97	0.96	0.95	1.00	1.00	1.15					8.53	8.82	8.64		
Visser, Nadine (NED) (1995)	time		2.56	3.58	4.56	5.54	6.51	7.49	8.47	9.47	10.47	11.50		12.68	4 / 2						
	reaction time	0.146															2.98	2.93	3.03		
	interval		1.02	0.98	0.98	0.97	0.98	0.98	1.00	1.00	1.03	1.18					8.56	8.70	8.42		
Kambundji, Ditaji (SUI) (2002)	time		2.55	3.55	4.55	5.56	6.54	7.52	8.50	9.52	10.53	11.56		12.71	2 / 3						
	reaction time	0.145															3.01	2.94	3.06		
	interval		1.00	1.00	1.01	0.98	0.98	0.98	1.02	1.01	1.03	1.15					8.47	8.67	8.33		
Mucci, Celeste (AUS) (1999)	time		2.56	3.64	4.67	5.65	6.65	7.65	8.67	9.68	10.70	11.73		12.90	3 / 4						
	reaction time	0.171															3.09	3.02	3.06		
	interval		1.08	1.03	0.98	1.00	1.00	1.02	1.01	1.02	1.03	1.17					8.25	8.44	8.33		



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: https://www.youtube.com/watch?v=j_2pRKl4xA&t=195s

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

100m Hurdles

Date: 2023.08.22

Wind: 0.1 m/s

Heat 3

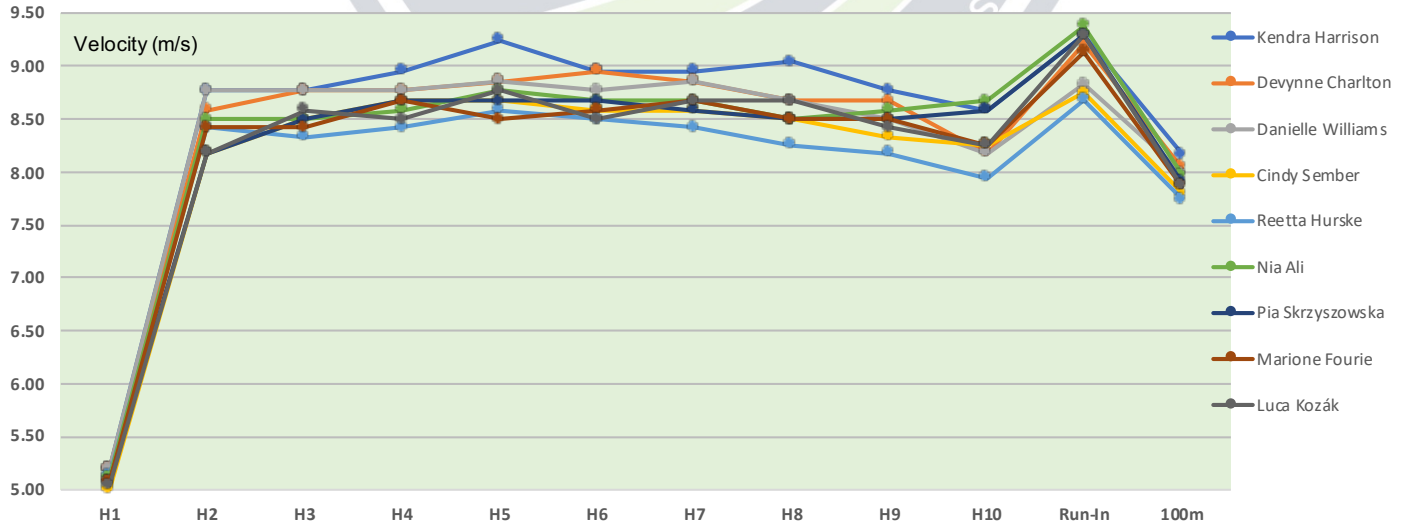
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Harrison, Kendra (USA) (1992)	time		2.50	3.47	4.44	5.39	6.31	7.26	8.21	9.15	10.12	11.11		12.24	4 / 1			
	reaction time	0.155		0.97	0.97	0.95	0.92	0.95	0.95	0.94	0.97	0.99	1.13			2.89	2.82	2.90
	velocity		5.20	8.76	8.76	8.95	9.24	8.95	8.95	9.04	8.76	8.59	9.29	8.17		8.82	9.04	8.79
Charlton, Devynne (BAH) (1995)	time		2.50	3.49	4.46	5.43	6.39	7.34	8.30	9.28	10.26	11.30		12.44	9 / 2			
	reaction time	0.159		0.99	0.97	0.97	0.96	0.95	0.96	0.98	0.98	1.04	1.14			2.93	2.87	3.00
	interval velocity		5.20	8.59	8.76	8.76	8.85	8.95	8.85	8.67	8.67	8.17	9.21	8.04		8.70	8.89	8.50
Williams, Danielle (JAM) (1992)	time		2.50	3.47	4.44	5.41	6.37	7.34	8.30	9.28	10.28	11.32		12.51	3 / 3			
	reaction time	0.116		0.97	0.97	0.97	0.96	0.97	0.96	0.98	1.00	1.04	1.19			2.91	2.89	3.02
	interval velocity		5.20	8.76	8.76	8.76	8.85	8.76	8.85	8.67	8.50	8.17	8.82	7.99		8.76	8.82	8.44
Sember, Cindy (GBR) (1994)	time		2.60	3.64	4.64	5.62	6.60	7.59	8.58	9.58	10.60	11.63		12.83	8 / 4			
	reaction time	0.173		1.04	1.00	0.98	0.98	0.99	0.99	1.00	1.02	1.03	1.20			3.02	2.96	3.05
	interval velocity		5.00	8.17	8.50	8.67	8.67	8.59	8.59	8.50	8.33	8.25	8.75	7.79		8.44	8.61	8.36
Hurske, Reetta (FIN) (1995)	time		2.53	3.54	4.56	5.57	6.56	7.56	8.57	9.60	10.64	11.71		12.92	1 / 5			
	reaction time	0.140		1.01	1.02	1.01	0.99	1.00	1.01	1.03	1.04	1.07	1.21			3.04	3.00	3.14
	interval velocity		5.14	8.42	8.33	8.42	8.59	8.50	8.42	8.25	8.17	7.94	8.68	7.74		8.39	8.50	8.12

Date: 2023.08.22

Wind: 0.0 m/s

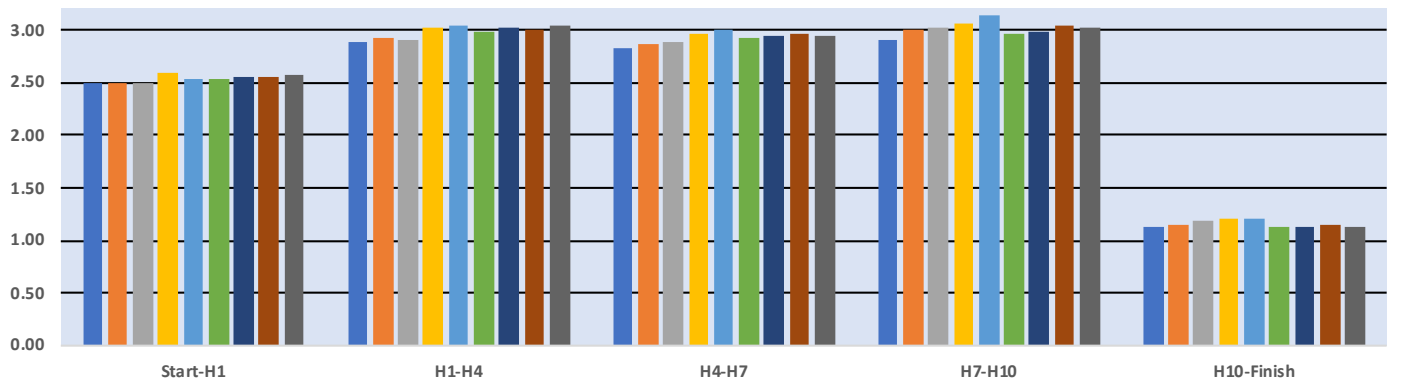
Heat 2

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Ali, Nia (USA) (1988)	time		2.54	3.54	4.54	5.53	6.50	7.48	8.46	9.46	10.45	11.43		12.55	5 / 1			
	reaction time	0.142		1.00	1.00	0.99	0.97	0.98	0.98	1.00	0.99	0.98	1.12			2.99	2.93	2.97
	interval velocity		5.12	8.50	8.50	8.59	8.76	8.67	8.67	8.50	8.59	8.67	9.37	7.97		8.53	8.70	8.59
Skrzysowska, Pia (POL) (2001)	time		2.56	3.60	4.60	5.58	6.56	7.54	8.53	9.53	10.53	11.52		12.65	4 / 2			
	reaction time	0.142		1.04	1.00	0.98	0.98	0.98	0.99	1.00	1.00	0.99	1.13			3.02	2.95	2.99
	interval velocity		5.08	8.17	8.50	8.67	8.67	8.67	8.59	8.50	8.50	8.59	9.29	7.91		8.44	8.64	8.53
Fourie, Marione (RSA) (2002)	time		2.56	3.57	4.58	5.56	6.56	7.55	8.53	9.53	10.53	11.56		12.71	2 / 3			
	reaction time	0.164		1.01	1.01	0.98	1.00	0.99	0.98	1.00	1.00	1.03	1.15			3.00	2.97	3.03
	interval velocity		5.08	8.42	8.42	8.67	8.50	8.59	8.67	8.50	8.50	8.25	9.13	7.87		8.50	8.59	8.42
Kozák, Luca (HUN) (1996)	time		2.58	3.62	4.61	5.61	6.58	7.58	8.56	9.54	10.55	11.58		12.71	6 / 3			
	reaction time	0.149		1.04	0.99	1.00	0.97	1.00	0.98	0.98	1.01	1.03	1.13			3.03	2.95	3.02
	interval velocity		5.04	8.17	8.59	8.50	8.76	8.50	8.67	8.67	8.42	8.25	9.29	7.87		8.42	8.64	8.44



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=j_2pRKl4xA&t=195s

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

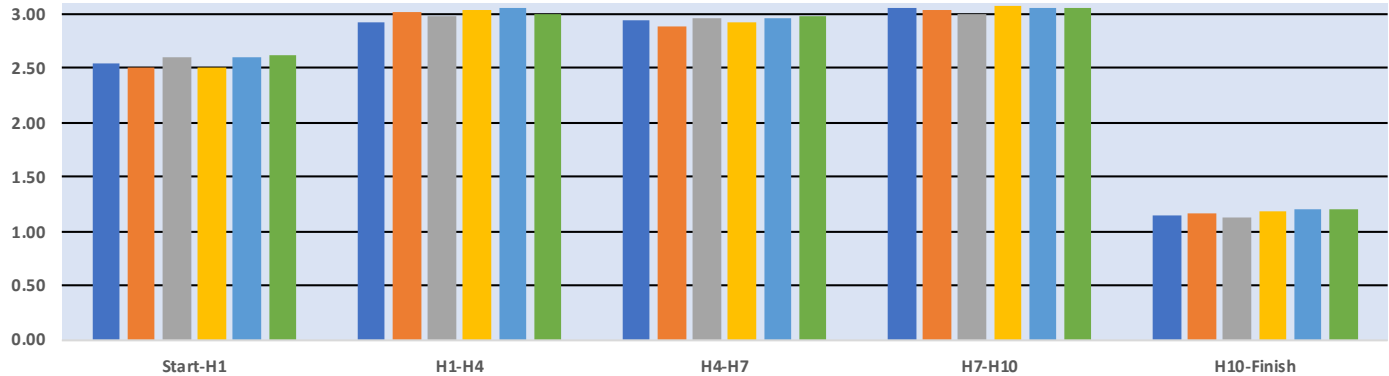
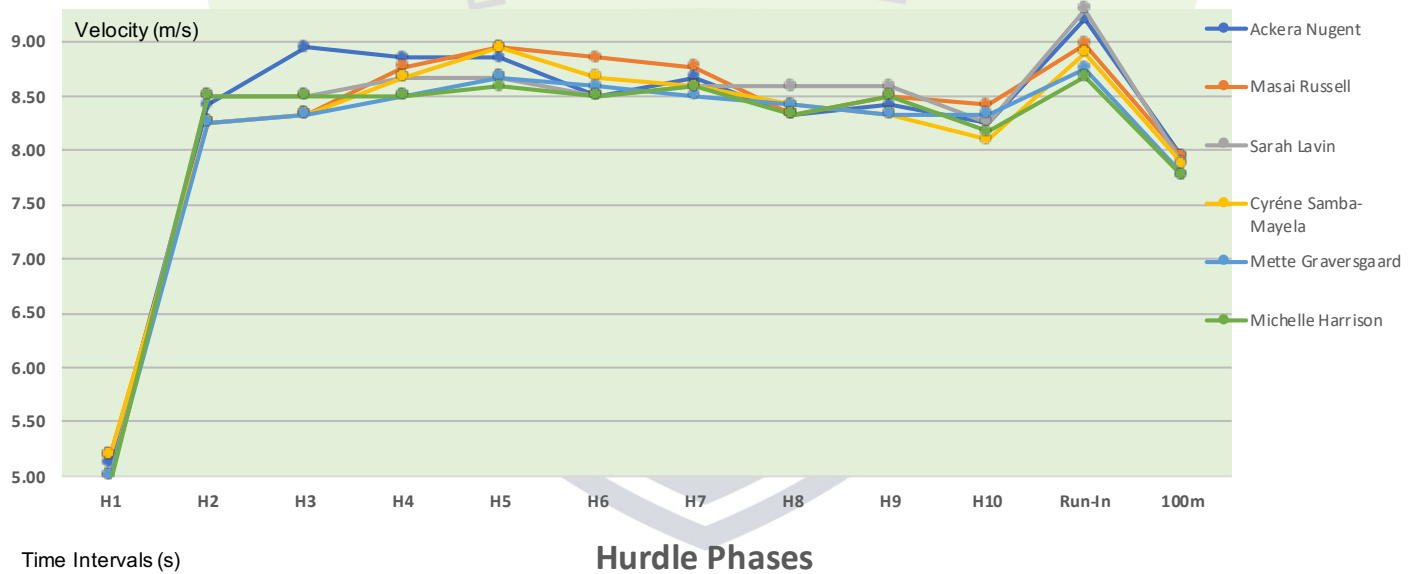
100m Hurdles

Date: 2023.08.22

Wind: 0.1 m/s

Heat 1

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Nugent, Ackera (JAM) (2002)	time		2.54	3.55	4.50	5.46	6.42	7.42	8.40	9.42	10.43	11.46		12.60	7 / 1			
	reaction time	0.134											1.14			2.92	2.94	3.06
	interval velocity		5.12	8.42	8.95	8.85	8.85	8.50	8.67	8.33	8.42	8.25	9.21	7.94		8.73	8.67	8.33
Russell, Masai (USA) (2000)	time		2.50	3.53	4.55	5.52	6.47	7.43	8.40	9.42	10.42	11.43		12.60	6 / 2			
	reaction time	0.164											1.17			3.02	2.88	3.03
	interval velocity		5.20	8.25	8.33	8.76	8.95	8.85	8.76	8.33	8.50	8.42	8.97	7.94		8.44	8.85	8.42
Lavin, Sarah (IRL) (1994)	time		2.60	3.60	4.60	5.58	6.56	7.56	8.55	9.54	10.53	11.56		12.69	2 / 3			
	reaction time	0.139											1.13			2.98	2.97	3.01
	interval velocity		5.00	8.50	8.50	8.67	8.67	8.50	8.59	8.59	8.59	8.25	9.29	7.88		8.56	8.59	8.47
Samba-Mayela, Cyréna (FRA) (2000)	time		2.50	3.53	4.55	5.53	6.48	7.46	8.45	9.46	10.48	11.53		12.71	9 / 4			
	reaction time	0.144											1.18			3.03	2.92	3.08
	interval velocity		5.20	8.25	8.33	8.67	8.95	8.67	8.59	8.42	8.33	8.10	8.90	7.87		8.42	8.73	8.28
Graversgaard, Mette (DEN) (1995)	time		2.60	3.63	4.65	5.65	6.63	7.62	8.62	9.63	10.65	11.67		12.87	5 / 5			
	reaction time	0.166											1.20			3.05	2.97	3.05
	interval velocity		5.00	8.25	8.33	8.50	8.67	8.59	8.50	8.42	8.33	8.33	8.75	7.77		8.36	8.59	8.36
Harrison, Michelle (CAN) (1992)	time		2.63	3.63	4.63	5.63	6.62	7.62	8.61	9.63	10.63	11.67		12.88	8 / 6			
	reaction time	0.152											1.21			3.00	2.98	3.06
	interval velocity		4.94	8.50	8.50	8.50	8.59	8.50	8.59	8.33	8.50	8.17	8.68	7.76		8.50	8.56	8.33

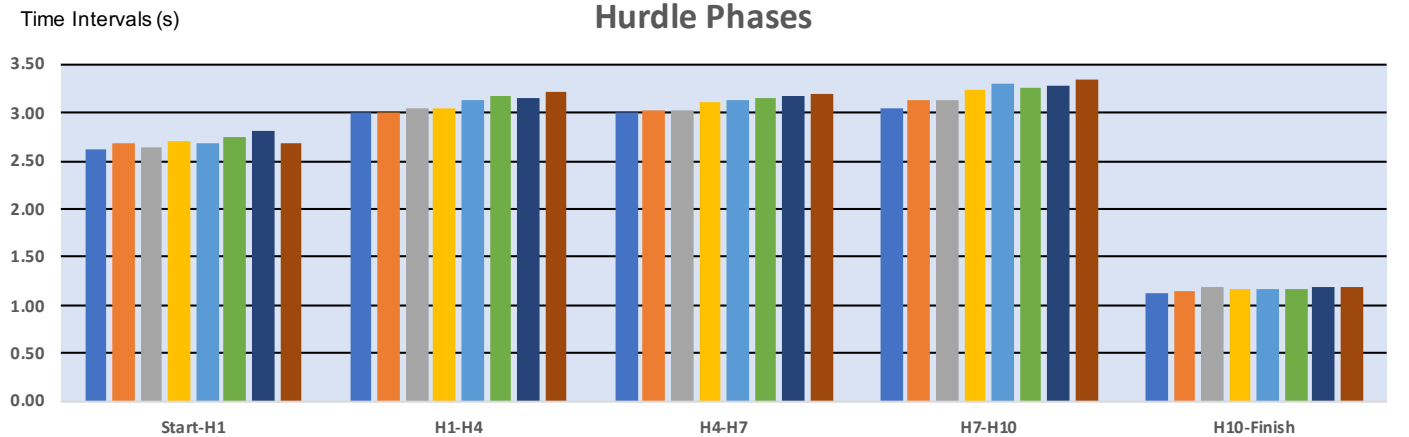
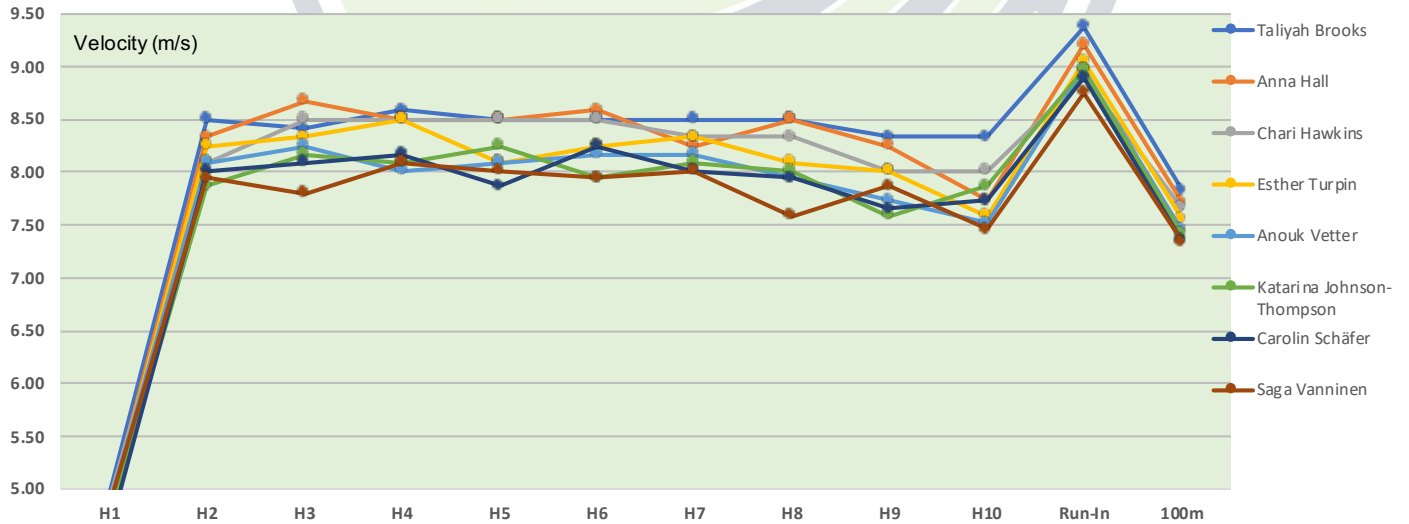


Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: https://www.youtube.com/watch?v=j_2peRKl4xA&t=195s

Biomechanical Analysis

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

Heptathlon - 100m Hurdles				Date: 2023.08.19				Wind: 0.4 m/s				Heat 3											
				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10				
Brooks, Taliyah (USA) (1995)	time		2.62	3.62	4.63	5.62	6.62	7.62	8.62	9.62	10.64	11.66			12.78	8 / 1							
	reaction time	0.177																3.00	3.00	3.04			
	interval		7 steps	1.00	1.01	0.99	1.00	1.00	1.00	1.00	1.02	1.02	1.12					8.50	8.50	8.39			
	velocity		4.96	8.50	8.42	8.59	8.50	8.50	8.50	8.50	8.33	8.33	9.38	7.82									
Hall, Anna (USA) (2001)	time		2.68	3.70	4.68	5.68	6.68	7.67	8.70	9.70	10.73	11.83			12.97	5 / 2							
	reaction time	0.187																3.00	3.02	3.13			
	interval		7 steps	1.02	0.98	1.00	1.00	0.99	1.03	1.00	1.03	1.10	1.14					8.50	8.44	8.15			
	velocity		4.85	8.33	8.67	8.50	8.50	8.59	8.25	8.50	8.25	7.73	9.21	7.71									
Hawkins, Chari (USA) (1991)	time		2.65	3.70	4.70	5.70	6.70	7.70	8.72	9.74	10.80	11.86			13.04	7 / 3							
	reaction time	0.168																3.05	3.02	3.14			
	interval			1.05	1.00	1.00	1.00	1.00	1.02	1.02	1.06	1.06	1.18	PB				8.36	8.44	8.12			
	velocity		4.91	8.10	8.50	8.50	8.50	8.50	8.33	8.33	8.02	8.02	8.90	7.67									
Turpin, Esther (FRA) (1996)	time		2.70	3.73	4.75	5.75	6.80	7.83	8.85	9.90	10.96	12.08			13.24	3 / 4							
	reaction time	0.172																3.05	3.10	3.23			
	interval			1.03	1.02	1.00	1.05	1.03	1.02	1.05	1.06	1.12	1.16					8.36	8.23	7.89			
	velocity		4.81	8.25	8.33	8.50	8.10	8.25	8.33	8.10	8.02	7.59	9.05	7.55									
Vetter, Anouk (NED) (1993)	time		2.68	3.73	4.76	5.82	6.87	7.91	8.95	10.02	11.12	12.25			13.42	4 / 5							
	reaction time	0.153																3.14	3.13	3.30			
	interval			1.05	1.03	1.06	1.05	1.04	1.04	1.07	1.10	1.13	1.17					8.12	8.15	7.73			
	velocity		4.85	8.10	8.25	8.02	8.10	8.17	8.17	7.94	7.73	7.52	8.97	7.45									
Johnson-Thompson, Katarina (GBR)	time		2.75	3.83	4.87	5.92	6.95	8.02	9.07	10.13	11.25	12.33			13.50	6 / 6							
	reaction time	0.185																3.17	3.15	3.26			
	interval		7 steps	1.08	1.04	1.05	1.03	1.07	1.05	1.06	1.12	1.08	1.17					8.04	8.10	7.82			
	velocity		4.73	7.87	8.17	8.10	8.25	7.94	8.10	8.02	7.59	7.87	8.97	7.41									
Schäfer, Carolin (GER) (1991)	time		2.82	3.88	4.93	5.97	7.05	8.08	9.14	10.21	11.32	12.42			13.60	9 / 7							
	reaction time	0.151																3.15	3.17	3.28			
	interval			1.06	1.05	1.04	1.08	1.03	1.06	1.07	1.11	1.10	1.18					8.10	8.04	7.77			
	velocity		4.61	8.02	8.10	8.17	7.87	8.25	8.02	7.94	7.66	7.73	8.90	7.35									
Vanninen, Saga (FIN) (2003)	time		2.68	3.75	4.84	5.89	6.95	8.02	9.08	10.20	11.28	12.42			13.62	2 / 8							
	reaction time	0.161																3.21	3.19	3.34			
	interval			1.07	1.09	1.05	1.06	1.07	1.06	1.12	1.08	1.14	1.20					7.94	7.99	7.63			
	velocity		4.85	7.94	7.80	8.10	8.02	7.94	8.02	7.59	7.87	7.46	8.75	7.34									



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: https://www.youtube.com/watch?v=k9_lit_wpu8g

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

Heptathlon - 100m Hurdles

Date: 2023.08.19

Wind: -0.2 m/s

Heat 2

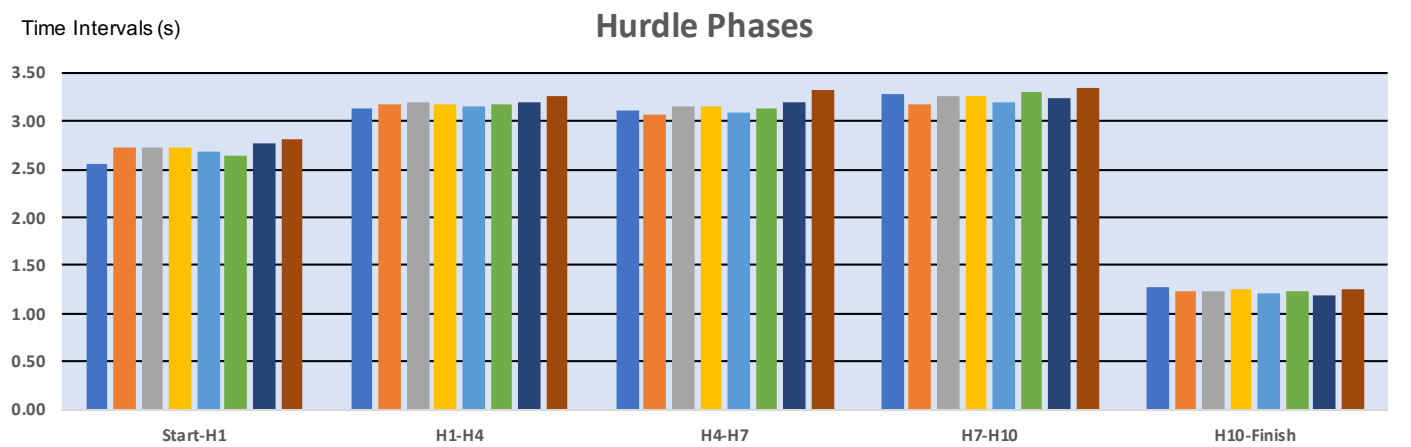
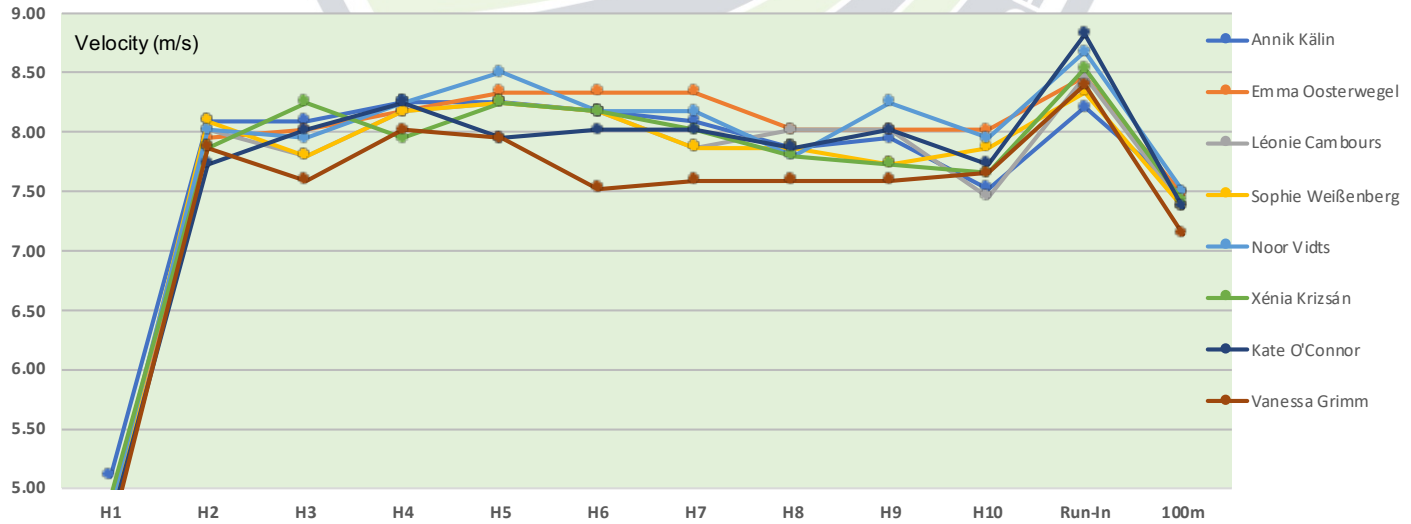
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Kälin, Annik (SUI) (2000)	time	2.55	3.60	4.65	5.68	6.71	7.75	8.80	9.88	10.95	12.08		13.36	6 / 1			
	reaction time	0.169										1.28			3.13	3.12	3.28
	interval		1.05	1.05	1.03	1.03	1.04	1.05	1.08	1.07	1.13	1.28			8.15	8.17	7.77
	velocity	5.10	8.10	8.10	8.25	8.25	8.17	8.10	7.87	7.94	7.52	8.20	7.49				
Oosterwegel, Emma (NED) (1998)	time	2.73	3.80	4.86	5.90	6.92	7.94	8.96	10.02	11.08	12.14		13.38	5 / 2			
	reaction time	0.181										1.24			3.17	3.06	3.18
	interval		1.07	1.06	1.04	1.02	1.02	1.06	1.06	1.06	1.06	1.24			8.04	8.33	8.02
	velocity	4.76	7.94	8.02	8.17	8.33	8.33	8.33	8.02	8.02	8.02	8.47	7.47				
Cambours, Léonie (FRA) (2000)	time	2.72	3.78	4.87	5.91	6.94	7.98	9.06	10.12	11.18	12.32		13.56	2 / 3			
	reaction time	0.180										1.24			3.19	3.15	3.26
	interval		1.06	1.09	1.04	1.03	1.04	1.08	1.06	1.06	1.14	1.24			7.99	8.10	7.82
	velocity	4.78	8.02	7.80	8.17	8.25	8.17	7.87	8.02	8.02	7.46	8.47	7.37				
Weißenberg, Sophie (GER) (1997)	time	2.73	3.78	4.87	5.91	6.94	7.98	9.06	10.14	11.24	12.32		13.58	3 / 4			
	reaction time	0.182										1.26			3.18	3.15	3.26
	interval		7 steps 1.05	1.09	1.04	1.03	1.04	1.08	1.08	1.10	1.08	1.26			8.02	8.10	7.82
	velocity	4.76	8.10	7.80	8.17	8.25	8.17	7.87	7.87	7.73	7.87	8.33	7.36				

Date: 2023.08.19

Wind: -1.1 m/s

Heat 1

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Vidts, Noor (BEL) (1996)	time	2.69	3.75	4.82	5.85	6.85	7.89	8.93	10.02	11.05	12.12		13.33	4 / 1			
	reaction time	0.176										1.21			3.16	3.08	3.19
	interval		1.06	1.07	1.03	1.00	1.04	1.04	1.09	1.03	1.07	1.21			8.07	8.28	7.99
	velocity	4.83	8.02	7.94	8.25	8.50	8.17	8.17	7.80	8.25	7.94	8.68	7.50				
Krizsán, Xénia (HUN) (1993)	time	2.64	3.72	4.75	5.82	6.85	7.89	8.95	10.04	11.14	12.25		13.48	8 / 2			
	reaction time	0.159										1.23			3.18	3.13	3.30
	interval		1.08	1.03	1.07	1.03	1.04	1.06	1.09	1.10	1.11	1.23			8.02	8.15	7.73
	velocity	4.92	7.87	8.25	7.94	8.25	8.17	8.02	7.80	7.73	7.66	8.54	7.42				
O'Connor, Kate (IRL) (2000)	time	2.76	3.86	4.92	5.95	7.02	8.08	9.14	10.22	11.28	12.38		13.57	7 / 3			
	reaction time	0.167										1.19	PB		3.19	3.19	3.24
	interval		1.10	1.06	1.03	1.07	1.06	1.06	1.08	1.06	1.10	1.19			7.99	7.99	7.87
	velocity	4.71	7.73	8.02	8.25	7.94	8.02	8.02	7.87	8.02	7.73	8.82	7.37				
Grimm, Vanessa (GER) (1997)	time	2.82	3.90	5.02	6.08	7.15	8.28	9.40	10.52	11.64	12.75		14.00	3 / 4			
	reaction time	0.187										1.25			3.26	3.32	3.35
	interval		1.08	1.12	1.06	1.07	1.13	1.12	1.12	1.12	1.11	1.25			7.82	7.68	7.61
	velocity	4.61	7.87	7.59	8.02	7.94	7.52	7.59	7.59	7.59	7.66	8.40	7.14				



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: https://www.youtube.com/watch?v=k9Jit_wpu8g

2023 Herculis Meeting International d'Athlétisme (Monaco, MON)

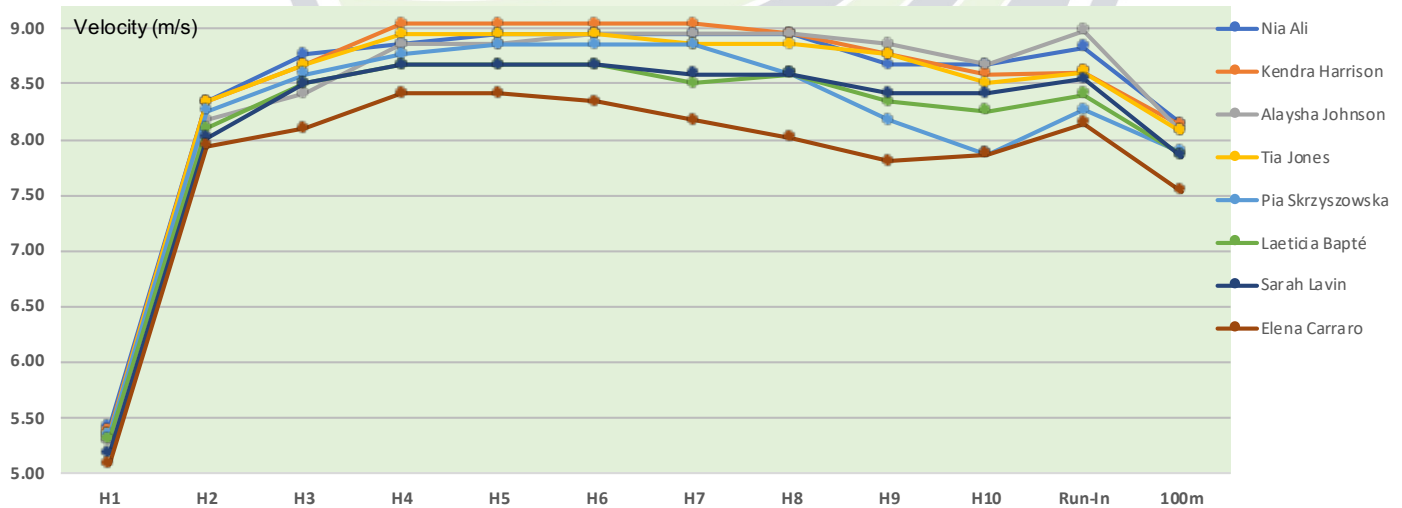
100m Hurdles

Date: 2023.07.21

Wind: 0.6 m/s

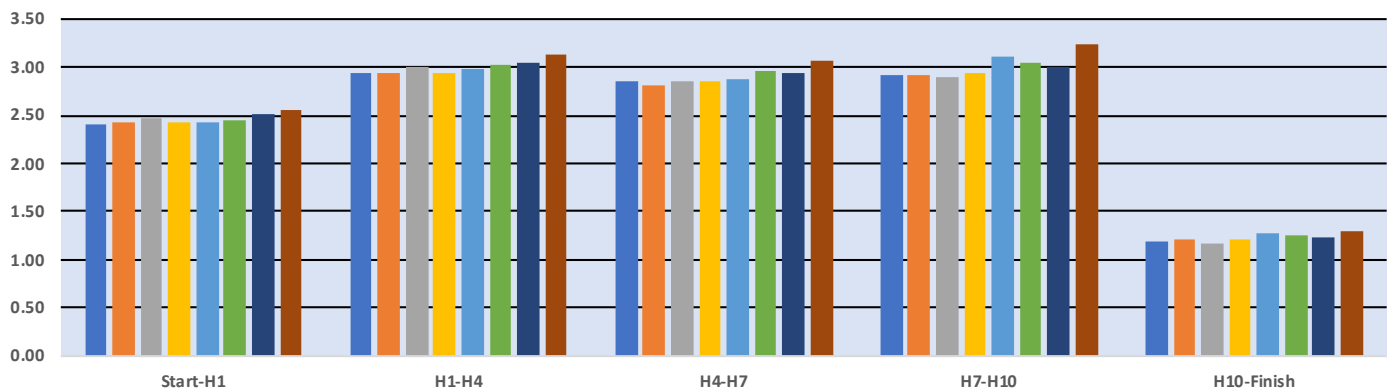
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Ali, Nia (USA) (1988)	time		2.40	3.42	4.39	5.35	6.30	7.25	8.20	9.15	10.13	11.11		12.30	5 / 1			
	reaction time	0.153												PB		2.95	2.85	2.91
	interval velocity		5.42	8.33	8.76	8.85	8.95	8.95	8.95	8.95	8.67	8.67	8.82	8.13		8.64	8.95	8.76
Harrison, Kendra (USA) 1992	time		2.42	3.44	4.42	5.36	6.30	7.24	8.18	9.13	10.10	11.09		12.31	4 / 2			
	reaction time	0.165												1.22		2.94	2.82	2.91
	interval velocity		5.37	8.33	8.67	9.04	9.04	9.04	9.04	8.95	8.76	8.59	8.61	8.12		8.67	9.04	8.76
Johnson, Alaysha (USA) (1996)	time		2.46	3.50	4.51	5.47	6.43	7.38	8.33	9.28	10.24	11.22		12.39	2 / 3			
	reaction time	0.172												1.17		3.01	2.86	2.89
	interval velocity		5.28	8.17	8.42	8.85	8.85	8.95	8.95	8.95	8.85	8.67	8.97	8.07		8.47	8.92	8.82
Jones, Tia (USA) (2000)	time		2.43	3.45	4.43	5.38	6.33	7.28	8.24	9.20	10.17	11.17		12.39	7 / 4			
	reaction time	0.156												1.22		2.95	2.86	2.93
	interval velocity		5.35	8.33	8.67	8.95	8.95	8.95	8.85	8.85	8.76	8.50	8.61	8.07		8.64	8.92	8.70
Skrzysowska, Pia (POL) (2001)	time		2.43	3.46	4.45	5.42	6.38	7.34	8.30	9.29	10.33	11.41		12.68	3 / 5			
	reaction time	0.125												1.27		2.99	2.88	3.11
	interval velocity		5.35	8.25	8.59	8.76	8.85	8.85	8.85	8.59	8.17	7.87	8.27	7.89		8.53	8.85	8.20
Bapté, Laetitia (FRA) (1999)	time		2.45	3.50	4.50	5.48	6.46	7.44	8.44	9.43	10.45	11.48		12.73	1 / 6			
	reaction time	0.153												PB		3.03	2.96	3.04
	interval velocity		5.31	8.10	8.50	8.67	8.67	8.67	8.50	8.59	8.33	8.25	8.40	7.86		8.42	8.61	8.39
Lavin, Sarah (IRL) (1994)	time		2.51	3.57	4.57	5.55	6.53	7.51	8.50	9.49	10.50	11.51		12.74	6 / 7			
	reaction time	0.156												1.23		3.04	2.95	3.01
	interval velocity		5.18	8.02	8.50	8.67	8.67	8.67	8.59	8.59	8.42	8.42	8.54	7.85		8.39	8.64	8.47
Carraro, Elena (ITA) (2001)	time		2.56	3.63	4.68	5.69	6.70	7.72	8.76	9.82	10.91	11.99		13.28	8 / 8			
	reaction time	0.172												1.29		3.13	3.07	3.23
	interval velocity		5.08	7.94	8.10	8.42	8.42	8.33	8.17	8.02	7.80	7.87	8.14	7.53		8.15	8.31	7.89



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Fri 21 Jul 2023 20:52) - diamond league race analysis

<https://www.omegatiming.com/File/0002030B0101050101FFFFFFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=it5-iiFFPa4>

2023 Kamila Skolimowska Memorial (Chorzów, POL)

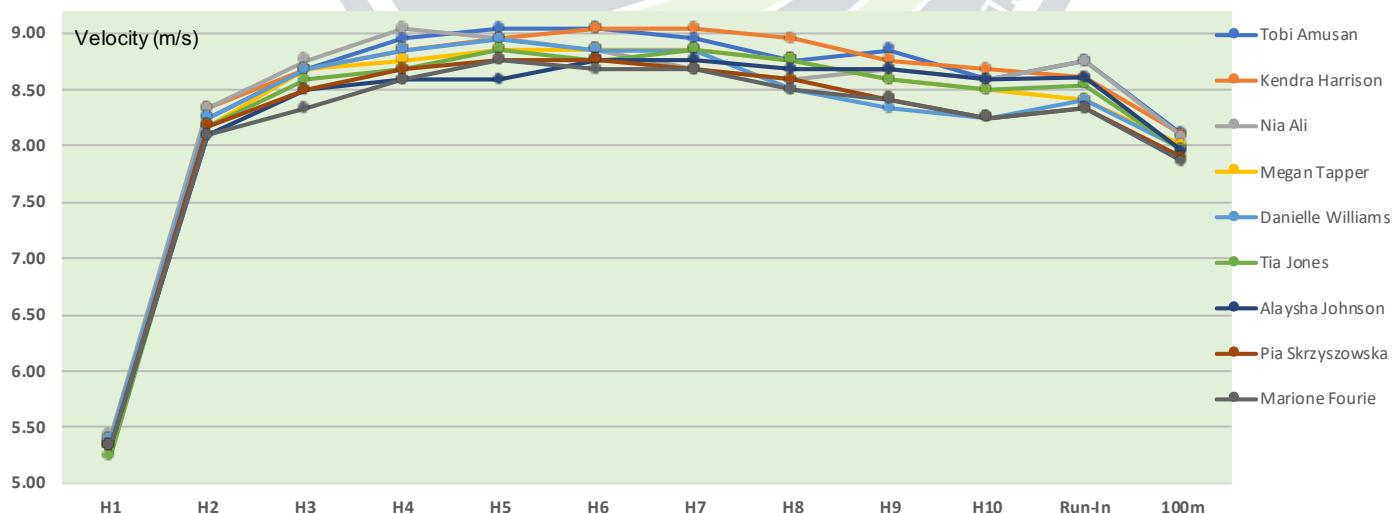
100m Hurdles

Date: 2023.07.16

Wind: 0.9 m/s

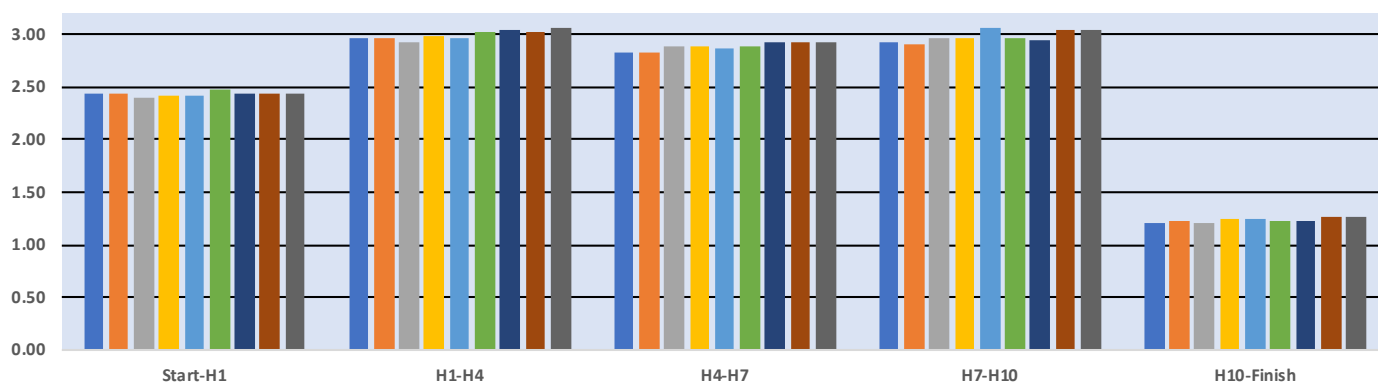
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Amusan, Tobi (NGR) (1997)	time		2.43	3.46	4.44	5.39	6.33	7.27	8.22	9.19	10.15	11.14		12.34	5 / 1			
	reaction time	0.146		1.03	0.98	0.95	0.94	0.94	0.95	0.97	0.96	0.99	1.20			2.96	2.83	2.92
	velocity		5.35	8.25	8.67	8.95	9.04	9.04	8.95	8.76	8.85	8.59	8.75	8.10		8.61	9.01	8.73
Harrison, Kendra (USA) (1992)	time		2.44	3.46	4.44	5.40	6.35	7.29	8.23	9.18	10.15	11.13		12.35	4 / 2			
	reaction time	0.161		1.02	0.98	0.96	0.95	0.94	0.95	0.97	0.98	1.22				2.96	2.83	2.90
	velocity		5.33	8.33	8.67	8.85	8.95	9.04	9.04	8.95	8.76	8.67	8.61	8.10		8.61	9.01	8.79
Ali, Nia (USA) (1988)	time		2.40	3.42	4.39	5.33	6.28	7.24	8.22	9.21	10.19	11.18		12.38	6 / 3			
	reaction time	0.162		1.02	0.97	0.94	0.95	0.96	0.98	0.99	0.98	0.99	1.20			2.93	2.89	2.96
	velocity		5.42	8.33	8.76	9.04	8.95	8.85	8.67	8.59	8.67	8.59	8.75	8.08		8.70	8.82	8.61
Tapper, Megan (JAM) (1994)	time		2.41	3.45	4.43	5.40	6.36	7.32	8.28	9.25	10.24	11.24		12.49	8 / 4			
	reaction time	0.150		1.04	0.98	0.97	0.96	0.96	0.96	0.97	0.99	1.00	1.25			2.99	2.88	2.96
	velocity		5.39	8.17	8.67	8.76	8.85	8.85	8.85	8.76	8.59	8.50	8.40	8.01		8.53	8.85	8.61
Williams, Danielle (JAM) (1992)	time		2.41	3.44	4.42	5.38	6.33	7.29	8.25	9.25	10.27	11.30		12.55	9 / 5			
	reaction time	0.141		1.03	0.98	0.96	0.95	0.96	0.96	1.00	1.02	1.03	1.25			2.97	2.87	3.05
	velocity		5.39	8.25	8.67	8.85	8.95	8.85	8.85	8.50	8.33	8.25	8.40	7.97		8.59	8.89	8.36
Jones, Tia (USA) (2000)	time		2.48	3.52	4.51	5.49	6.45	7.42	8.38	9.35	10.34	11.34		12.57	2 / 6			
	reaction time	0.175		1.04	0.99	0.98	0.96	0.97	0.96	0.97	0.99	1.00	1.23			3.01	2.89	2.96
	velocity		5.24	8.17	8.59	8.67	8.85	8.76	8.85	8.76	8.59	8.50	8.54	7.96		8.47	8.82	8.61
Johnson, Alaysha (USA) (1996)	time		2.44	3.49	4.49	5.48	6.47	7.44	8.41	9.39	10.37	11.36		12.58	3 / 7			
	reaction time	0.151		1.05	1.00	0.99	0.99	0.97	0.97	0.98	0.98	0.99	1.22			3.04	2.93	2.95
	velocity		5.33	8.10	8.50	8.59	8.59	8.76	8.76	8.67	8.67	8.59	8.61	7.95		8.39	8.70	8.64
Skrzysowska, Pia (POL) (2001)	time		2.44	3.48	4.48	5.46	6.43	7.40	8.38	9.37	10.38	11.41		12.67	7 / 8			
	reaction time	0.130		1.04	1.00	0.98	0.97	0.97	0.98	0.99	1.01	1.03	1.26			3.02	2.92	3.03
	velocity		5.33	8.17	8.50	8.67	8.76	8.76	8.67	8.59	8.42	8.25	8.33	7.89		8.44	8.73	8.42
Fourie, Marione (RSA) (2002)	time		2.44	3.49	4.51	5.50	6.47	7.45	8.43	9.43	10.44	11.47		12.73	1 / 9			
	reaction time	0.148		1.05	1.02	0.99	0.97	0.98	0.98	1.00	1.01	1.03	1.26			3.06	2.93	3.04
	velocity		5.33	8.10	8.33	8.59	8.76	8.67	8.67	8.50	8.42	8.25	8.33	7.86		8.33	8.70	8.39



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Sun 16 Jul 2023 16:50) - diamond league race analysis

<https://www.omegatiming.com/File/0002030A0101080101FFFFFFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=7rhVdx1la3I>

2023 USATF National Championships (Eugene, OR) (TV Analysis)

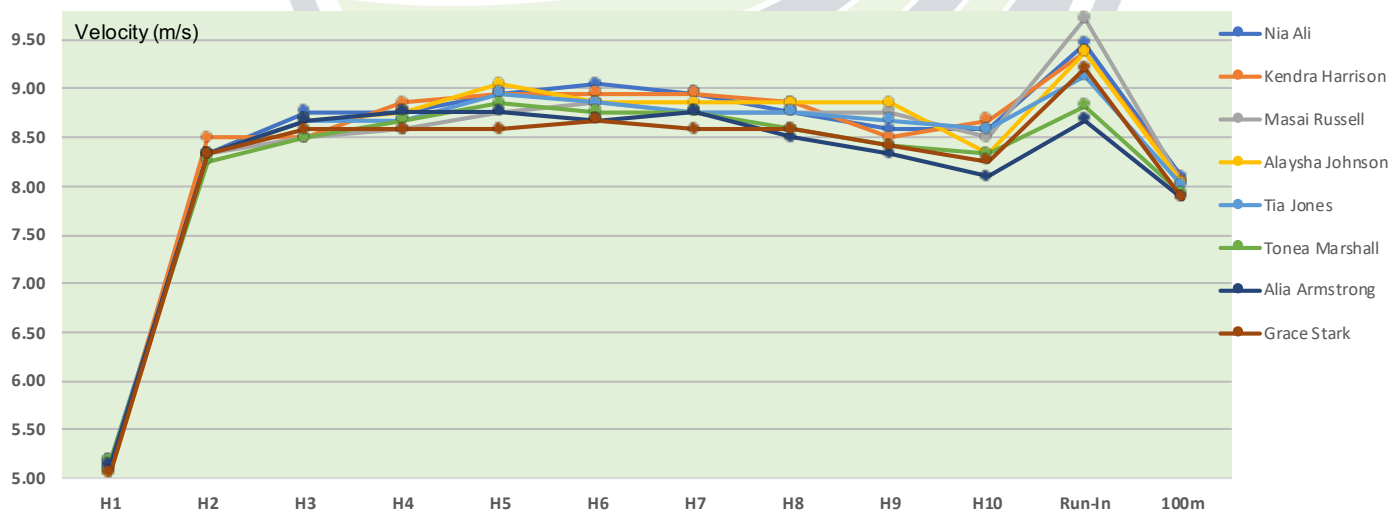
100m Hurdles

Date: 2023.07.08

Wind: 0.4 m/s

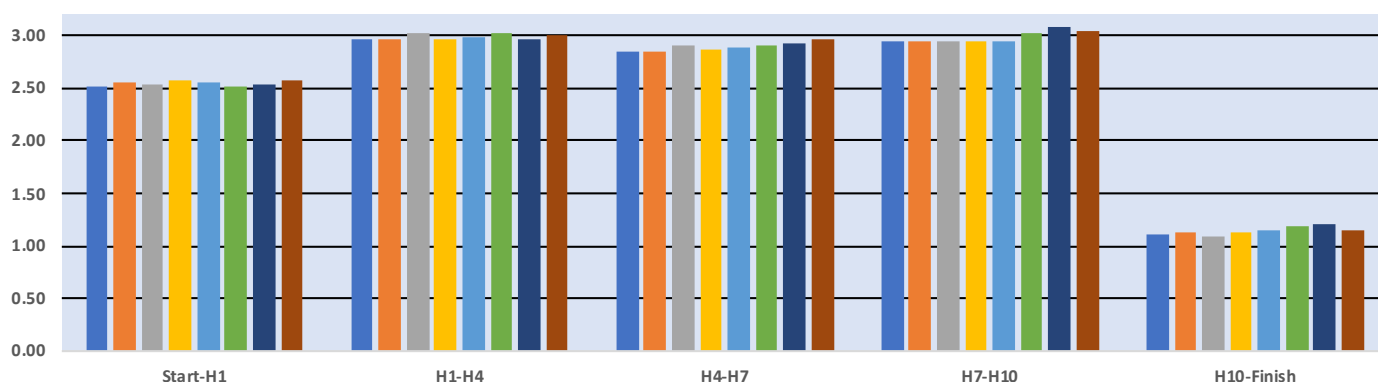
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Ali, Nia (USA) (1988)	time	2.51	3.53	4.50	5.47	6.42	7.36	8.31	9.28	10.27	11.26		12.37	4 / 1			
	reaction time														2.96	2.84	2.95
	interval		1.02	0.97	0.97	0.95	0.94	0.95	0.97	0.99	0.99	1.11			8.61	8.98	8.64
	velocity	5.18	8.33	8.76	8.76	8.95	9.04	8.95	8.76	8.59	8.59	9.46	8.08				
Harrison, Kendra (USA) 1992	time	2.55	3.55	4.55	5.51	6.46	7.41	8.36	9.32	10.32	11.30		12.42	6 / 2			
	reaction time														2.96	2.85	2.94
	interval		1.00	1.00	0.96	0.95	0.95	0.95	0.96	1.00	0.98	1.12			8.61	8.95	8.67
	velocity	5.10	8.50	8.50	8.85	8.95	8.95	8.95	8.85	8.50	8.67	9.38	8.05				
Russell, Masai (USA) (2000)	time	2.53	3.55	4.55	5.54	6.51	7.47	8.44	9.41	10.38	11.38		12.46	2 / 3			
	reaction time														3.01	2.90	2.94
	interval		1.02	1.00	0.99	0.97	0.96	0.97	0.97	0.97	1.00	1.08			8.47	8.79	8.67
	velocity	5.14	8.33	8.50	8.59	8.76	8.85	8.76	8.76	8.76	8.50	9.72	8.03				
Johnson, Alaysha (USA) (1996)	time	2.57	3.59	4.57	5.54	6.48	7.44	8.40	9.36	10.32	11.34		12.46	3 / 4			
	reaction time														2.97	2.86	2.94
	interval		1.02	0.98	0.97	0.94	0.96	0.96	0.96	0.96	1.02	1.12			8.59	8.92	8.67
	velocity	5.06	8.33	8.67	8.76	9.04	8.85	8.85	8.85	8.85	8.33	9.37	8.03				
Jones, Tia (USA) (2000)	time	2.55	3.57	4.55	5.53	6.48	7.44	8.41	9.38	10.36	11.35		12.50	7 / 5			
	reaction time														2.98	2.88	2.94
	interval		1.02	0.98	0.98	0.95	0.96	0.97	0.97	0.98	0.99	1.15			8.56	8.85	8.67
	velocity	5.10	8.33	8.67	8.67	8.95	8.85	8.76	8.76	8.67	8.59	9.13	8.00				
Marshall, Tonea (USA) (1998)	time	2.51	3.54	4.54	5.52	6.48	7.45	8.42	9.41	10.42	11.44		12.63	5 / 6			
	reaction time														3.01	2.90	3.02
	interval		1.03	1.00	0.98	0.96	0.97	0.97	0.99	1.01	1.02	1.19			8.47	8.79	8.44
	velocity	5.18	8.25	8.50	8.67	8.85	8.76	8.76	8.59	8.42	8.33	8.82	7.92				
Armstrong, Alia (USA) (2000)	time	2.53	3.55	4.53	5.50	6.47	7.45	8.42	9.42	10.44	11.49		12.70	1 / 7			
	reaction time														2.97	2.92	3.07
	interval		1.02	0.98	0.97	0.97	0.98	0.97	1.00	1.02	1.05	1.21			8.59	8.73	8.31
	velocity	5.14	8.33	8.67	8.76	8.76	8.67	8.76	8.50	8.33	8.10	8.68	7.87				
Stark, Grace (USA) (2001)	time	2.57	3.59	4.58	5.57	6.56	7.54	8.53	9.52	10.53	11.56		12.70	8 / 8			
	reaction time														3.00	2.96	3.03
	interval		1.02	0.99	0.99	0.99	0.98	0.99	0.99	1.01	1.03	1.14			8.50	8.61	8.42
	velocity	5.06	8.33	8.59	8.59	8.59	8.67	8.59	8.59	8.42	8.25	9.21	7.87				



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=TTfFDEd00&t=2s>

2023 Bauhaus Galan (Stockholm, SWE)

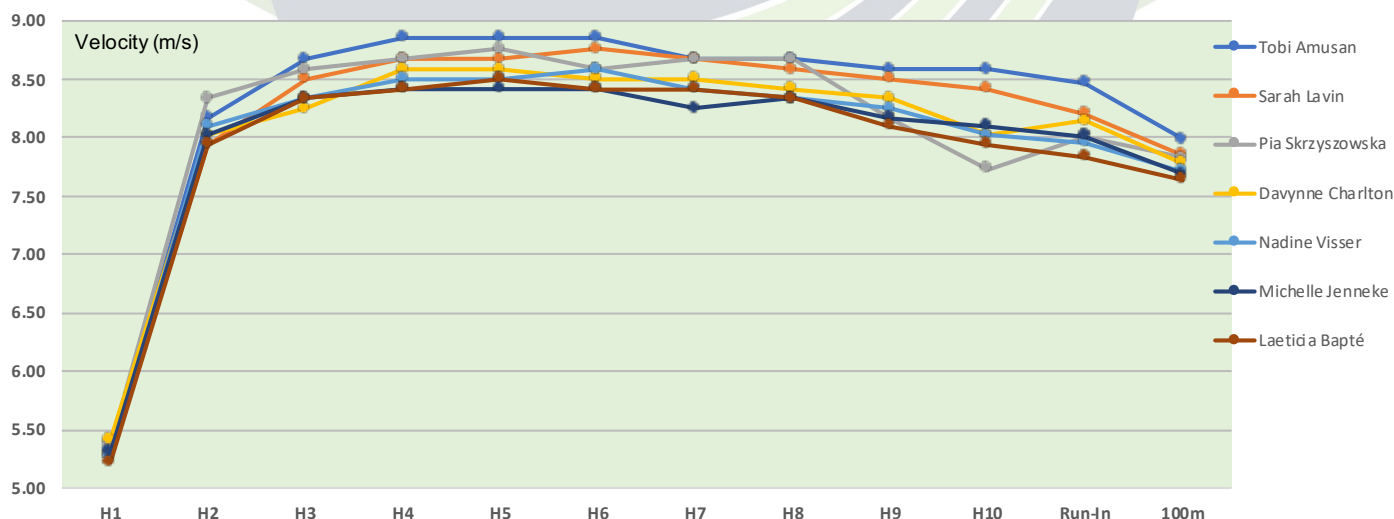
100m Hurdles

Date: 2023.07.02

Wind: 0.9 m/s

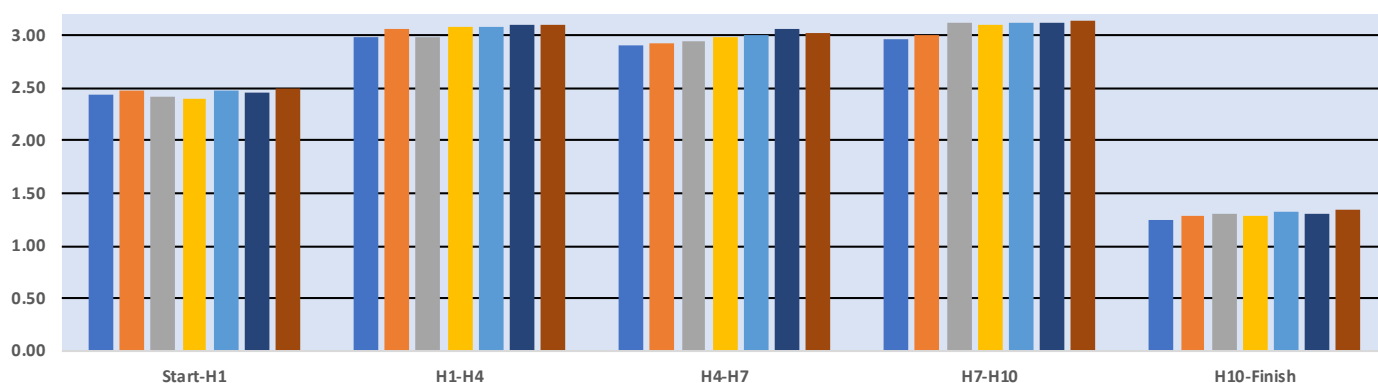
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Amusan, Tobi (NGR) (1997)	time		2.44	3.48	4.46	5.42	6.38	7.34	8.32	9.30	10.29	11.28		12.52	4 / 1	2.98	2.90	2.96
	reaction time	0.145											1.24			8.56	8.79	8.61
	interval			1.04	0.98	0.96	0.96	0.96	0.98	0.98	0.99	0.99	1.24					
Lavin, Sarah (IRL) (1994)	time		2.47	3.54	4.54	5.52	6.50	7.47	8.45	9.44	10.44	11.45		12.73	1 / 2	3.05	2.93	3.00
	reaction time	0.139											1.28	PB		8.36	8.70	8.50
	interval			1.07	1.00	0.98	0.98	0.97	0.98	0.99	1.00	1.01	1.28	7.86				
Skrzysowska, Pia (POL) (2001)	time		2.42	3.44	4.43	5.41	6.38	7.37	8.35	9.33	10.37	11.47		12.78	5 / 3	2.99	2.94	3.12
	reaction time	0.132											1.31			8.53	8.67	8.17
	interval			1.02	0.99	0.98	0.97	0.99	0.98	0.98	1.04	1.10	1.31	7.82				
Charlton, Devynne (BAH) (1995)	time		2.40	3.46	4.49	5.48	6.47	7.47	8.47	9.48	10.50	11.56		12.85	3 / 4	3.08	2.99	3.09
	reaction time	0.141											1.29			8.28	8.53	8.25
	interval			1.06	1.03	0.99	0.99	1.00	1.00	1.01	1.02	1.06	1.29	7.78				
Visser, Nadine (NED) (1995)	time		2.47	3.52	4.54	5.54	6.54	7.53	8.54	9.56	10.59	11.65		12.97	6 / 5	3.07	3.00	3.11
	reaction time	0.149											1.32			8.31	8.50	8.20
	interval			1.05	1.02	1.00	1.00	0.99	1.01	1.02	1.03	1.06	1.32	7.95				
Hurske, Reetta (FIN) (1995)	time		2.47	3.52	4.54	5.54	6.54	7.53	8.54	9.56	10.59	11.65		12.97	6 / 5	3.07	3.00	3.11
	reaction time	0.149											1.32			8.31	8.50	8.20
	interval			1.05	1.02	1.00	1.00	0.99	1.01	1.02	1.03	1.06	1.32	7.95				
Jenneke, Michelle (AUS) (1993)	time		2.45	3.51	4.53	5.54	6.55	7.56	8.59	9.61	10.65	11.70		13.01	7 / 7	3.09	3.05	3.11
	reaction time	0.145											1.31			8.25	8.36	8.20
	interval			1.06	1.02	1.01	1.01	1.01	1.03	1.02	1.04	1.05	1.31	7.69				
Bapté, Laetitia (FRA) (1999)	time		2.49	3.56	4.58	5.59	6.59	7.60	8.61	9.63	10.68	11.75		13.09	8 / 8	3.10	3.02	3.14
	reaction time	0.171											1.34			8.23	8.44	8.12
	interval			1.07	1.02	1.01	1.00	1.01	1.01	1.02	1.05	1.07	1.34	7.64				
Bapté, Laetitia (FRA) (1999)	time		2.49	3.56	4.58	5.59	6.59	7.60	8.61	9.63	10.68	11.75		13.09	8 / 8	3.10	3.02	3.14
	reaction time	0.171											1.34			8.23	8.44	8.12
	interval			1.07	1.02	1.01	1.00	1.01	1.01	1.02	1.05	1.07	1.34	7.64				



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Sun 2 Jul 2023 19:04) - diamond league race analysis

<https://www.omegatiming.com/File/0002030901010A0101FFFFFFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=zGzRLe6GAP8>

2023 Bauhaus Galan (Stockholm, SWE)

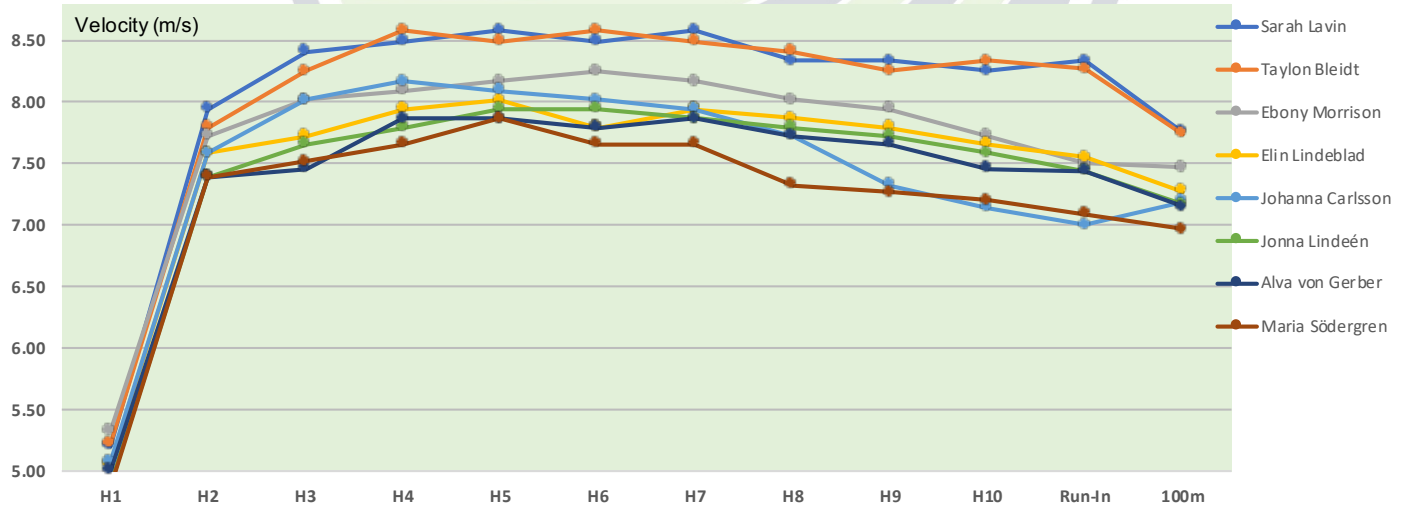
100m Hurdles

Date: 2023.07.02

Wind: 0.6 m/s

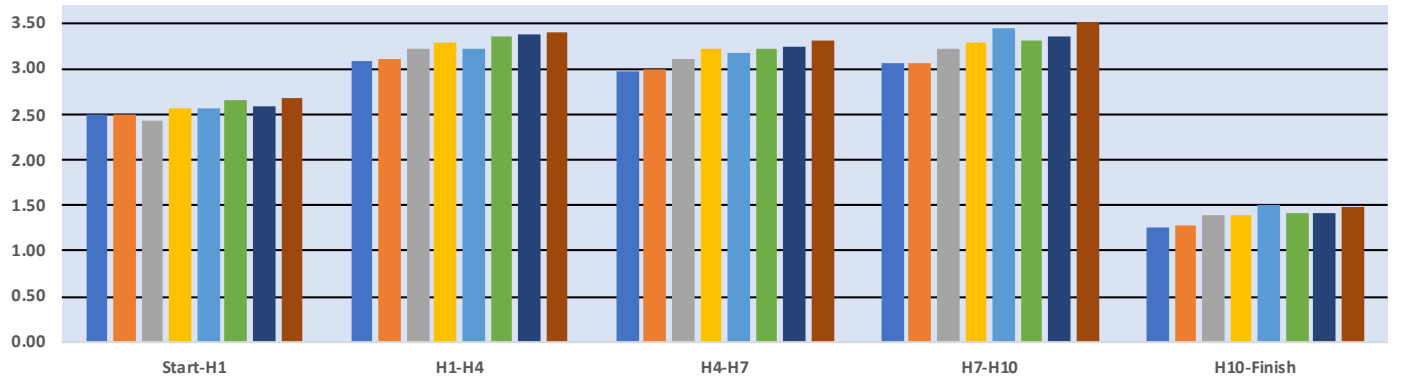
National FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10	
Lavin, Sarah (IRL) (1994)	time reaction time	0.140	time	2.50	3.57	4.58	5.58	6.57	7.57	8.56	9.58	10.60	11.63	12.89	3 / 1	3.08	2.98	3.07	
			interval	1.07	1.01	1.00	0.99	1.00	0.99	1.02	1.02	1.03	1.26						
			velocity	5.20	7.94	8.42	8.50	8.59	8.50	8.59	8.33	8.33	8.25						8.33
Bieldt, Taylon (RSA) (1998)	time reaction time	0.141	time	2.49	3.58	4.61	5.60	6.60	7.59	8.59	9.60	10.63	11.65	12.92	4 / 2	3.11	2.99	3.06	
			interval	1.09	1.03	0.99	1.00	0.99	1.00	1.01	1.03	1.02	1.27						
			velocity	5.22	7.80	8.25	8.59	8.50	8.59	8.50	8.42	8.25	8.33						8.27
Morrison, Ebony (LBR) (1994)	time reaction time	0.137	time	2.44	3.54	4.60	5.65	6.69	7.72	8.76	9.82	10.89	11.99	13.39	6 / 3	3.21	3.11	3.23	
			interval	1.10	1.06	1.05	1.04	1.03	1.04	1.06	1.07	1.10	1.40						
			velocity	5.33	7.73	8.02	8.10	8.17	8.25	8.17	8.02	7.94	7.73						7.50
Lindeblad, Elin (SWE) (1995)	time reaction time	0.140	time	2.57	3.69	4.79	5.86	6.92	8.01	9.08	10.16	11.25	12.36	13.75	5 / 4	3.29	3.22	3.28	
			interval	1.12	1.10	1.07	1.06	1.09	1.07	1.08	1.09	1.11	1.39						
			velocity	5.06	7.59	7.73	7.94	8.02	7.80	7.94	7.87	7.80	7.66						7.55
Carlsson, Johanna (SWE) (1994)	time reaction time	0.149	time	2.56	3.68	4.74	5.78	6.83	7.89	8.96	10.06	11.22	12.41	13.91	1 / 5	3.22	3.18	3.45	
			interval	1.12	1.06	1.04	1.05	1.06	1.07	1.10	1.16	1.19	1.50						PB
			velocity	5.08	7.59	8.02	8.17	8.10	8.02	7.94	7.73	7.33	7.14						7.00
Lindeén, Jonna (SWE) (1996)	time reaction time	0.195	time	2.66	3.81	4.92	6.01	7.08	8.15	9.23	10.32	11.42	12.54	13.95	7 / 6	3.35	3.22	3.31	
			interval	1.15	1.11	1.09	1.07	1.07	1.08	1.09	1.10	1.12	1.41						
			velocity	4.89	7.39	7.66	7.80	7.94	7.94	7.87	7.80	7.73	7.59						7.45
von Gerber, Alva (SWE) (2000)	time reaction time	0.141	time	2.60	3.75	4.89	5.97	7.05	8.14	9.22	10.32	11.43	12.57	13.98	2 / 7	3.37	3.25	3.35	
			interval	1.15	1.14	1.08	1.08	1.09	1.08	1.10	1.11	1.14	1.41						
			velocity	5.00	7.39	7.46	7.87	7.87	7.80	7.87	7.73	7.66	7.46						7.45
Södergren, Maria (SWE) (1998)	time reaction time	0.140	time	2.67	3.82	4.95	6.06	7.14	8.25	9.36	10.52	11.69	12.87	14.35	8 / 8	3.39	3.30	3.51	
			interval	1.15	1.13	1.11	1.08	1.11	1.11	1.16	1.17	1.18	1.48						
			velocity	4.87	7.39	7.52	7.66	7.87	7.66	7.66	7.33	7.26	7.20						7.09



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Sun 2 Jul 2023 16:36) - diamond league race analysis
<https://www.omegatiming.com/File/000203090101030101FFFFFFFFFFFF4D.pdf>

Video: No Video Found

2023 Athletissima (Lausanne, SUI)

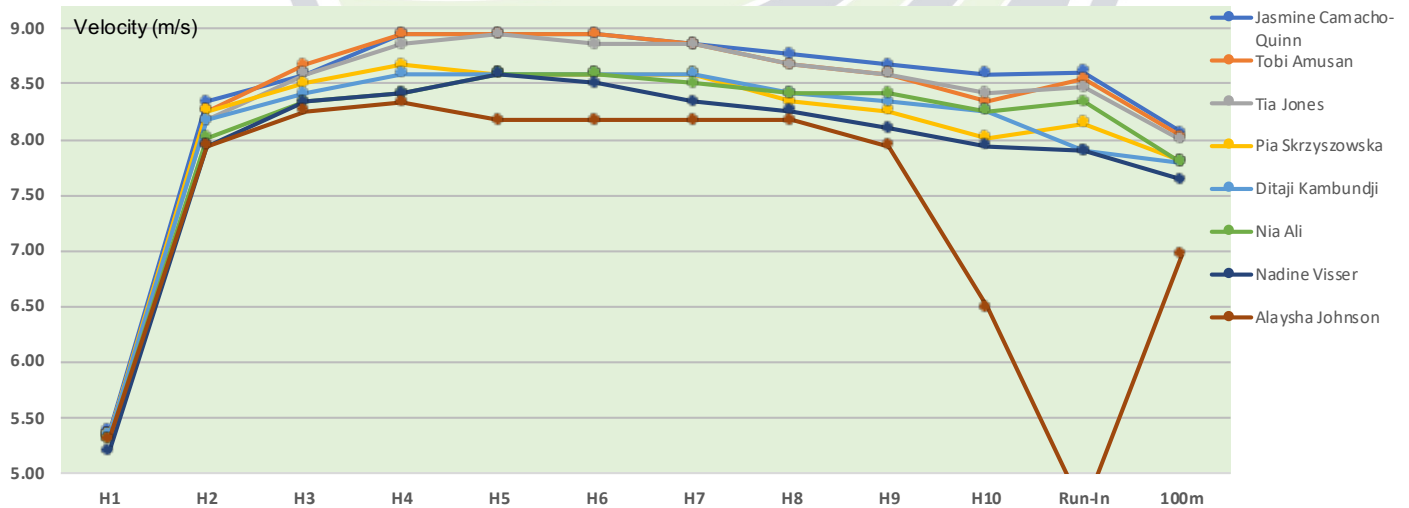
100m Hurdles

Date: 2023.06.30

Wind: -1.4 m/s

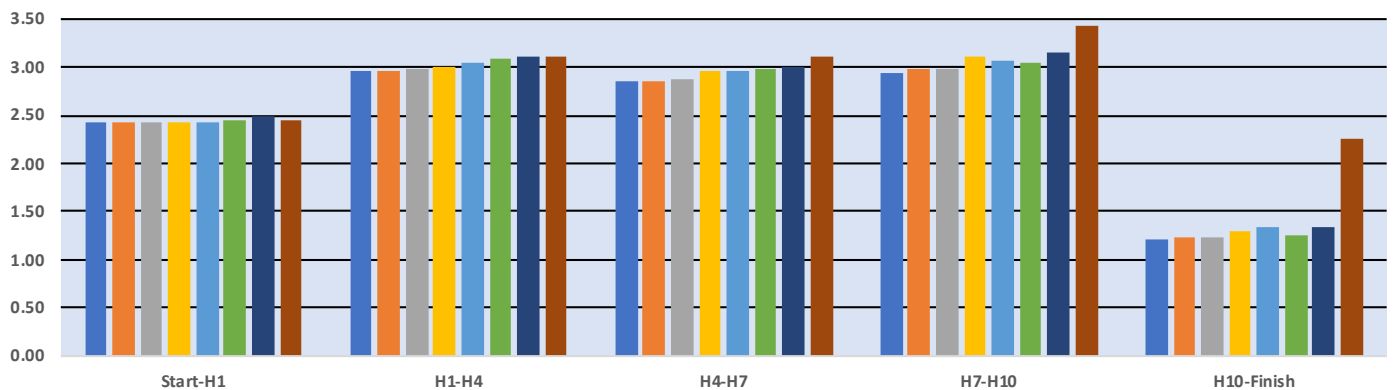
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Camacho-Quinn, Jasmine (PUR) (199)	time	2.42	3.44	4.43	5.38	6.33	7.28	8.24	9.21	10.19	11.18			12.40	5 / 1			
	reaction time	0.139														2.96	2.86	2.94
	interval velocity		5.37	8.33	8.59	8.95	8.95	8.95	8.85	8.76	8.67	8.59	8.61	8.06		8.61	8.92	8.67
Amusan, Tobi (NGR) (1997)	time	2.43	3.46	4.44	5.39	6.34	7.29	8.25	9.23	10.22	11.24			12.47	4 / 2			
	reaction time	0.133														2.96	2.86	2.99
	interval velocity		5.35	8.25	8.67	8.95	8.95	8.95	8.85	8.67	8.59	8.33	8.54	8.02		8.61	8.92	8.53
Jones, Tia (USA) (2000)	time	2.43	3.47	4.46	5.42	6.37	7.33	8.29	9.27	10.26	11.27			12.51	3 / 3			
	reaction time	0.139														2.99	2.87	2.98
	interval velocity		5.35	8.17	8.59	8.85	8.95	8.85	8.85	8.67	8.59	8.42	8.47	7.99		8.53	8.89	8.56
Skrzysowska, Pia (POL) (2001)	time	2.43	3.46	4.46	5.44	6.43	7.42	8.41	9.43	10.46	11.52			12.81	8 / 4			
	reaction time	0.139														3.01	2.97	3.11
	interval velocity		5.35	8.25	8.50	8.67	8.59	8.59	8.59	8.33	8.25	8.02	8.14	7.81		8.47	8.59	8.20
Kambundji, Ditaji (SUI) (2002)	time	2.43	3.47	4.48	5.47	6.46	7.45	8.44	9.45	10.47	11.50			12.83	7 / 5			
	reaction time	0.142														3.04	2.97	3.06
	interval velocity		5.35	8.17	8.42	8.59	8.59	8.59	8.42	8.33	8.25	7.89	7.79			8.39	8.59	8.33
Ali, Nia (USA) (1988)	time	2.45	3.51	4.53	5.54	6.53	7.52	8.52	9.53	10.54	11.57			12.83	2 / 6			
	reaction time	0.154														3.09	2.98	3.05
	interval velocity		5.31	8.02	8.33	8.42	8.59	8.59	8.50	8.42	8.42	8.25	8.33	7.79		8.25	8.56	8.36
Visser, Nadine (NED) (1995)	time	2.50	3.57	4.59	5.60	6.59	7.59	8.61	9.64	10.69	11.76			13.09	1 / 7			
	reaction time	0.182														3.10	3.01	3.15
	interval velocity		5.20	7.94	8.33	8.42	8.59	8.50	8.33	8.25	8.10	7.94	7.89	7.64		8.23	8.47	8.10
Johnson, Alaysha (USA) (1996)	time	2.45	3.52	4.55	5.57	6.61	7.65	8.69	9.73	10.80	12.11			14.36	6 / 8			
	reaction time	0.139														3.12	3.12	3.42
	interval velocity		5.31	7.94	8.25	8.33	8.17	8.17	8.17	8.17	7.94	6.49	4.67	6.96		8.17	8.17	7.46



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Fri 30 Jun 2023 21:22) - diamond league race analysis

<https://www.omegatiming.com/File/0002030801010C0101FFFFFFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=BMdhfl3hvAA>

2023 USATF New York City Grand Prix (Randalls Island, NY) (TV Analysis)

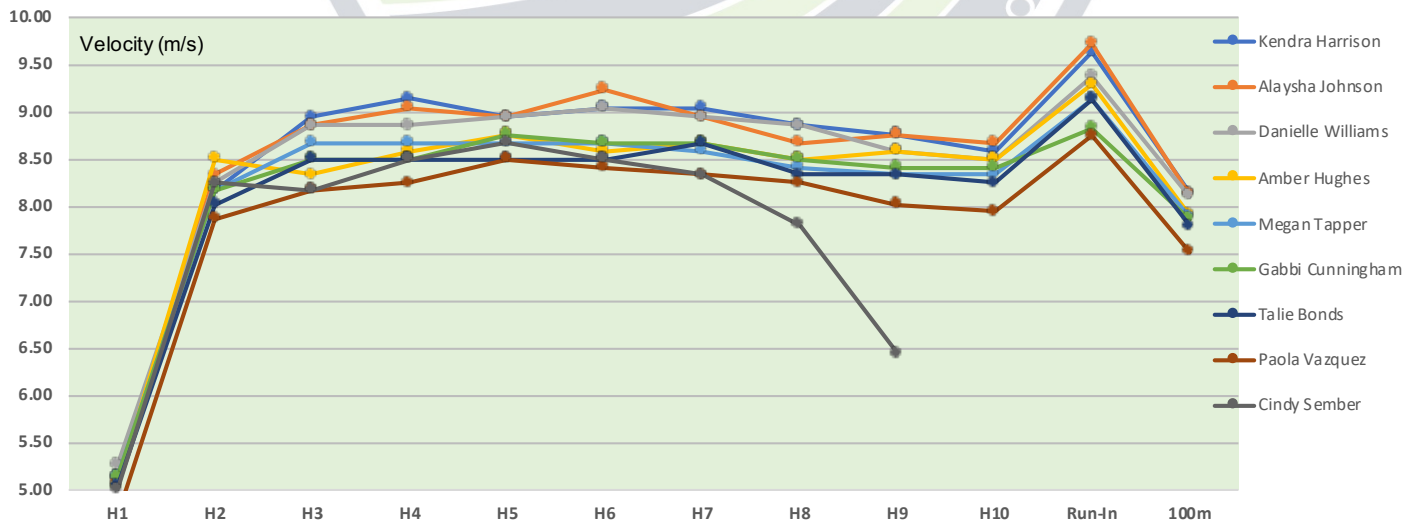
100m Hurdles

Date: 2023.06.24

Wind: 2.8 m/s

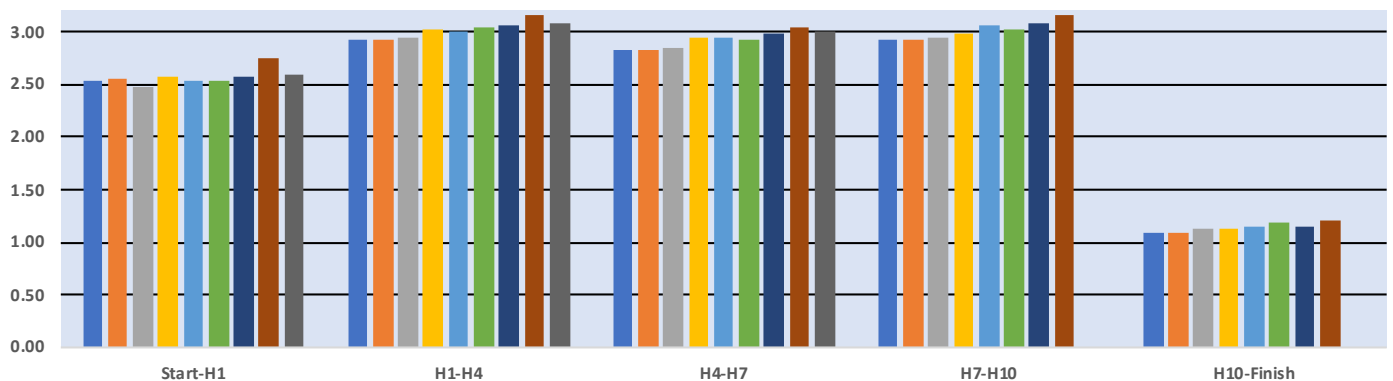
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Harrison, Kendra (USA) (1992)	time	2.53	3.57	4.52	5.45	6.40	7.34	8.28	9.24	10.21	11.20		12.29	5 / 1			
	reaction time	0.151													2.92	2.83	2.92
	interval		1.04	0.95	0.93	0.95	0.94	0.94	0.96	0.97	0.99	1.09			8.73	9.01	8.73
Johnson, Alaysha (USA) (1996)	time	2.55	3.57	4.53	5.47	6.42	7.34	8.29	9.27	10.24	11.22		12.30	4 / 2			
	reaction time	0.206													2.92	2.82	2.93
	interval		1.02	0.96	0.94	0.95	0.92	0.95	0.98	0.97	0.98	1.08			8.73	9.04	8.70
Williams, Danielle (JAM) (1992)	time	2.47	3.50	4.46	5.42	6.37	7.31	8.26	9.22	10.21	11.21		12.33	3 / 3			
	reaction time	0.331													2.95	2.84	2.95
	interval		1.03	0.96	0.96	0.95	0.94	0.95	0.96	0.99	1.00	1.12			8.64	8.98	8.64
Hughes, Amber (USA) (1994)	time	2.57	3.57	4.59	5.58	6.55	7.54	8.52	9.52	10.51	11.51		12.64	2 / 4			
	reaction time	0.147													3.01	2.94	2.99
	interval		1.00	1.02	0.99	0.97	0.99	0.98	1.00	0.99	1.00	1.13			8.47	8.67	8.53
Tapper, Megan (JAM) (1994)	time	2.53	3.57	4.55	5.53	6.51	7.49	8.48	9.49	10.51	11.53		12.68	6 / 5			
	reaction time	0.216													3.00	2.95	3.05
	interval		1.04	0.98	0.98	0.98	0.98	0.99	1.01	1.02	1.02	1.15			8.50	8.64	8.36
Cunningham, Gabbi (USA) (1998)	time	2.53	3.57	4.57	5.57	6.54	7.52	8.50	9.50	10.51	11.52		12.71	1 / 6			
	reaction time	0.506													3.04	2.93	3.02
	interval		1.04	1.00	1.00	0.97	0.98	0.98	1.00	1.01	1.01	1.19			8.39	8.70	8.44
Bonds, Talie (USA) (1998)	time	2.58	3.64	4.64	5.64	6.64	7.64	8.62	9.64	10.66	11.69		12.84	8 / 7			
	reaction time	0.164													3.06	2.98	3.07
	interval		1.06	1.00	1.00	1.00	1.00	0.98	1.02	1.02	1.03	1.15			8.33	8.56	8.31
Vazquez, Paola (PUR) (1998)	time	2.75	3.83	4.87	5.90	6.90	7.91	8.93	9.96	11.02	12.09		13.29	9 / 8			
	reaction time	0.251													3.15	3.03	3.16
	interval		1.08	1.04	1.03	1.00	1.01	1.02	1.03	1.06	1.07	1.20			8.10	8.42	8.07
Sember, Cindy (GBR) (1994)	time	2.60	3.63	4.67	5.67	6.65	7.65	8.67	9.76	11.08			dnf	7 / --			
	reaction time	0.201													3.07	3.00	-8.67
	interval		1.03	1.04	1.00	0.98	1.00	1.02	1.09	1.32					8.31	8.50	-2.94



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=IAQglbhCgIQ&t=5s>

2023 NCAA Championships (Austin, TX) (TV Analysis)

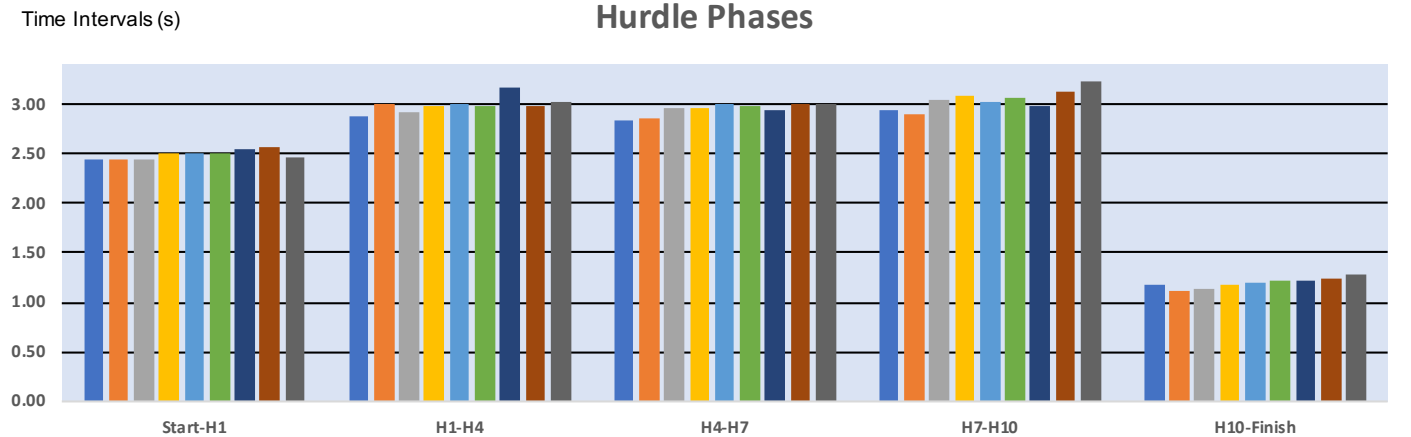
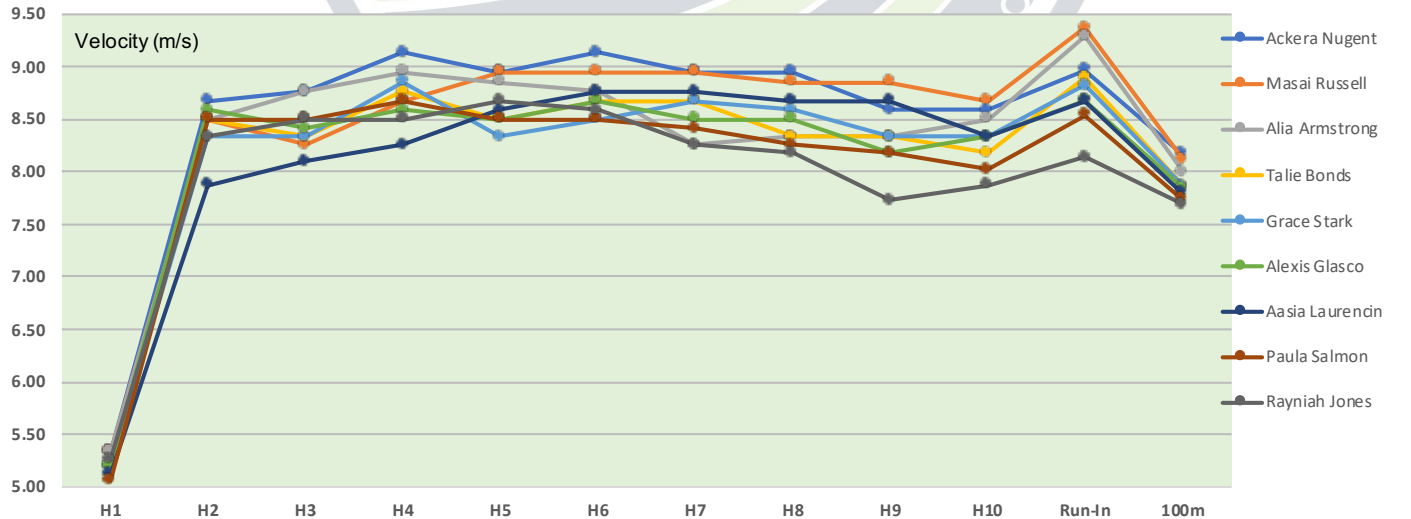
100m Hurdles

Date: 2023.06.10

Wind: 3.8 m/s

FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Nugent, Ackera (JAM) (2002)	time	2.44	3.42	4.39	5.32	6.27	7.20	8.15	9.10	10.09	11.08		12.25	6 / 1			
	reaction time		0.98	0.97	0.93	0.95	0.93	0.95	0.95	0.99	0.99	1.17			2.88	2.83	2.93
	velocity	5.33	8.67	8.76	9.14	8.95	9.14	8.95	8.95	8.59	8.59	8.97	8.16		8.85	9.01	8.70
Russell, Masai (USA) (2000)	time	2.44	3.44	4.47	5.45	6.40	7.35	8.30	9.26	10.22	11.20		12.32	4 / 2			
	reaction time		1.00	1.03	0.98	0.95	0.95	0.95	0.96	0.96	0.98	1.12			3.01	2.85	2.90
	velocity	5.33	8.50	8.25	8.67	8.95	8.95	8.95	8.85	8.85	8.67	9.37	8.12		8.47	8.95	8.79
Armstrong, Alia (USA) (2000)	time	2.44	3.44	4.41	5.36	6.32	7.29	8.32	9.34	10.36	11.36		12.49	5 / 3			
	reaction time		1.00	0.97	0.95	0.96	0.97	1.03	1.02	1.02	1.00	1.13			2.92	2.96	3.04
	velocity	5.33	8.50	8.76	8.95	8.85	8.76	8.25	8.33	8.33	8.50	9.29	8.01		8.73	8.61	8.39
Bonds, Talie (USA) (1998)	time	2.50	3.50	4.52	5.49	6.49	7.47	8.45	9.47	10.49	11.53		12.71	7 / 4			
	reaction time		1.00	1.02	0.97	1.00	0.98	0.98	1.02	1.02	1.04	1.18			2.99	2.96	3.08
	velocity	5.20	8.50	8.33	8.76	8.50	8.67	8.67	8.33	8.33	8.17	8.90	7.87		8.53	8.61	8.28
Stark, Grace (USA) (2001)	time	2.50	3.52	4.54	5.50	6.52	7.52	8.50	9.49	10.51	11.53		12.72	2 / 5			
	reaction time		1.02	1.02	0.96	1.02	1.00	0.98	0.99	1.02	1.02	1.19			3.00	3.00	3.03
	velocity	5.20	8.33	8.33	8.85	8.33	8.50	8.67	8.59	8.33	8.33	8.82	7.86		8.50	8.50	8.42
Glasco, Alexis (USA) (2002)	time	2.50	3.49	4.50	5.49	6.49	7.47	8.47	9.47	10.51	11.53		12.74	3 / 6			
	reaction time		0.99	1.01	0.99	1.00	0.98	1.00	1.00	1.04	1.02	1.21			2.99	2.98	3.06
	velocity	5.20	8.59	8.42	8.59	8.50	8.67	8.50	8.50	8.17	8.33	8.68	7.85		8.53	8.56	8.33
Laurencin, Aasia (USA) (2002)	time	2.54	3.62	4.67	5.70	6.69	7.66	8.63	9.61	10.59	11.61		12.82	9 / 7			
	reaction time		1.08	1.05	1.03	0.99	0.97	0.97	0.98	0.98	1.02	1.21			3.16	2.93	2.98
	velocity	5.12	7.87	8.10	8.25	8.59	8.76	8.76	8.67	8.67	8.33	8.68	7.80		8.07	8.70	8.56
Salmon, Paula (USA) (1999)	time	2.57	3.57	4.57	5.55	6.55	7.55	8.56	9.59	10.63	11.69		12.92	1 / 8			
	reaction time		1.00	1.00	0.98	1.00	1.00	1.01	1.03	1.04	1.06	1.23			2.98	3.01	3.13
	velocity	5.06	8.50	8.50	8.67	8.50	8.50	8.42	8.25	8.17	8.02	8.54	7.74		8.56	8.47	8.15
Jones, Rayniah (USA) (2001)	time	2.47	3.49	4.49	5.49	6.47	7.46	8.49	9.53	10.63	11.71		13.00	8 / 9			
	reaction time		1.02	1.00	1.00	0.98	0.99	1.03	1.04	1.10	1.08	1.29			3.02	3.00	3.22
	velocity	5.26	8.33	8.50	8.50	8.67	8.59	8.25	8.17	7.73	7.87	8.14	7.69		8.44	8.50	7.92



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1280 x 720 @ 30fps
Timing From: First Movement
Source: <https://www.youtube.com/watch?v=-fk3TRy0s5c>

2023 FBK Games (Hengelo, NED)

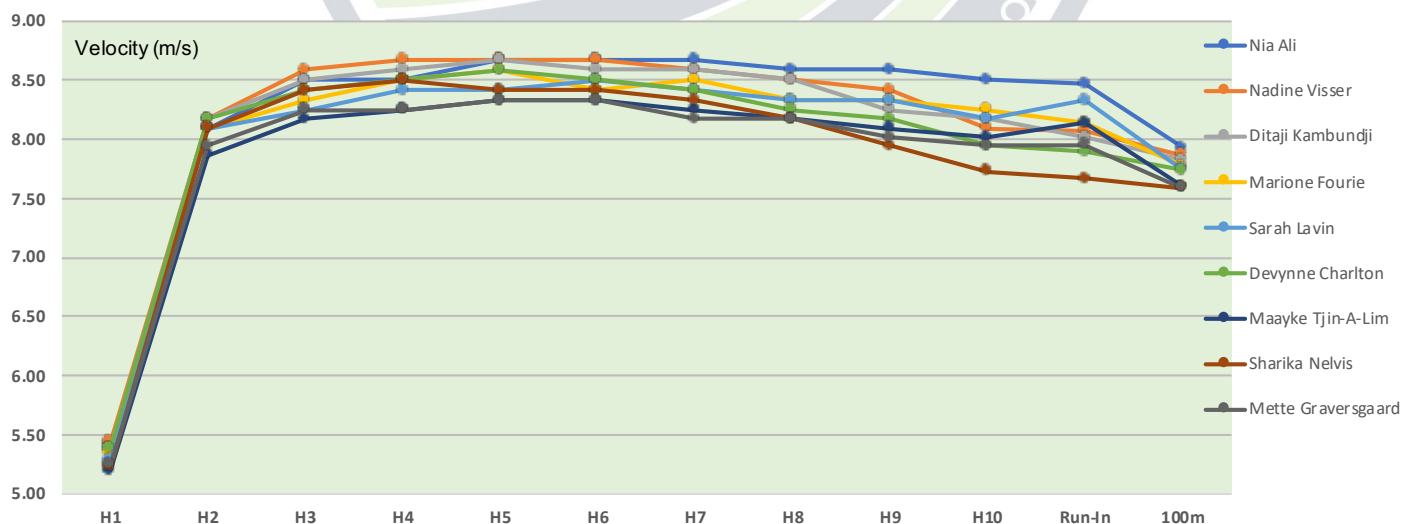
100m Hurdles

Date: 2023.06.04

Wind: 0.2 m/s

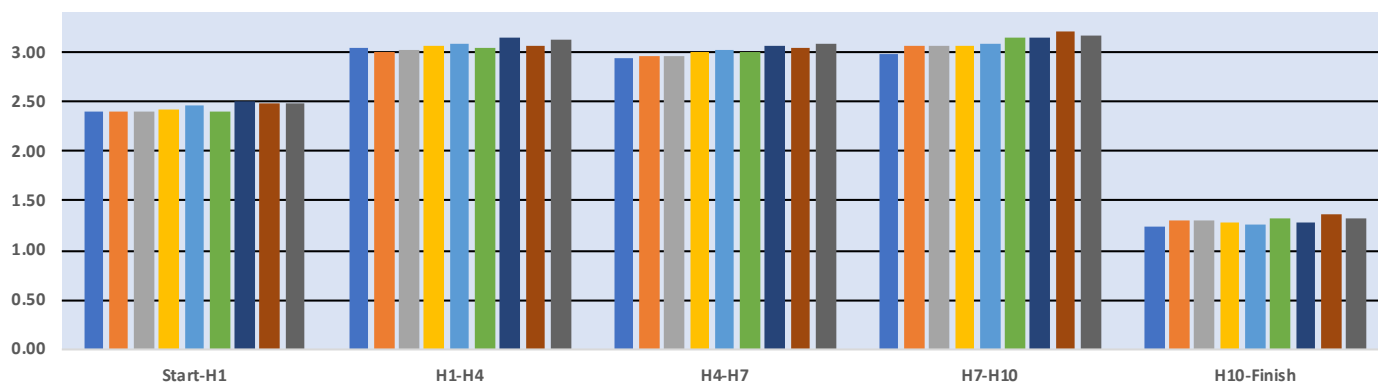
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Ali, Nia (USA) (1988)	time		2.40	3.45	4.45	5.45	6.43	7.41	8.39	9.38	10.37	11.37		12.61	5 / 1			
	reaction time	0.156											1.24			3.05	2.94	2.98
	interval			1.05	1.00	1.00	0.98	0.98	0.98	0.99	0.99	1.00	1.24			8.36	8.67	8.56
Visser, Nadine (NED) (1995)	time		2.39	3.43	4.42	5.40	6.38	7.36	8.35	9.35	10.36	11.41		12.71	4 / 2			
	reaction time	0.133											1.30			3.01	2.95	3.06
	interval			1.04	0.99	0.98	0.98	0.98	0.99	1.00	1.01	1.05	1.30			8.47	8.64	8.33
Kambundji, Ditaji (SUI) (2002)	time		2.41	3.45	4.45	5.44	6.42	7.41	8.40	9.40	10.43	11.47		12.78	7 / 3			
	reaction time	0.134											1.31			3.03	2.96	3.07
	interval			1.04	1.00	0.99	0.98	0.99	0.99	1.00	1.03	1.04	1.31			8.42	8.61	8.31
Fourie, Marione (RSA) (2002)	time		2.43	3.48	4.50	5.50	6.49	7.50	8.50	9.52	10.54	11.57		12.86	8 / 4			
	reaction time	0.143											1.29	=PB		3.07	3.00	3.07
	interval			1.05	1.02	1.00	0.99	1.01	1.00	1.02	1.02	1.03	1.29			8.31	8.50	8.31
Lavin, Sarah (IRL) (1994)	time		2.46	3.51	4.54	5.55	6.56	7.56	8.57	9.59	10.61	11.65		12.91	1 / 5			
	reaction time	0.139											1.26			3.09	3.02	3.08
	interval			1.05	1.03	1.01	1.01	1.00	1.01	1.02	1.02	1.04	1.26			8.25	8.44	8.28
Charlton, Devynne (BAH) (1995)	time		2.41	3.45	4.46	5.46	6.45	7.45	8.46	9.49	10.53	11.60		12.93	6 / 6			
	reaction time	0.155											1.33			3.05	3.00	3.14
	interval			1.04	1.01	1.00	0.99	1.00	1.01	1.03	1.04	1.07	1.33			8.36	8.50	8.12
Tjin-A-Lim, Maayke (NED) (1998)	time		2.50	3.58	4.62	5.65	6.67	7.69	8.72	9.76	10.81	11.87		13.16	2 / 7			
	reaction time	0.149											1.29			3.15	3.07	3.15
	interval			1.08	1.04	1.03	1.02	1.02	1.03	1.04	1.05	1.06	1.29			8.10	8.31	8.10
Nelvis, Sharika (USA) (1990)	time		2.49	3.54	4.55	5.55	6.56	7.57	8.59	9.63	10.70	11.80		13.17	9 / 8			
	reaction time	0.142											1.37			3.06	3.04	3.21
	interval			1.05	1.01	1.00	1.01	1.01	1.02	1.04	1.07	1.10	1.37			8.33	8.39	7.94
Graversgaard, Mette (DEN) (1995)	time		2.48	3.55	4.58	5.61	6.63	7.65	8.69	9.73	10.79	11.86		13.18	3 / 9			
	reaction time	0.132											1.32			3.13	3.08	3.17
	interval			1.07	1.03	1.03	1.02	1.02	1.04	1.04	1.06	1.07	1.32			8.15	8.28	8.04
	velocity		5.24	7.94	8.25	8.25	8.33	8.33	8.17	8.17	8.02	7.94	7.95	7.59				



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Sun 4 Jun 2023 18:16) - continental tour race analysis

<https://www.omegaitiming.com/File/0002030101010A0101FFFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=s1ydEfrnTLQ>

2023 USATF Los Angeles Grand Prix (Westwood, CA) (TV Analysis)

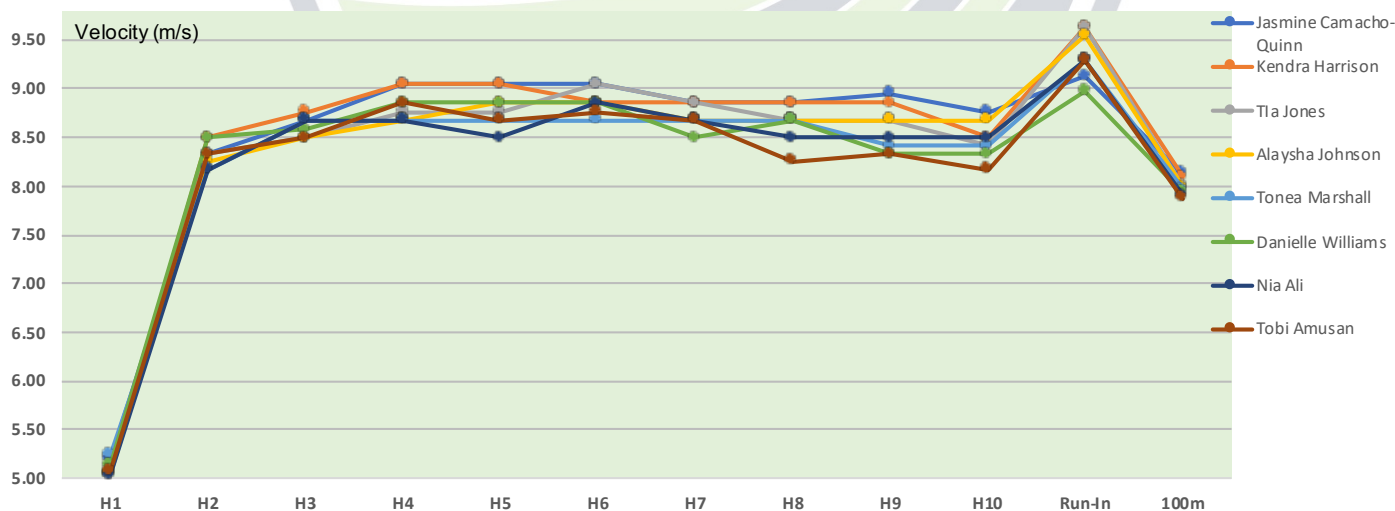
100m Hurdles

Date: 2023.05.27

Wind: -0.2 m/s

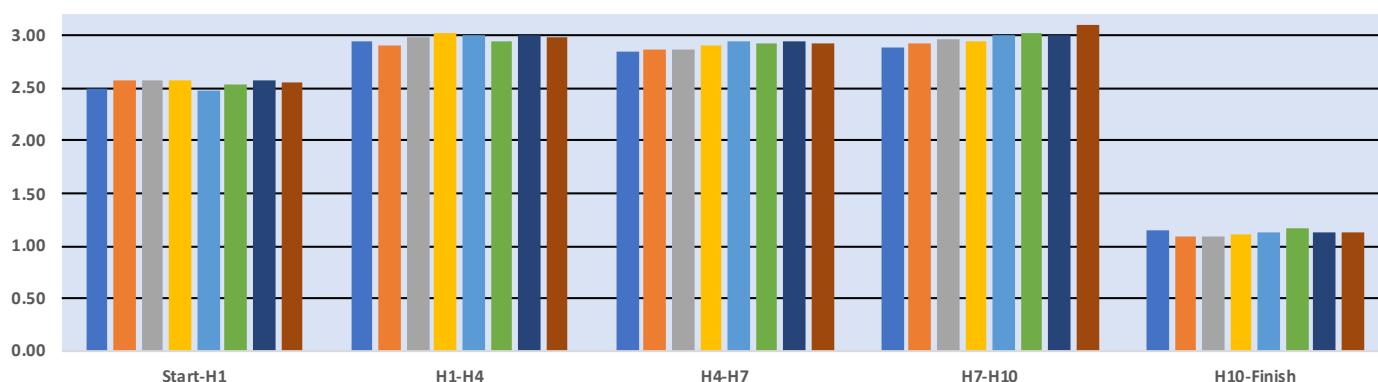
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Camacho-Quinn, Jasmine (PUR) (199)	time	2.50	3.52	4.50	5.44	6.38	7.32	8.28	9.24	10.19	11.16			12.31	5 / 1	2.94	2.84	2.88
	reaction time	0.158		1.02	0.98	0.94	0.94	0.94	0.96	0.96	0.95	0.97	1.15			8.67	8.98	8.85
	interval		5.20	8.33	8.67	9.04	9.04	9.04	8.85	8.85	8.95	8.76	9.13	8.12				
	velocity																	
Harrison, Kendra (USA) (1992)	time	2.57	3.57	4.54	5.48	6.42	7.38	8.34	9.30	10.26	11.26			12.35	6 / 2	2.91	2.86	2.92
	reaction time	0.207		1.00	0.97	0.94	0.94	0.96	0.96	0.96	1.00	1.09				8.76	8.92	8.73
	interval		5.06	8.50	8.76	9.04	9.04	8.85	8.85	8.85	8.85	8.50	9.63	8.10				
	velocity																	
Jones, Tia (USA) (2000)	time	2.58	3.60	4.60	5.57	6.54	7.48	8.44	9.42	10.40	11.41			12.50	7 / 3	2.99	2.87	2.97
	reaction time	0.186		1.02	1.00	0.97	0.97	0.94	0.96	0.98	1.01	1.09				8.53	8.89	8.59
	interval		5.04	8.33	8.50	8.76	8.76	9.04	8.85	8.67	8.67	8.42	9.63	8.00				
	velocity																	
Johnson, Alaysha (USA) (1996)	time	2.57	3.60	4.60	5.58	6.54	7.50	8.48	9.46	10.44	11.42			12.52	2 / 4	3.01	2.90	2.94
	reaction time	0.178		1.03	1.00	0.98	0.96	0.96	0.98	0.98	0.98	1.10				8.47	8.79	8.67
	interval		5.06	8.25	8.50	8.67	8.85	8.85	8.67	8.67	8.67	9.55	7.99					
	velocity																	
Marshall, Tanea (USA) (1998)	time	2.48	3.52	4.50	5.48	6.46	7.44	8.42	9.40	10.41	11.42			12.55	8 / 5	3.00	2.94	3.00
	reaction time	0.202		1.04	0.98	0.98	0.98	0.98	0.98	1.01	1.01	1.13				8.50	8.67	8.50
	interval		5.24	8.17	8.67	8.67	8.67	8.67	8.67	8.42	8.42	9.29	7.97					
	velocity																	
Williams, Danielle (JAM) (1992)	time	2.53	3.53	4.52	5.48	6.44	7.40	8.40	9.38	10.40	11.42			12.59	1 / 6	2.95	2.92	3.02
	reaction time	0.437		1.00	0.99	0.96	0.96	1.00	0.98	1.02	1.02	1.17				8.64	8.73	8.44
	interval		5.14	8.50	8.59	8.85	8.85	8.50	8.67	8.33	8.33	8.97	7.94					
	velocity																	
Ali, Nia (USA) (1988)	time	2.58	3.62	4.60	5.58	6.58	7.54	8.52	9.52	10.52	11.52			12.65	3 / 7	3.00	2.94	3.00
	reaction time	0.185		1.04	0.98	0.98	1.00	0.96	0.98	1.00	1.00	1.13				8.50	8.67	8.50
	interval		5.04	8.17	8.67	8.67	8.50	8.85	8.67	8.50	8.50	9.29	7.91					
	velocity																	
Amusan, Tobi (NGR) (1997)	time	2.56	3.58	4.58	5.54	6.52	7.49	8.47	9.50	10.52	11.56			12.69	4 / 8	2.98	2.93	3.09
	reaction time	0.184		1.02	1.00	0.96	0.98	0.97	0.98	1.03	1.02	1.04	1.13			8.56	8.70	8.25
	interval		5.08	8.33	8.50	8.85	8.67	8.76	8.67	8.25	8.33	8.17	9.29	7.88				
	velocity																	



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=RAivxrcYsv0>

2023 USATF Bermuda Grand Prix (Devonshire, BER) (TV Analysis)

100m Hurdles

Date: 2023.05.21

Wind: 3.5 m/s

FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Camacho-Quinn, Jasmine (PUR) (199)	time	2.50	3.52	4.46	5.40	6.32	7.25	8.19	9.13	10.10	11.06		12.17	5 / 1			
	reaction time	0.153															
	interval		1.02	0.94	0.94	0.92	0.93	0.94	0.94	0.97	0.96	1.11			2.90	2.79	2.87
	velocity	5.20	8.33	9.04	9.04	9.24	9.14	9.04	9.04	8.76	8.85	9.46	8.22		8.79	9.14	8.89
Williams, Danielle (JAM) (1992)	time	2.53	3.54	4.50	5.46	6.39	7.34	8.29	9.27	10.25	11.26		12.38	4 / 2			
	reaction time	0.521															
	interval		1.01	0.96	0.96	0.93	0.95	0.95	0.98	0.98	1.01	1.12			2.93	2.83	2.97
	velocity	5.14	8.42	8.85	8.85	9.14	8.95	8.95	8.67	8.67	8.42	9.37	8.08		8.70	9.01	8.59
Marshall, Tanea (USA) (1998)	time	2.50	3.52	4.49	5.46	6.42	7.37	8.32	9.29	10.26	11.26		12.39	3 / 3			
	reaction time	0.176															
	interval		1.02	0.97	0.97	0.96	0.95	0.95	0.97	0.97	1.00	1.13			2.96	2.86	2.94
	velocity	5.20	8.33	8.76	8.76	8.85	8.95	8.95	8.76	8.76	8.50	9.29	8.07		8.61	8.92	8.67
Tapper, Megan (JAM) (1994)	time	2.53	3.54	4.49	5.44	6.39	7.37	8.34	9.32	10.33	11.35		12.47	6 / 4			
	reaction time	0.183															
	interval		1.01	0.95	0.95	0.95	0.98	0.97	0.98	1.01	1.02	1.12			2.91	2.90	3.01
	velocity	5.14	8.42	8.95	8.95	8.95	8.67	8.76	8.67	8.42	8.33	9.37	8.02		8.76	8.79	8.47

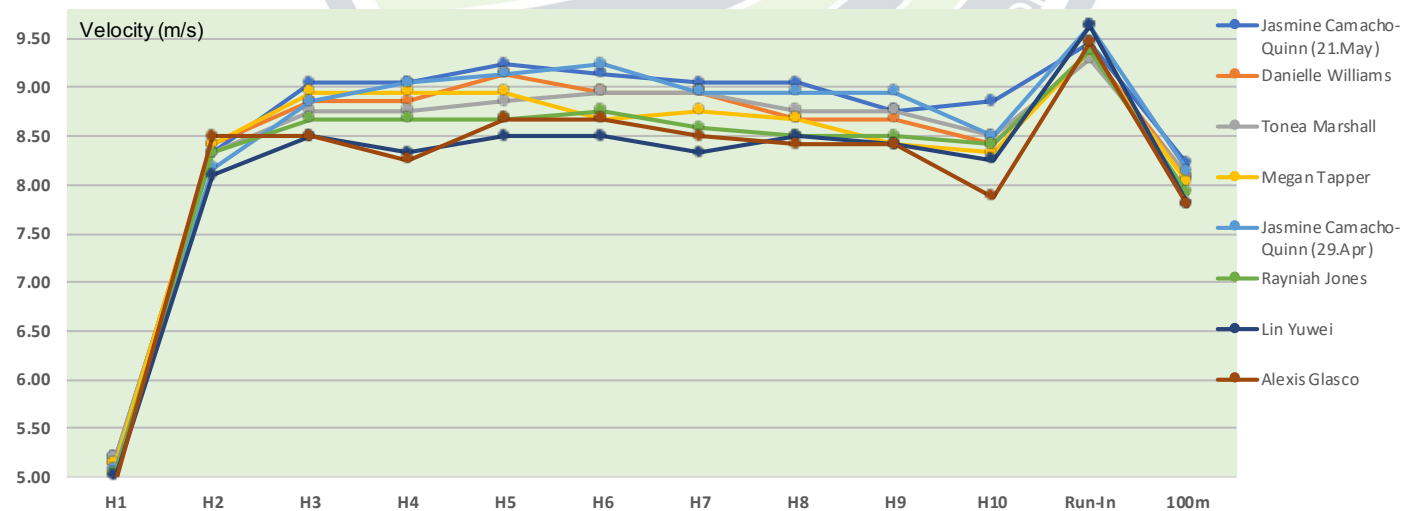
2023 UNF East Coast Relays (Jacksonville, FL)

Date: 2023.04.29

Wind: 3.2 m/s

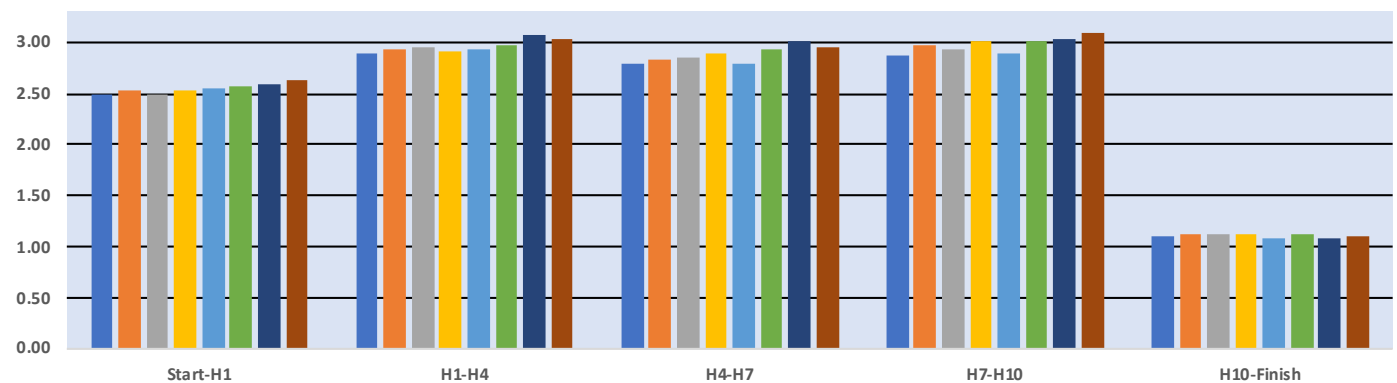
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Camacho-Quinn, Jasmine (PUR) (199)	time	2.56	3.60	4.56	5.50	6.43	7.35	8.30	9.25	10.20	11.20		12.29	5 / 1			
	reaction time																
	interval		1.04	0.96	0.94	0.93	0.92	0.95	0.95	0.95	1.00	1.09			2.94	2.80	2.90
	velocity	5.08	8.17	8.85	9.04	9.14	9.24	8.95	8.95	8.95	8.50	9.63	8.14		8.67	9.11	8.79
Jones, Rayniah (USA) (2001)	time	2.58	3.60	4.58	5.56	6.54	7.51	8.50	9.50	10.50	11.51		12.63	6 / 2			
	reaction time																
	interval		1.02	0.98	0.98	0.98	0.97	0.99	1.00	1.00	1.01	1.12			2.98	2.94	3.01
	velocity	5.04	8.33	8.67	8.67	8.67	8.76	8.59	8.50	8.50	8.42	9.37	7.92		8.56	8.67	8.47
Lin Yuwei (CHN) (1999)	time	2.60	3.65	4.65	5.67	6.67	7.67	8.69	9.69	10.70	11.73		12.82	4 / 3			
	reaction time																
	interval		1.05	1.00	1.02	1.00	1.00	1.02	1.00	1.01	1.03	1.09			3.07	3.02	3.04
	velocity	5.00	8.10	8.50	8.33	8.50	8.50	8.33	8.50	8.42	8.25	9.63	7.80		8.31	8.44	8.39
Glasco, Alexis (USA) (2002)	time	2.63	3.63	4.63	5.66	6.64	7.62	8.62	9.63	10.64	11.72		12.83	3 / 4			
	reaction time																
	interval		1.00	1.00	1.03	0.98	0.98	1.00	1.01	1.01	1.08	1.11			3.03	2.96	3.10
	velocity	4.94	8.50	8.50	8.25	8.67	8.67	8.50	8.42	8.42	7.87	9.46	7.79		8.42	8.61	8.23



Time Intervals (s)

Hurdle Phases



USATF Bermuda Grand Prix

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=K9o370LAAR4>

UNF East Coast Relays

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: Gun Flash

Sources: <https://www.youtube.com/watch?v=vZXXoX3f96w>
Video from Coach - 1080 @ 30fps

2023 Doha Diamond League (Doha, QAT) (TV Analysis)

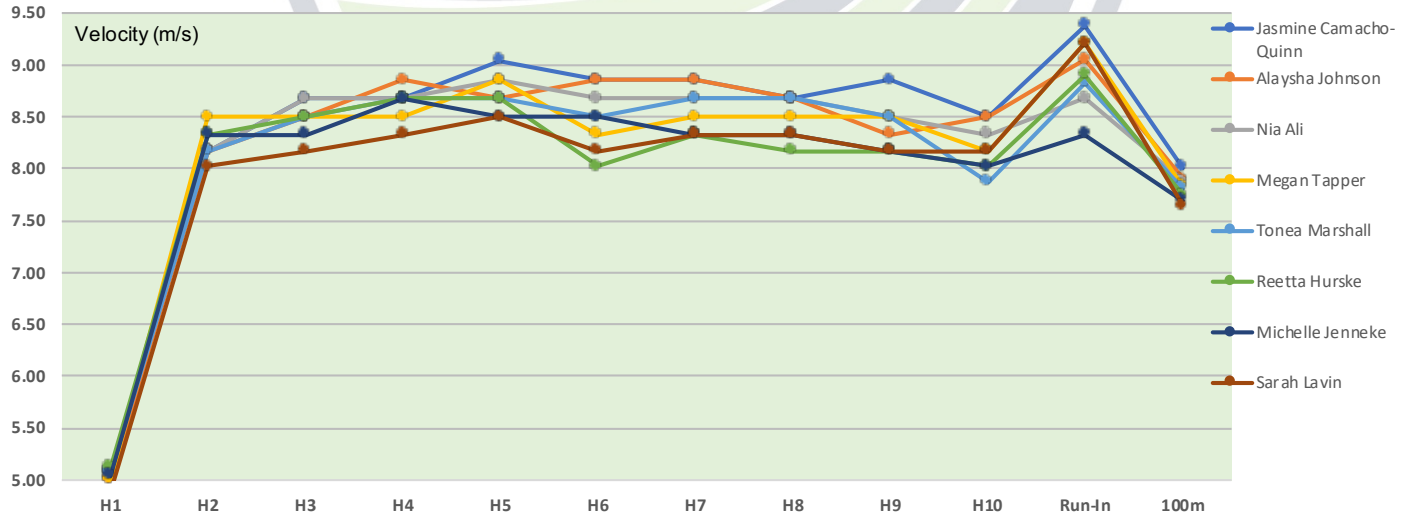
100m Hurdles

Date: 2023.05.05

Wind: 1.1 m/s

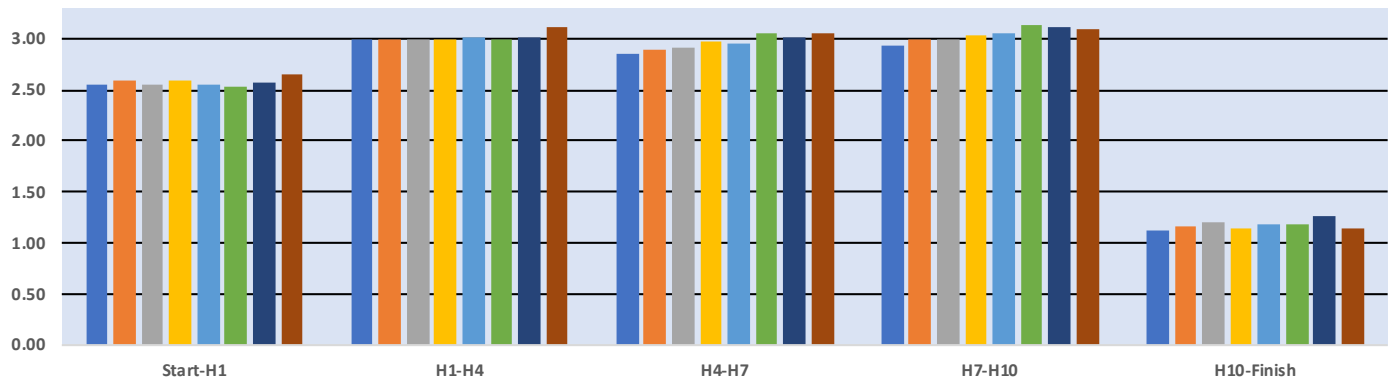
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Camacho-Quinn, Jasmine (PUR) (199)	time		2.56	3.60	4.58	5.56	6.50	7.46	8.42	9.40	10.36	11.36		12.48	4 / 1			
	reaction time	0.148											1.12			3.00	2.86	2.94
	interval velocity		5.08	8.17	8.67	8.67	9.04	8.85	8.85	8.67	8.85	8.50	9.37	8.01		8.50	8.92	8.67
Johnson, Alaysha (USA) (1996)	time		2.60	3.64	4.64	5.60	6.58	7.54	8.50	9.48	10.50	11.50		12.66	5 / 2			
	reaction time	0.165											1.16			3.00	2.90	3.00
	interval velocity		5.00	8.17	8.50	8.85	8.67	8.85	8.85	8.67	8.33	8.50	9.05	7.90		8.50	8.79	8.50
Ali, Nia (USA) (1988)	time		2.56	3.60	4.58	5.56	6.52	7.50	8.48	9.46	10.46	11.48		12.69	3 / 3			
	reaction time	0.167											1.21			3.00	2.92	3.00
	interval velocity		5.08	8.17	8.67	8.67	8.85	8.67	8.67	8.67	8.50	8.33	8.68	7.88		8.50	8.73	8.50
Tapper, Megan (JAM) (1994)	time		2.60	3.60	4.60	5.60	6.56	7.58	8.58	9.58	10.58	11.62		12.76	8 / 4			
	reaction time	0.163											1.14			3.00	2.98	3.04
	interval velocity		5.00	8.50	8.50	8.50	8.85	8.33	8.50	8.50	8.50	8.50	8.17	7.84		8.50	8.56	8.39
Marshall, Tanea (USA) (1998)	time		2.56	3.60	4.60	5.58	6.56	7.56	8.54	9.52	10.52	11.60		12.79	2 / 5			
	reaction time	0.129											1.19			3.02	2.96	3.06
	interval velocity		5.08	8.17	8.50	8.67	8.67	8.50	8.67	8.67	8.50	7.87	8.82	7.82		8.44	8.61	8.33
Hurske, Reetta (FIN) (1995)	time		2.54	3.56	4.56	5.54	6.52	7.58	8.60	9.64	10.68	11.74		12.92	6 / 6			
	reaction time	0.132											1.18			3.00	3.06	3.14
	interval velocity		5.12	8.33	8.50	8.67	8.67	8.02	8.33	8.17	8.17	8.02	8.90	7.74		8.50	8.33	8.12
Jenneke, Michelle (AUS) (1993)	time		2.58	3.60	4.62	5.60	6.60	7.60	8.62	9.64	10.68	11.74		13.00	1 / 7			
	reaction time	0.154											1.26			3.02	3.02	3.12
	interval velocity		5.04	8.33	8.33	8.67	8.50	8.50	8.33	8.33	8.17	8.02	8.33	7.69		8.44	8.44	8.17
Lavin, Sarah (IRL) (1994)	time		2.66	3.72	4.76	5.78	6.78	7.82	8.84	9.86	10.90	11.94		13.08	7 / 8			
	reaction time	0.137											1.14			3.12	3.06	3.10
	interval velocity		4.89	8.02	8.17	8.33	8.50	8.17	8.33	8.33	8.17	8.17	9.21	7.65		8.17	8.33	8.23



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=9exSPMzGN2w>

Men's 400m Hurdles

Biomechanical Analysis

2023 Top 10 Times - Men's 400m Hurdles

Benjamin, Rai (USA) (1997)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 Prefontaine Classic (Eugene, OR)																		
date	16-Sep	time	5.74	9.40	13.10	16.86	20.68	24.61	28.60	32.70	36.97	41.36		46.39	5 / 1			
reaction time	0.154	interval		3.66	3.70	3.76	3.82	3.93	3.99	4.10	4.27	4.39	5.03			11.12	11.74	12.76
		velocity	7.84	9.56	9.46	9.31	9.16	8.91	8.77	8.54	8.20	7.97	7.95	8.62		9.44	8.94	8.23
H1 lead leg	R	strides	20	13	13	12	12	13	13	13	13	13	17	152				
Warholm, Karsten (NOR) (1996)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 Herculis Meeting International d'Athlétisme (Monaco, MON)																		
date	21-Jul	time	5.55	9.05	12.62	16.26	20.02	23.95	28.03	32.24	36.65	41.21		46.51	7 / 1			
reaction time	0.146	interval		3.50	3.57	3.64	3.76	3.93	4.08	4.21	4.41	4.56	5.30			10.71	11.77	13.18
		velocity	8.11	10.00	9.80	9.62	9.31	8.91	8.58	8.31	7.94	7.68	7.55	8.60		9.80	8.92	7.97
H1 lead leg	L	strides	20	13	13	13	13	13	13	13	13	15	17.7	156.7				
Warholm, Karsten (NOR) (1996)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 Prefontaine Classic (Eugene, OR)																		
date	16-Sep	time	5.59	9.17	12.80	16.46	20.22	24.10	28.12	32.37	36.62	41.18		46.53	7 / 2			
reaction time	0.135	interval		3.58	3.63	3.66	3.76	3.88	4.02	4.25	4.25	4.56	5.35			10.87	11.66	13.06
		velocity	8.05	9.78	9.64	9.56	9.31	9.02	8.71	8.24	8.24	7.68	7.48	8.60		9.66	9.01	8.04
H1 lead leg	L	strides	20	13	13	13	13	13	13	13	13	15	18	157				
Warholm, Karsten (NOR) (1996)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 Bislett Games (Oslo, NOR)																		
date	15-Jun	time	5.59	9.16	12.76	16.41	20.17	24.05	28.07	32.27	36.63	41.20		46.52	7 / 1			
reaction time	0.162	interval		3.57	3.60	3.65	3.76	3.88	4.02	4.20	4.36	4.57	5.32			10.82	11.66	13.13
		velocity	8.05	9.80	9.72	9.59	9.31	9.02	8.71	8.33	8.03	7.66	7.52	8.60		9.70	9.01	8.00
H1 lead leg	L	strides	20	13	13	13	13	13	13	13	13	15	17.7	156.7				
Benjamin, Rai (USA) (1997)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 USATF National Championships (Eugene, OR) (TV Analysis)																		
date	9-Jul	time	5.81	9.44	13.14	16.92	20.75	24.70	28.69	32.76	37.00	41.47		46.62	5 / 1			
reaction time		interval		3.63	3.70	3.78	3.83	3.95	3.99	4.07	4.24	4.47	5.15			11.11	11.77	12.78
		velocity	7.75	9.64	9.46	9.26	9.14	8.86	8.77	8.60	8.25	7.83	7.77	8.58		9.45	8.92	8.22
H1 lead leg	R	strides	20	13	13	13	13	13	13	13	13	13	17	154				
Warholm, Karsten (NOR) (1996)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 Norwegian National Championships (Jessheim, NOR)																		
date	6-Jul	time												46.76	/ 1			
reaction time		interval	no information available															
		velocity											8.55					
H1 lead leg		strides																
Warholm, Karsten (NOR) (1996)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 World Athletics Championships (Budapest, HUN) (TV Analysis)																		
date	23-Aug	time	5.81	9.46	12.90	16.52	20.29	24.25	28.29	32.50	36.93	41.61		46.89	7 / 1			
reaction time	0.171	interval		3.65	3.44	3.62	3.77	3.96	4.04	4.21	4.43	4.68	5.28			10.71	11.77	13.32
		velocity	7.75	9.59	10.17	9.67	9.28	8.84	8.66	8.31	7.90	7.48	7.58	8.53		9.80	8.92	7.88
H1 lead leg	L	strides	20	13	13	13	13	13	13	13	13	15	18	157				
Warholm, Karsten (NOR) (1996)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
Semi-Final 3 - 2023 World Athletics Championships (Budapest, HUN) (TV Analysis)																		
date	21-Aug	time	5.77	9.44	13.08	16.61	20.42	24.36	28.42	32.63	37.25	41.97		47.09	5 / 1			
reaction time	0.162	interval		3.67	3.64	3.53	3.81	3.94	4.06	4.21	4.62	4.72	5.12			10.84	11.81	13.55
		velocity	7.80	9.54	9.62	9.92	9.19	8.88	8.62	8.31	7.58	7.42	7.81	8.49		9.69	8.89	7.75
H1 lead leg	L	strides	20	13	13	13	13	13	13	13	15	15	17	158				
Benjamin, Rai (USA) (1997)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
Semi-Final 2 - 2023 World Athletics Championships (Budapest, HUN) (TV Analysis)																		
date	21-Aug	time	5.77	9.54	13.08	16.92	20.82	24.82	28.93	33.21	37.61	42.14		47.24	7 / 1			
reaction time	0.169	interval		3.77	3.54	3.84	3.90	4.00	4.11	4.28	4.40	4.53	5.10			11.15	12.01	13.21
		velocity	7.80	9.28	9.89	9.11	8.97	8.75	8.52	8.18	7.95	7.73	7.84	8.47		9.42	8.74	7.95
H1 lead leg	R	strides	20	13	13	13	13	13	13	13	13	13	16.5	153.5				
McMaster, Kyrion (IVB) (1997)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 P-T-S Meeting (Banská Bystrica, SVK) (TV Analysis)																		
date	20-Jul	time	5.78	9.32	13.00	16.78	20.66	24.66	28.80	33.10	37.58	42.12		47.26	6 / 1			
reaction time	0.210	interval		3.54	3.68	3.78	3.88	4.00	4.14	4.30	4.48	4.54	5.14			11.00	12.02	13.32
		velocity	7.79	9.89	9.51	9.26	9.02	8.75	8.45	8.14	7.81	7.71	7.78	8.46		9.55	8.74	7.88
H1 lead leg	L	strides		13	13	13	13	13	13	14	14	14	14	17.2	138.2			
McMaster, Kyrion (IVB) (1997)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 Weltklasse (Zürich, SUI)																		
date	31-Aug	time	5.56	9.05	12.66	16.39	20.25	24.26	28.39	32.72	37.25	41.90		47.27	6 / 1			
reaction time	0.149	interval		3.49	3.61	3.73	3.86	4.01	4.13	4.33	4.53	4.65	5.37			10.83	12.00	13.51
		velocity	8.09	10.03	9.70	9.38	9.07	8.73	8.47	8.08	7.73	7.53	7.45	8.46		9.70	8.75	7.77
H1 lead leg	L	strides	21	13	13	13	13	13	13	14	14	14	14	17.2	158.2			
Warholm, Karsten (NOR) (1996)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 Weltklasse (Zürich, SUI)																		
date	31-Aug	time	5.63	9.23	12.94	16.69	20.55	24.50	28.55	32.78	37.30	41.91		47.30	7 / 2			
reaction time	0.169	interval		3.60	3.71	3.75	3.86	3.95	4.05	4.23	4.52	4.61	5.39			11.06	11.86	13.36
		velocity	7.99	9.72	9.43	9.33	9.07	8.86	8.64	8.27	7.74	7.59	7.42	8.46		9.49	8.85	7.86
H1 lead leg	L	strides	20	13	13	13	13	13	13	13	15	15	18	159				
McMaster, Kyrion (IVB) (1997)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 Prefontaine Classic (Eugene, OR)																		
date	16-Sep	time	5.58	9.11	12.71	16.42	20.29	24.26	28.35	32.59	37.11	41.75		47.31	6 / 3			
reaction time	0.133	interval		3.53	3.60	3.71	3.87	3.97	4.09	4.24	4.52	4.64	5.56			10.84	11.93	13.40
		velocity	8.06	9.92	9.72	9.43	9.04	8.82	8.56	8.25	7.74	7.54	7.19	8.45		9.69	8.80	7.84
H1 lead leg	L	strides	21	13	13	13	12	13	13	13	13	14	14	17	156			
Clarke, Roshawn (JAM) (2004)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
Semi-Final 2 - 2023 World Athletics Championships (Budapest, HUN) (TV Analysis)																		
date	21-Aug	time	5.77	9.48	13.08	16.61	20.42	24.49	28.66	33.01	37.54	42.14		47.34	7 / 2			
reaction time	0.198	interval		3.71	3.60	3.53	3.81	4.07	4.17	4.35	4.53	4.60	5.20			10.84	12.05	13.48
		velocity	7.80	9.43	9.72	9.92	9.19	8.60	8.39	8.05	7.73	7.61	7.69	8.45		9.69	8.71	7.79
H1 lead leg	R	strides	21	13	13	13	13	14	14	15	15	15	15	18.5	164.5			
McMaster, Kyrion (IVB) (1997)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 World Athletics Championships (Budapest, HUN) (TV Analysis)																		
date	23-Aug	time	5.67	9.33	12.80	16.45	20.26	24.28	28.39	32.78	37.33	41.98		47.34	8 / 2			
reaction time	0.151	interval		3.66	3.47	3.65	3.81	4.02	4.11	4.39	4.55	4.65	5.36			10.78	11.94	13.59
		velocity	7.94	9.56	10.09	9.59	9.19	8.71	8.52	7.97	7.69	7.53	7.46	8.45		9.74	8.79	7.73
H1 lead leg	L	strides	21	13	13	13	13	13	13	14	14	14	14	17.7	158.7			

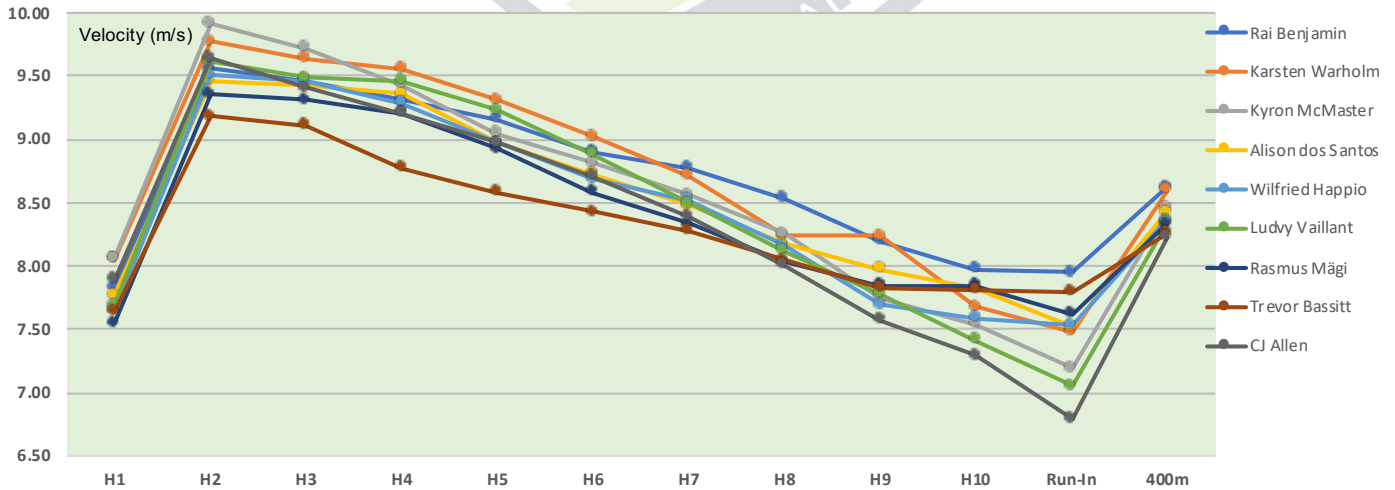
2023 Prefontaine Classic (Eugene, OR)

Men's 400m Hurdles

Date 2023.09.16

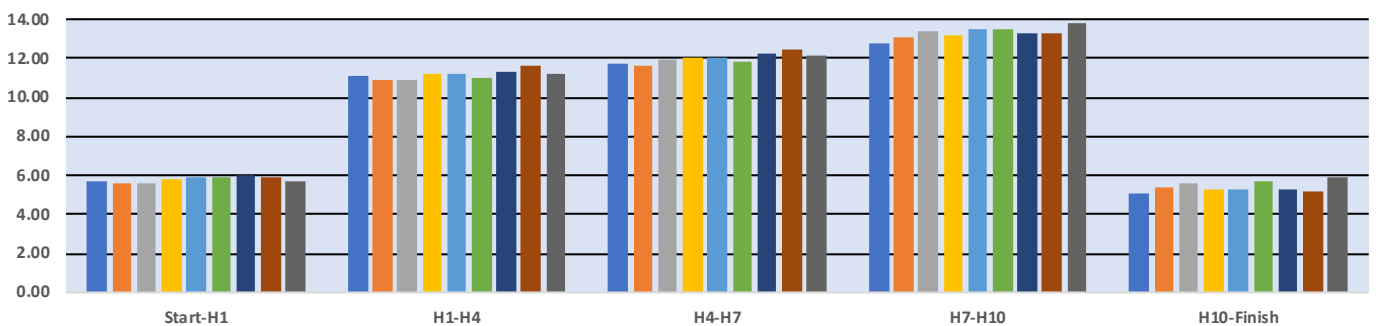
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Benjamin, Rai (USA) (1997)	time		5.74	9.40	13.10	16.86	20.68	24.61	28.60	32.70	36.97	41.36		46.39	5 / 1			
	reaction time	0.154																
	interval		7.84	3.66	3.70	3.76	3.82	3.93	3.99	4.10	4.27	4.39	5.03			11.12	11.74	12.76
	velocity		8.06	9.56	9.46	9.31	9.16	8.91	8.77	8.54	8.20	7.97	7.95	8.62		9.44	8.94	8.23
Warholm, Karsten (NOR) (1996)	time		5.59	9.17	12.80	16.46	20.22	24.10	28.12	32.37	36.62	41.18		46.53	7 / 2			
	reaction time	0.135																
	interval		8.05	3.58	3.63	3.66	3.76	3.88	4.02	4.25	4.25	4.56	5.35			10.87	11.66	13.06
	velocity		8.05	9.78	9.64	9.56	9.31	9.02	8.71	8.24	8.24	7.68	7.48	8.60		9.66	9.01	8.04
McMaster, Kyrn (IVB) (1997)	time		5.58	9.11	12.71	16.42	20.29	24.26	28.35	32.59	37.11	41.75		47.31	6 / 3			
	reaction time	0.133																
	interval		8.06	3.53	3.60	3.71	3.87	3.97	4.09	4.24	4.52	4.64	5.56			10.84	11.93	13.40
	velocity		8.06	9.92	9.72	9.43	9.04	8.82	8.56	8.25	7.74	7.54	7.19	8.45		9.69	8.80	7.84
dos Santos, Alison (BRA) (2000)	time		5.79	9.49	13.20	16.94	20.84	24.85	28.98	33.26	37.65	42.12		47.44	4 / 4			
	reaction time	0.172																
	interval		7.77	3.70	3.71	3.74	3.90	4.01	4.13	4.28	4.39	4.47	5.32			11.15	12.04	13.14
	velocity		7.77	9.46	9.43	9.36	8.97	8.73	8.47	8.18	7.97	7.83	7.52	8.43		9.42	8.72	7.99
Happio, Wilfried (FRA) (1998)	time		5.88	9.56	13.26	17.03	20.93	24.96	29.07	33.36	37.91	42.52		47.83	3 / 5			
	reaction time	0.173																
	interval		7.65	3.68	3.70	3.77	3.90	4.03	4.11	4.29	4.55	4.61	5.31			11.15	12.04	13.45
	velocity		7.65	9.51	9.46	9.28	8.97	8.68	8.52	8.16	7.69	7.59	7.53	8.36		9.42	8.72	7.81
Vaillant, Ludvy (FRA) (1995)	time		5.85	9.49	13.18	16.88	20.67	24.61	28.73	33.04	37.54	42.26		47.93	1 / 6			
	reaction time	0.138																
	interval		7.69	3.64	3.69	3.70	3.79	3.94	4.12	4.31	4.50	4.72	5.67			11.03	11.85	13.53
	velocity		7.69	9.62	9.49	9.46	9.23	8.88	8.50	8.12	7.78	7.42	7.05	8.35		9.52	8.86	7.76
Mägi, Rasmus (EST) (1992)	time		5.96	9.70	13.46	17.26	21.18	25.26	29.46	33.82	38.28	42.74		47.99	9 / 7			
	reaction time	0.155																
	interval		7.55	3.74	3.76	3.80	3.92	4.08	4.20	4.36	4.46	4.46	5.25			11.30	12.20	13.28
	velocity		7.55	9.36	9.31	9.21	8.93	8.58	8.33	8.03	7.85	7.85	7.62	8.34		9.29	8.61	7.91
Bassitt, Trevor (USA) (1998)	time		5.89	9.70	13.54	17.53	21.61	25.76	29.99	34.34	38.81	43.29		48.42	8 / 8			
	reaction time	0.154																
	interval		7.64	3.81	3.84	3.99	4.08	4.15	4.23	4.35	4.47	4.48	5.13			11.64	12.46	13.30
	velocity		7.64	9.19	9.11	8.77	8.58	8.43	8.27	8.05	7.83	7.81	7.80	8.26		9.02	8.43	7.89
Allen, CJ (USA) (1995)	time		5.70	9.33	13.05	16.85	20.75	24.77	28.94	33.31	37.93	42.73		48.62	2 / 9			
	reaction time	0.137																
	interval		7.89	3.63	3.72	3.80	3.90	4.02	4.17	4.37	4.62	4.80	5.89			11.15	12.09	13.79
	velocity		7.89	9.64	9.41	9.21	8.97	8.71	8.39	8.01	7.58	7.29	6.79	8.23		9.42	8.68	7.61



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Thu 31 Aug 2023 20:15) - diamond league race analysis

<https://www.omegatiming.com/File/0002030D0102070101FFFFFFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=4S5SKwasIRs>

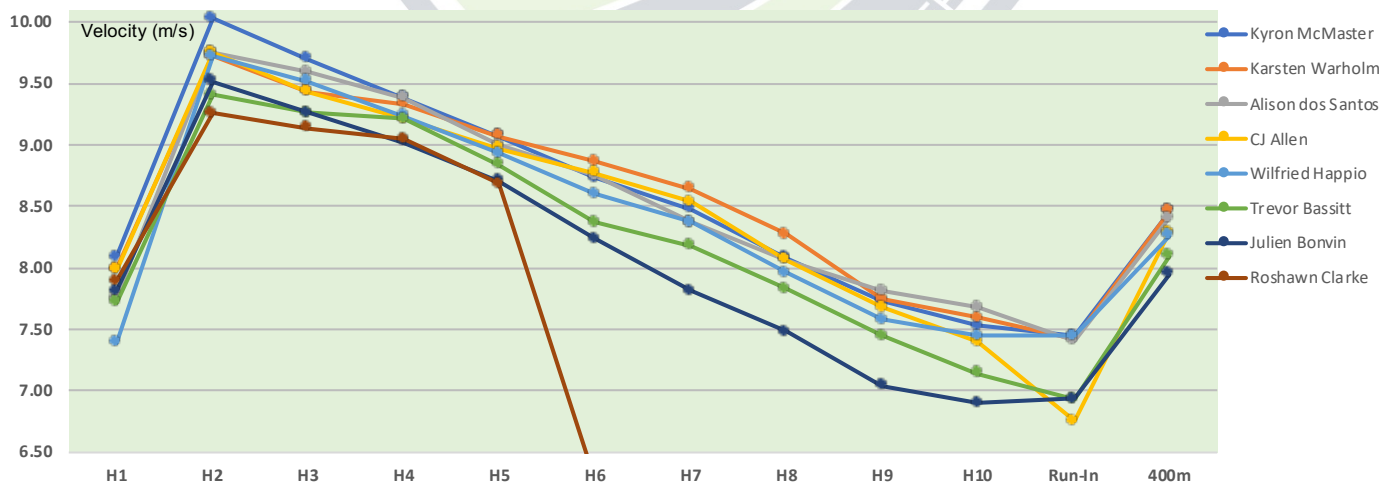
2023 Weltklasse (Zürich, SUI)

Men's 400m Hurdles

Date 2023.08.31

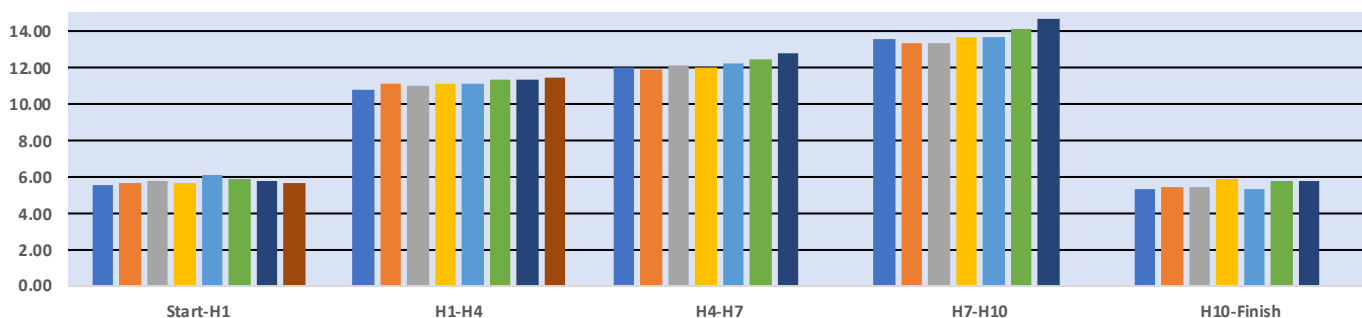
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McMaster, Kyron (IVB) (1997)	time		5.56	9.05	12.66	16.39	20.25	24.26	28.39	32.72	37.25	41.90		47.27	6 / 1			
	reaction time	0.149																
	interval		8.09	3.49	3.61	3.73	3.86	4.01	4.13	4.33	4.53	4.65	5.37			10.83	12.00	13.51
	velocity		8.09	10.03	9.70	9.38	9.07	8.73	8.47	8.08	7.73	7.53	7.45	8.46		9.70	8.75	7.77
Warholm, Karsten (NOR) (1996)	time		5.63	9.23	12.94	16.69	20.55	24.50	28.55	32.78	37.30	41.91		47.30	7 / 2			
	reaction time	0.169																
	interval		7.99	3.60	3.71	3.75	3.86	3.95	4.05	4.23	4.52	4.61	5.39			11.06	11.86	13.36
	velocity		7.99	9.72	9.43	9.33	9.07	8.86	8.64	8.27	7.74	7.59	7.42	8.46		9.49	8.85	7.86
dos Santos, Alison (BRA) (2000)	time		5.80	9.39	13.04	16.77	20.66	24.66	28.84	33.18	37.66	42.22		47.62	5 / 3			
	reaction time	0.162																
	interval		7.76	3.59	3.65	3.73	3.89	4.00	4.18	4.34	4.48	4.56	5.40			10.97	12.07	13.38
	velocity		7.76	9.75	9.59	9.38	9.00	8.75	8.37	8.06	7.81	7.68	7.41	8.40		9.57	8.70	7.85
Allen, CJ (USA) (1995)	time		5.64	9.23	12.94	16.74	20.64	24.63	28.73	33.07	37.63	42.36		48.28	3 / 4			
	reaction time	0.141																
	interval		7.98	3.59	3.71	3.80	3.90	3.99	4.10	4.34	4.56	4.73	5.92			11.10	11.99	13.63
	velocity		7.98	9.75	9.43	9.21	8.97	8.77	8.54	8.06	7.68	7.40	6.76	8.29		9.46	8.76	7.70
Happio, Wilfried (FRA) (1998)	time		6.09	9.69	13.37	17.16	21.08	25.15	29.33	33.73	38.35	43.05		48.42	2 / 5			
	reaction time	0.469																
	interval		7.39	3.60	3.68	3.79	3.92	4.07	4.18	4.40	4.62	4.70	5.37			11.07	12.17	13.72
	velocity		7.39	9.72	9.51	9.23	8.93	8.60	8.37	7.95	7.58	7.45	7.45	8.26		9.49	8.63	7.65
Bassitt, Trevor (USA) (1998)	time		5.83	9.55	13.33	17.13	21.09	25.27	29.55	34.02	38.72	43.62		49.39	8 / 6			
	reaction time	0.171																
	interval		7.72	3.72	3.78	3.80	3.96	4.18	4.28	4.47	4.70	4.90	5.77			11.30	12.42	14.07
	velocity		7.72	9.41	9.26	9.21	8.84	8.37	8.18	7.83	7.45	7.14	6.93	8.10		9.29	8.45	7.46
Bonvin, Julien (SUI) (1999)	time		5.76	9.44	13.22	17.10	21.12	25.37	29.85	34.53	39.50	44.57		50.34	1 / 7			
	reaction time	0.149																
	interval		7.81	3.68	3.78	3.88	4.02	4.25	4.48	4.68	4.97	5.07	5.77			11.34	12.75	14.72
	velocity		7.81	9.51	9.26	9.02	8.71	8.24	7.81	7.48	7.04	6.90	6.93	7.95		9.26	8.24	7.13
Clarke, Roshawn (JAM) (2004)	time		5.70	9.48	13.31	17.18	21.21	26.79						dnf	4 / --			
	reaction time	0.175																
	interval		7.89	3.78	3.83	3.87	4.03	5.58										
	velocity		7.89	9.26	9.14	9.04	8.68	6.27										
	H1 lead leg	L	22	14			14							50				



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Thu 31 Aug 2023 20:15) - diamond league race analysis

<https://www.omegatiming.com/File/0002030D0102070101FFFFFFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=4S5SKwasIRs>

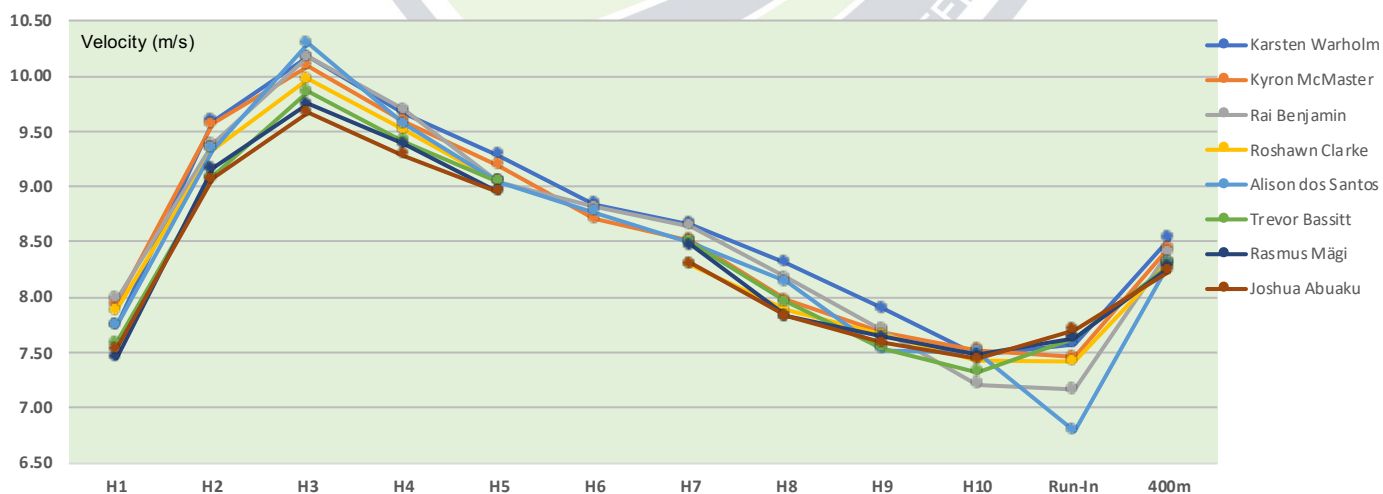
2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

Men's 400m Hurdles

Date 2023.08.23

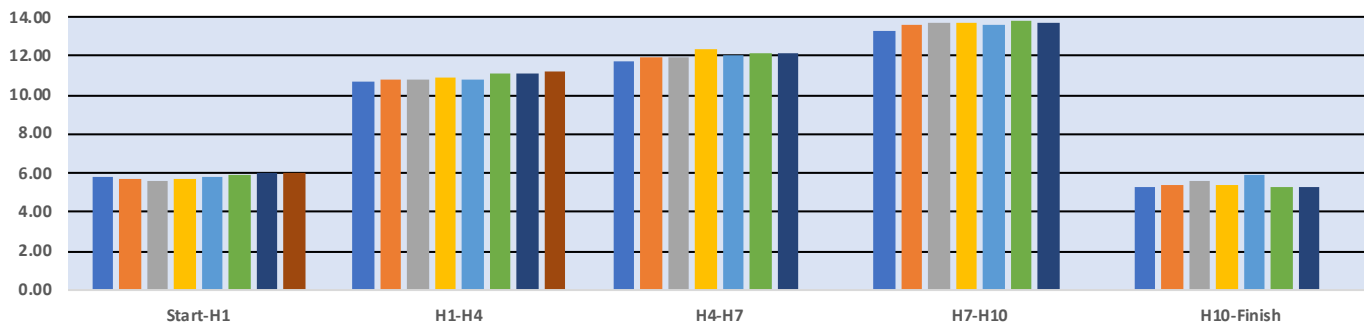
FINAL

			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		5.81	9.46	12.90	16.52	20.29	24.25	28.29	32.50	36.93	41.61		46.89	7 / 1			
	reaction time	0.171																
	interval		7.75	3.65	3.44	3.62	3.77	3.96	4.04	4.21	4.43	4.68	5.28			10.71	11.77	13.32
	velocity		7.75	9.59	10.17	9.67	9.28	8.84	8.66	8.31	7.90	7.48	7.58	8.53		9.80	8.92	7.88
McMaster, Kyron (IVB) (1997)	time		5.67	9.33	12.80	16.45	20.26	24.28	28.39	32.78	37.33	41.98		47.34	8 / 2			
	reaction time	0.151																
	interval		7.94	3.66	3.47	3.65	3.81	4.02	4.11	4.39	4.55	4.65	5.36			10.78	11.94	13.59
	velocity		7.94	9.56	10.09	9.59	9.19	8.71	8.52	7.97	7.69	7.53	7.46	8.45		9.74	8.79	7.73
Benjamin, Rai (USA) (1997)	time		5.64	9.37	12.81	16.42	20.29	24.26	28.31	32.59	37.13	41.98		47.56	6 / 3			
	reaction time	0.168																
	interval		7.98	3.73	3.44	3.61	3.87	3.97	4.05	4.28	4.54	4.85	5.58			10.78	11.89	13.67
	velocity		7.98	9.38	10.17	9.70	9.04	8.82	8.64	8.18	7.71	7.22	7.17	8.41		9.74	8.83	7.68
Clarke, Roshawn (JAM) (2004)	time		5.71	9.46	12.97	16.65	20.52		28.96	33.40	37.97	42.68		48.07	5 / 4			
	reaction time	0.164																
	interval		7.88	3.75	3.51	3.68	3.87		8.44	4.44	4.57	4.71	5.39			10.94	12.31	13.72
	velocity		7.88	9.33	9.97	9.51	9.04		8.29	7.88	7.66	7.43	7.42	8.32		9.60	8.53	7.65
dos Santos, Alison (BRA) (2000)	time		5.81	9.56	12.96	16.62	20.49	24.48	28.60	32.90	37.55	42.21		48.10	9 / 5			
	reaction time	0.164																
	interval		7.75	3.75	3.40	3.66	3.87	3.99	4.12	4.30	4.65	4.66	5.89			10.81	11.98	13.61
	velocity		7.75	9.33	10.29	9.56	9.04	8.77	8.50	8.14	7.53	7.51	6.79	8.32		9.71	8.76	7.71
Bassitt, Trevor (USA) (1998)	time		5.93	9.78	13.33	17.05	20.92		29.16	33.56	38.20	42.98		48.22	3 / 6			
	reaction time	0.164																
	interval		7.59	3.85	3.55	3.72	3.87		8.24	4.40	4.64	4.78	5.24			11.12	12.11	13.82
	velocity		7.59	9.09	9.86	9.41	9.04		8.50	7.95	7.54	7.32	7.63	8.30		9.44	8.67	7.60
Mägi, Rasmus (EST) (1992)	time		6.04	9.86	13.45	17.18	21.09		29.36	33.83	38.41	43.09		48.33	4 / 7			
	reaction time	0.161																
	interval		7.45	3.82	3.59	3.73	3.91		8.27	4.47	4.58	4.68	5.24			11.14	12.18	13.73
	velocity		7.45	9.16	9.75	9.38	8.95		8.46	7.83	7.64	7.48	7.63	8.28		9.43	8.62	7.65
Abuaku, Joshua (GER) (1996)	time		5.97	9.83	13.45	17.22	21.13		29.56	34.03	38.64	43.34		48.53	2 / 8			
	reaction time	0.156																
	interval		7.54	3.86	3.62	3.77	3.91		8.43	4.47	4.61	4.70	5.19			11.25	12.34	13.78
	velocity		7.54	9.07	9.67	9.28	8.95		8.30	7.83	7.59	7.45	7.71	8.24		9.33	8.51	7.62



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=kW3kfam5DrM>

Biomechanical Analysis

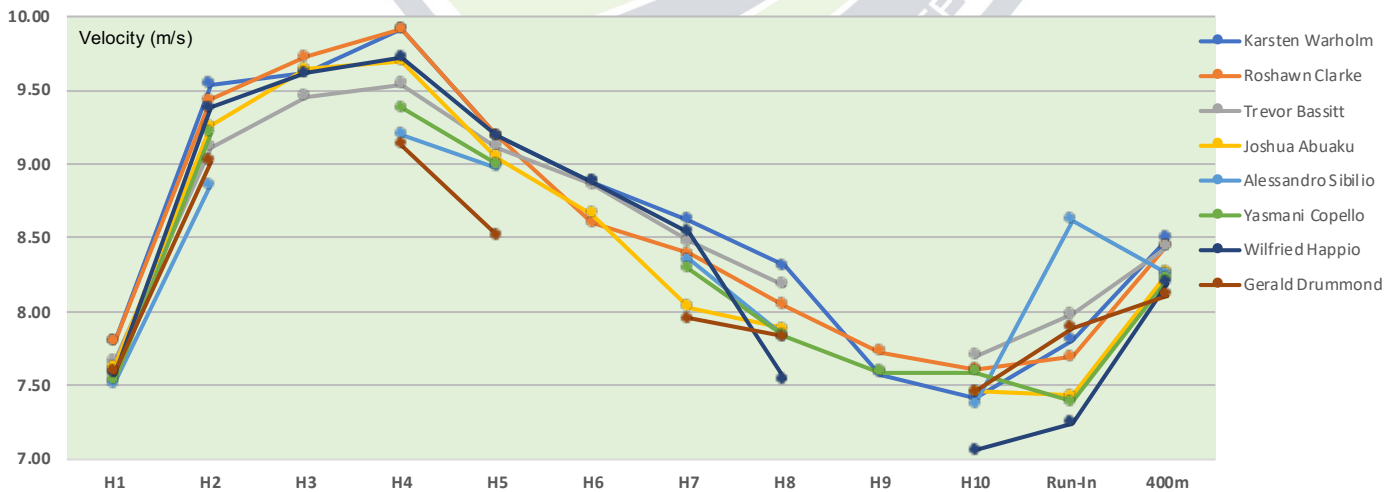
2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

Men's 400m Hurdles

Date 2023.08.21

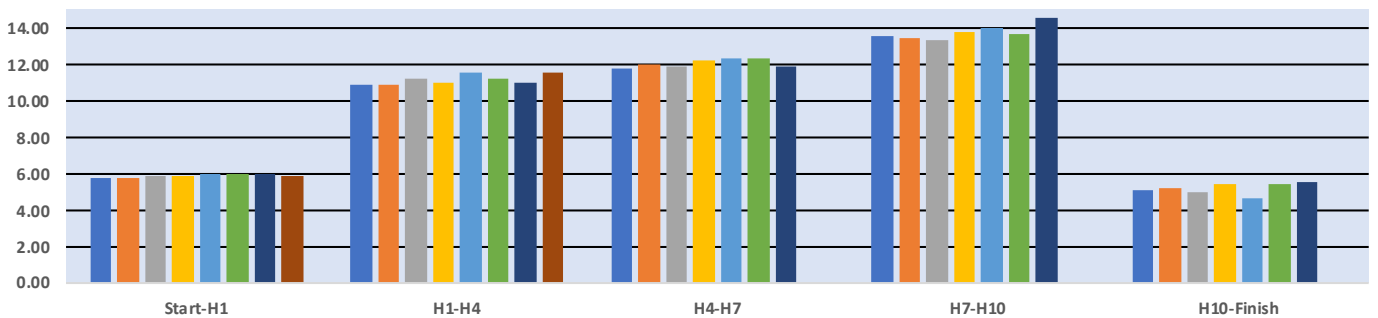
Semi-Final 3

			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	9.44	13.08	16.61	20.42	24.36	28.42	32.63	37.25	41.97		47.09	5 / 1			
	reaction time	0.162																
	interval		7.80	3.67	3.64	3.53	3.81	3.94	4.06	4.21	4.62	4.72	5.12			10.84	11.81	13.55
	velocity		7.80	9.54	9.62	9.92	9.19	8.88	8.62	8.31	7.58	7.42	7.81	8.49		9.69	8.89	7.75
Clarke, Roshawn (JAM) (2004)	time		5.77	9.48	13.08	16.61	20.42	24.49	28.66	33.01	37.54	42.14		47.34	7 / 2			
	reaction time	0.198																
	interval		7.80	3.71	3.60	3.53	3.81	4.07	4.17	4.35	4.53	4.60	5.20	WJR		10.84	12.05	13.48
	velocity		7.80	9.43	9.72	9.92	9.19	8.60	8.39	8.05	7.73	7.61	7.69	8.45		9.69	8.71	7.79
Bassitt, Trevor (USA) (1998)	time		5.87	9.71	13.41	17.08	20.92	24.87	29.00	33.28		42.37		47.38	9 / 3			
	reaction time	0.187																
	interval		7.67	3.84	3.70	3.67	3.84	3.95	4.13	4.28		9.09	5.01	PB		11.21	11.92	13.37
	velocity		7.67	9.11	9.46	9.54	9.11	8.86	8.47	8.18		7.70	7.98	8.44		9.37	8.81	7.85
Abuaku, Joshua (GER) (1996)	time		5.90	9.68	13.31	16.92	20.79	24.83	29.19	33.63		43.01		48.39	8 / 4			
	reaction time	0.179																
	interval		7.63	3.78	3.63	3.61	3.87	4.04	4.36	4.44		9.38	5.38			11.02	12.27	13.82
	velocity		7.63	9.26	9.64	9.70	9.04	8.66	8.03	7.88		7.46	7.43	8.27		9.53	8.56	7.60
Sibilio, Alessandro (ITA) (1999)	time		5.99	9.94		17.55	21.45		29.83	34.30		43.79		48.43	2 / 5			
	reaction time	0.152																
	interval		7.51	3.95		7.61	3.90		8.38	4.47		9.49	4.64			11.56	12.28	13.96
	velocity		7.51	8.86		9.20	8.97		8.35	7.83		7.38	8.62	8.26		9.08	8.55	7.52
Copello, Yasmani (TUR) (1987)	time		5.97	9.77		17.23	21.12		29.57	34.03	38.64	43.25		48.66	3 / 6			
	reaction time	0.220																
	interval		7.54	3.80		7.46	3.89		8.45	4.46	4.61	4.61	5.41			11.26	12.34	13.68
	velocity		7.54	9.21		9.38	9.00		8.29	7.84	7.59	7.59	7.39	8.22		9.33	8.51	7.67
Happio, Wilfried (FRA) (1998)	time		5.94	9.67	13.31	16.91	20.72	24.66	28.76	33.40		43.31		48.83	6 / 7			
	reaction time	0.176																
	interval		7.58	3.73	3.64	3.60	3.81	3.94	4.10	4.64		9.91	5.52			10.97	11.85	14.55
	velocity		7.58	9.38	9.62	9.72	9.19	8.88	8.54	7.54		7.06	7.25	8.19		9.57	8.86	7.22
Drummond, Gerald (CRC) (1994)	time		5.93	9.81		17.48	21.59		30.39	34.86		44.24		49.31	4 / 8			
	reaction time	0.169																
	interval		7.59	3.88		7.67	4.11		8.80	4.47		9.38	5.07			11.55	12.91	13.85
	velocity		7.59	9.02		9.13	8.52		7.95	7.83		7.46	7.89	8.11		9.09	8.13	7.58



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=fP1CbXQ3e44>

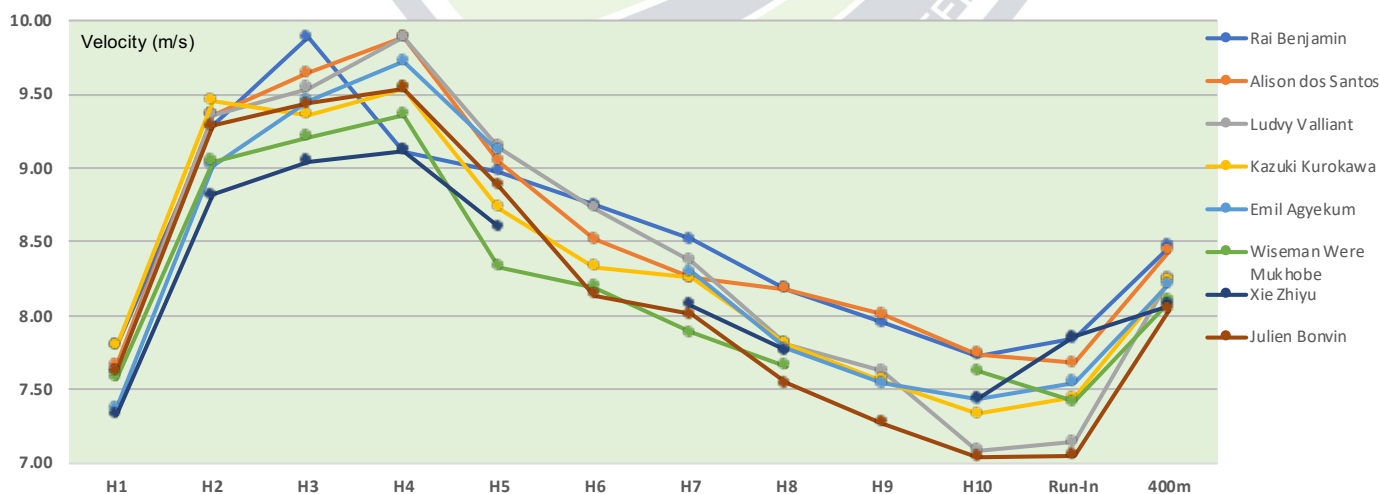
2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

Men's 400m Hurdles

Date 2023.08.21

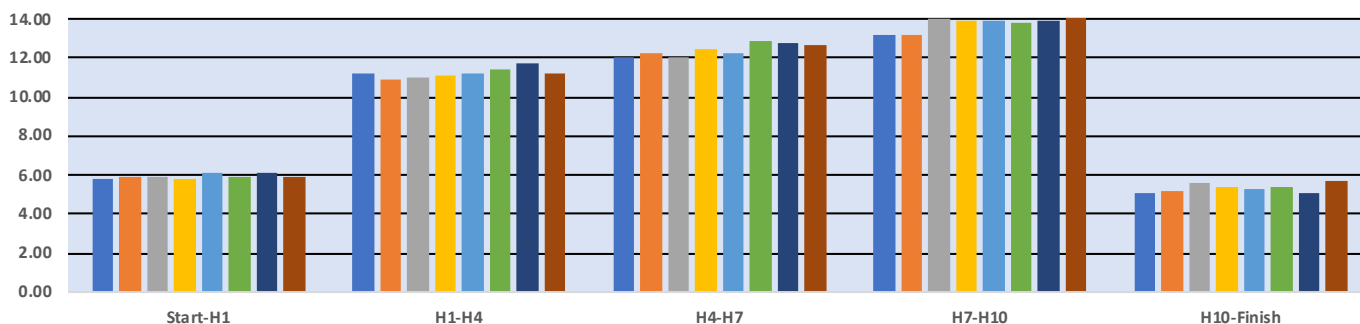
Semi-Final 2

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Benjamin, Rai (USA) (1997)	time		5.77	9.54	13.08	16.92	20.82	24.82	28.93	33.21	37.61	42.14		47.24	7 / 1			
	reaction time	0.169																
	interval		7.80	3.77	3.54	3.84	3.90	4.00	4.11	4.28	4.40	4.53	5.10			11.15	12.01	13.21
	velocity		7.80	9.28	9.89	9.11	8.97	8.73	8.52	8.18	7.95	7.73	7.84	8.47		9.42	8.74	7.95
dos Santos, Alison (BRA) (2000)	time		5.87	9.61	13.24	16.78	20.65	24.76	29.00	33.28	37.65	42.17		47.38	8 / 2			
	reaction time	0.182																
	interval		7.67	3.74	3.63	3.54	3.87	4.11	4.24	4.28	4.37	4.52	5.21			10.91	12.22	13.17
	velocity		7.67	9.36	9.64	9.89	9.04	8.52	8.25	8.18	8.01	7.74	7.68	8.44		9.62	8.59	7.97
Vaillant, Ludvy (FRA) (1995)	time		5.90	9.64	13.31	16.85	20.68	24.69	28.87	33.35	37.94	42.88		48.48	6 / 3			
	reaction time	0.194																
	interval		7.63	3.74	3.67	3.54	3.83	4.01	4.18	4.48	4.59	4.94	5.60			10.95	12.02	14.01
	velocity		7.63	9.36	9.54	9.89	9.14	8.73	8.37	7.81	7.63	7.09	7.14	8.25		9.59	8.74	7.49
Kurokawa, Kazuki (JPN) (2001)	time		5.77	9.47	13.21	16.88	20.89	25.09	29.33	33.81	38.44	43.21		48.58	5 / 4			
	reaction time	0.144																
	interval		7.80	3.70	3.74	3.67	4.01	4.20	4.24	4.48	4.63	4.77	5.37	PB		11.11	12.45	13.88
	velocity		7.80	9.46	9.36	9.54	8.73	8.33	8.25	7.81	7.56	7.34	7.45	8.23		9.45	8.43	7.56
Agyekum, Emil (GER) (1999)	time		6.10	9.98	13.68	17.28	21.12		29.56	34.06	38.70	43.41		48.71	3 / 5			
	reaction time	0.196																
	interval		7.38	3.88	3.80	3.74	4.20	4.27	4.44	4.57	4.64	4.71	5.30	PB		11.18	12.28	13.85
	velocity		7.38	9.02	9.46	9.72	9.11		8.29	7.78	7.54	7.43	7.55	8.21		9.39	8.55	7.58
Mukhobe, Wiseman Were (KEN) (1999)	time		5.94	9.81	13.61	17.35	21.55	25.82	30.26	34.83		44.01		49.40	9 / 6			
	reaction time	0.196																
	interval		7.58	3.87	3.80	3.74	4.20	4.27	4.44	4.57		9.18	5.39			11.41	12.91	13.75
	velocity		7.58	9.04	9.21	9.36	8.33	8.20	7.88	7.66		7.63	7.42	8.10		9.20	8.13	7.64
Xie Zhiyu (CHN) (2000)	time		6.14	10.11	13.98	17.82	21.89		30.56	35.07		44.48		49.57	2 / 7			
	reaction time	0.189																
	interval		7.33	3.97	3.87	3.84	4.07		8.67	4.51		9.41	5.09			11.68	12.74	13.92
	velocity		7.33	8.82	9.04	9.11	8.60		8.07	7.76		7.44	7.86	8.07		8.99	8.24	7.54
Bonvin, Julien (SUI) (1999)	time		5.90	9.67	13.38	17.05	20.99	25.29	29.66	34.30	39.11	44.08		49.75	4 / 8			
	reaction time	0.175																
	interval		7.63	3.77	3.71	3.67	3.94	4.30	4.37	4.64	4.81	4.97	5.67			11.15	12.61	14.42
	velocity		7.63	9.28	9.43	9.54	8.88	8.14	8.01	7.54	7.28	7.04	7.05	8.04		9.42	8.33	7.28



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=0vCaWWJaR08>

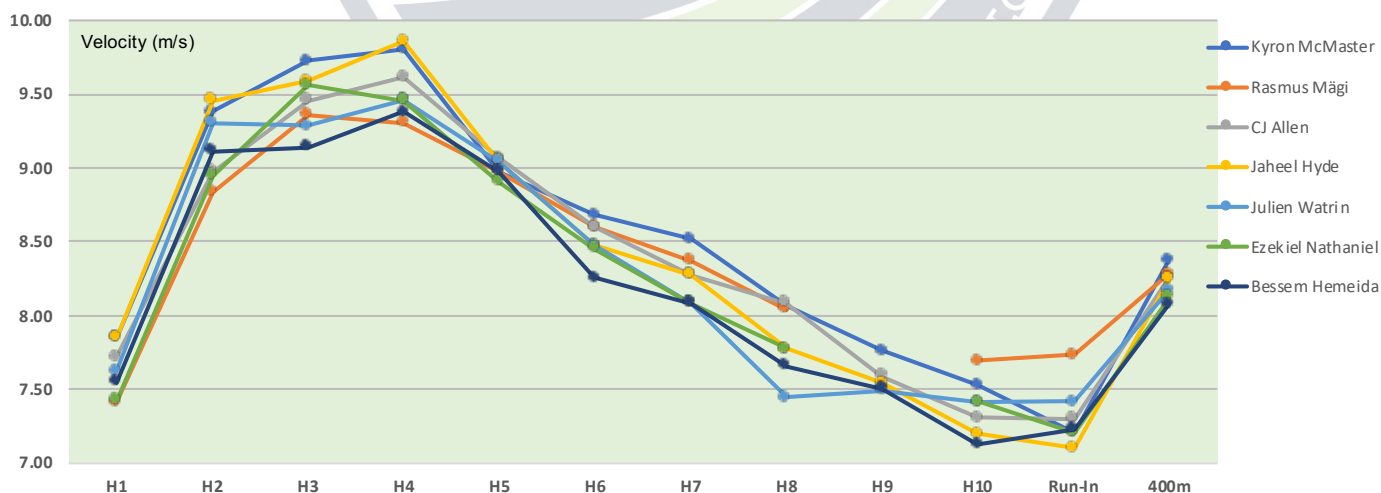
2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

Men's 400m Hurdles

Date 2023.08.21

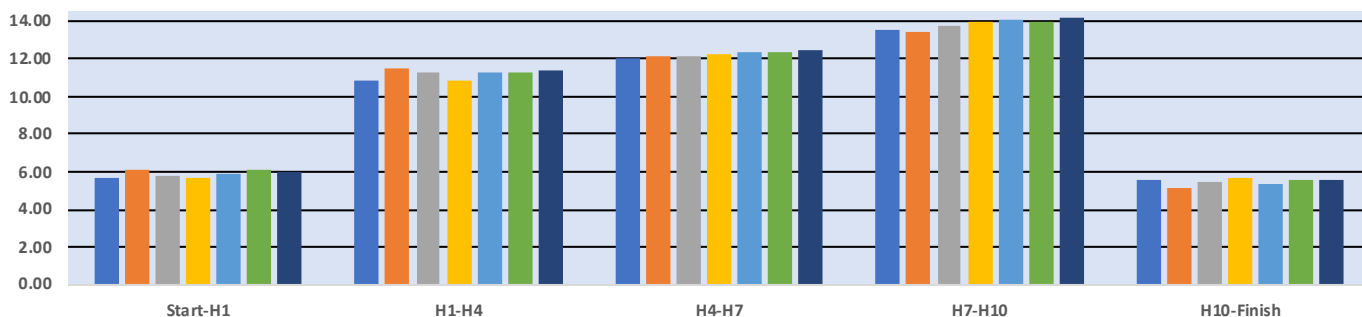
Semi-Final 1

				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McMaster, Kyron (IVB) (1997)	time			5.73	9.46	13.06	16.63	20.53	24.56	28.67	33.01	37.52	42.17		47.72	8 / 1			
	reaction time	0.168	interval		3.73	3.60	3.57	3.90	4.03	4.11	4.34	4.51	4.65	5.55			10.90	12.04	13.50
	velocity			7.85	9.38	9.72	9.80	8.97	8.68	8.52	8.06	7.76	7.53	7.21	8.38		9.63	8.72	7.78
	H1 lead leg	L	strides	21	13	13	13	13	13	13	13	14	14	17	157				
Mägi, Rasmus (EST) (1992)	time			6.07	10.03	13.77	17.53	21.43	25.50	29.68	34.03		43.13		48.30	7 / 2			
	reaction time	0.180	interval		3.96	3.74	3.76	3.90	4.07	4.18	4.35		9.10	5.17			11.46	12.15	13.45
	velocity			7.41	8.84	9.36	9.31	8.97	8.60	8.37	8.05		7.69	7.74	8.28		9.16	8.64	7.81
	H1 lead leg	R	strides	21	13	13	13	13	13	13	14		17.5	17.5	130.5				
Allen, CJ (USA) (1995)	time			5.83	9.73	13.43	17.07	20.93	25.00	29.23	33.56	38.17	42.96		48.44	6 / 3			
	reaction time	0.152	interval		3.90	3.70	3.64	3.86	4.07	4.23	4.33	4.61	4.79	5.48			11.24	12.16	13.73
	velocity			7.72	8.97	9.46	9.62	9.07	8.60	8.27	8.08	7.59	7.31	7.30	8.26		9.34	8.63	7.65
	H1 lead leg	L	strides	20	13	13	13	13	13	14	14	14	14	17.2	158.2				
Hyde, Jaheel (JAM) (1997)	time			5.73	9.43	13.08	16.63	20.50	24.63	28.86	33.36	38.00	42.86		48.49	5 / 4			
	reaction time	0.150	interval		3.70	3.65	3.55	3.87	4.13	4.23	4.50	4.64	4.86	5.63			10.90	12.23	14.00
	velocity			7.85	9.46	9.59	9.86	9.04	8.47	8.27	7.78	7.54	7.20	7.10	8.25		9.63	8.59	7.50
	H1 lead leg	L	strides	22	13	13	13	13	14	14	14	14	15	18.7	163.7				
Watrin, Julien (BEL) (1992)	time			5.90	9.66	13.43	17.13	21.00	25.13	29.46	34.16	38.83	43.55		48.94	3 / 5			
	reaction time	0.205	interval		3.76	3.77	3.70	3.87	4.14	4.33	4.70	4.67	4.72	5.39			11.23	12.33	14.09
	velocity			7.63	9.31	9.28	9.46	9.04	8.47	8.08	7.45	7.49	7.42	7.42	8.17		9.35	8.52	7.45
	H1 lead leg	R	strides	20	13	13	13	13	13	13	14	15	15	18	147				
Nathaniel, Ezekiel (NGR) (2003)	time			6.06	9.97	13.63	17.33	21.26	25.40	29.73	34.23		43.67		49.22	9 / 6			
	reaction time	0.209	interval		3.91	3.66	3.70	3.93	4.14	4.33	4.50		9.44	5.55			11.27	12.40	13.94
	velocity			7.43	8.95	9.56	9.46	8.91	8.45	8.08	7.78		7.42	7.21	8.13		9.32	8.47	7.53
	H1 lead leg	R	strides	21	13	13	13	13	13	14	14		17	131					
Hemeida, Bassem (QAT) (2000)	time			5.96	9.80	13.63	17.36	21.26	25.50	29.83	34.40	39.06	43.97		49.50	4 / 7			
	reaction time	0.172	interval		3.84	3.83	3.73	3.90	4.24	4.33	4.57	4.66	4.91	5.53			11.40	12.47	14.14
	velocity			7.55	9.11	9.14	9.38	8.97	8.25	8.08	7.66	7.51	7.13	7.23	8.08		9.21	8.42	7.43
	H1 lead leg	R	strides	21	13	14	13	13	14		14	14	15	17.7	148.7				



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=JAqk2zgOPzA>

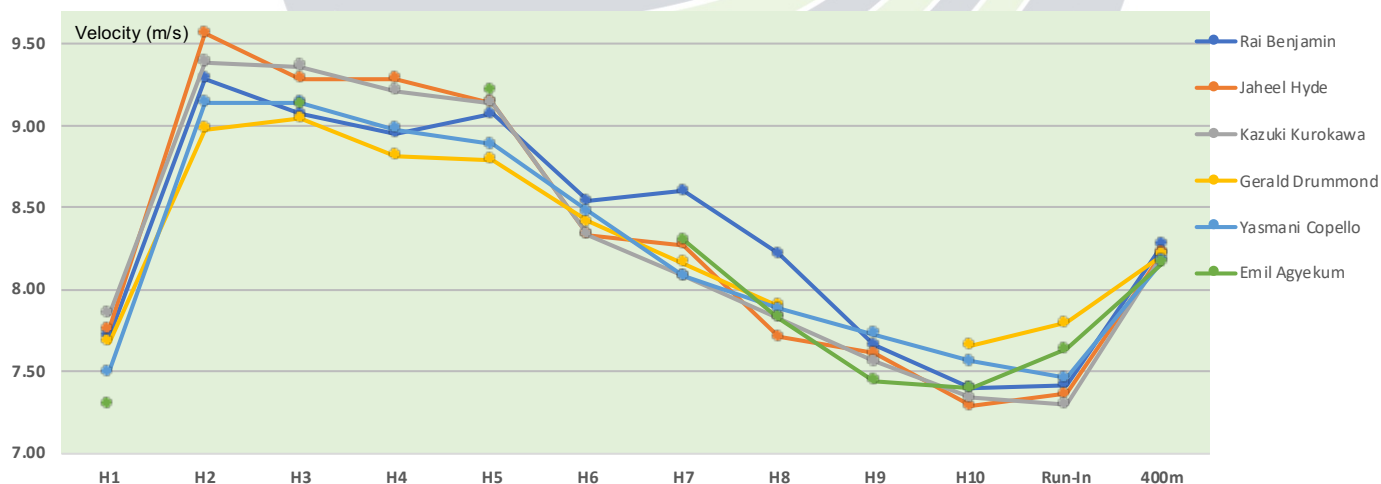
2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

Men's 400m Hurdles

Date 2023.08.20

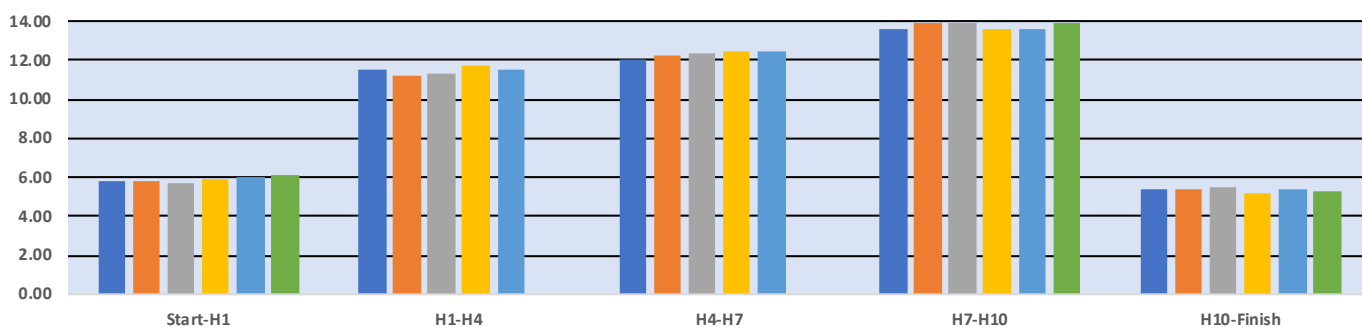
Heat 5

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Benjamin, Rai (USA) (1997)	time		5.83	9.60	13.46	17.37	21.23	25.33	29.40	33.66	38.23	42.96		48.35	5 / 1			
	reaction time	0.176																
	interval		7.72	3.77	3.86	3.91	3.86	4.10	4.07	4.26	4.57	4.73	5.39			11.54	12.03	13.56
	velocity		7.72	9.28	9.07	8.95	9.07	8.54	8.60	8.22	7.66	7.40	7.42	8.27		9.10	8.73	7.74
Hyde, Jaheel (JAM) (1997)	time		5.80	9.46	13.23	17.00	20.83	25.03	29.26	33.80	38.40	43.20		48.63	9 / 2			
	reaction time	0.182																
	interval		7.76	3.66	3.77	3.77	3.83	4.20	4.23	4.54	4.60	4.80	5.43			11.20	12.26	13.94
	velocity		7.76	9.56	9.28	9.28	9.14	8.33	8.27	7.71	7.61	7.29	7.37	8.23		9.38	8.56	7.53
Kurokawa, Kazuki (JPN) (2001)	time		5.73	9.46	13.20	17.00	20.83	25.03	29.36	33.83	38.46	43.23		48.71	3 / 3			
	reaction time	0.158																
	interval		7.85	3.73	3.74	3.80	3.83	4.20	4.33	4.47	4.63	4.77	5.48			11.27	12.36	13.87
	velocity		7.85	9.38	9.36	9.21	9.14	8.33	8.08	7.83	7.56	7.34	7.30	8.21		9.32	8.50	7.57
Drummond, Gerald (CRC) (1994)	time		5.86	9.76	13.63	17.60	21.58	25.74	30.03	34.46		43.60		48.73	8 / 4			
	reaction time	0.220																
	interval		7.68	3.90	3.87	3.97	3.98	4.16	4.29	4.43		9.14	5.13			11.74	12.43	13.57
	velocity		7.68	8.97	9.04	8.82	8.79	8.41	8.16	7.90		7.66	7.80	8.21		8.94	8.45	7.74
Copello, Yasmani (TUR) (1987)	time		6.00	9.83	13.66	17.56	21.50	25.63	29.96	34.40	38.93	43.56		48.92	6 / 5			
	reaction time	0.244																
	interval		7.50	3.83	3.83	3.90	3.94	4.13	4.33	4.44	4.53	4.63	5.36			11.56	12.40	13.60
	velocity		7.50	9.14	9.14	8.97	8.88	8.47	8.08	7.88	7.73	7.56	7.46	8.18		9.08	8.47	7.72
Agyekum, Emil (GER) (1999)	time		6.16		13.83		21.43		29.86	34.33	39.03	43.76		49.00	1 / 6			
	reaction time	0.232					7.67		8.43	4.47	4.70	4.73	5.24					13.90
	interval		7.31		9.13		9.21		8.30	7.83	7.45	7.40	7.63	8.16				7.55
	velocity		7.31															
Agyekum, Emil (GER) (1999)	time		6.16		13.83		21.43		29.86	34.33	39.03	43.76		49.00	1 / 6			
	reaction time	0.232					7.67		8.43	4.47	4.70	4.73	5.24					13.90
	interval		7.31		9.13		9.21		8.30	7.83	7.45	7.40	7.63	8.16				7.55
	velocity		7.31															



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=W4r-yvIQ5wI&t=72s>

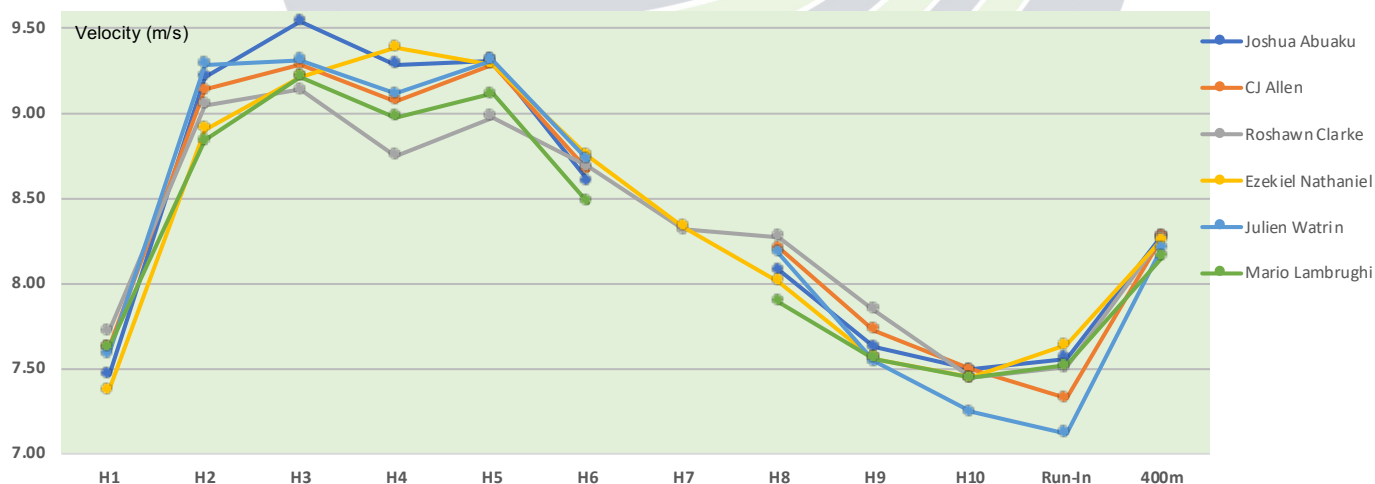
2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

Men's 400m Hurdles

Date 2023.08.20

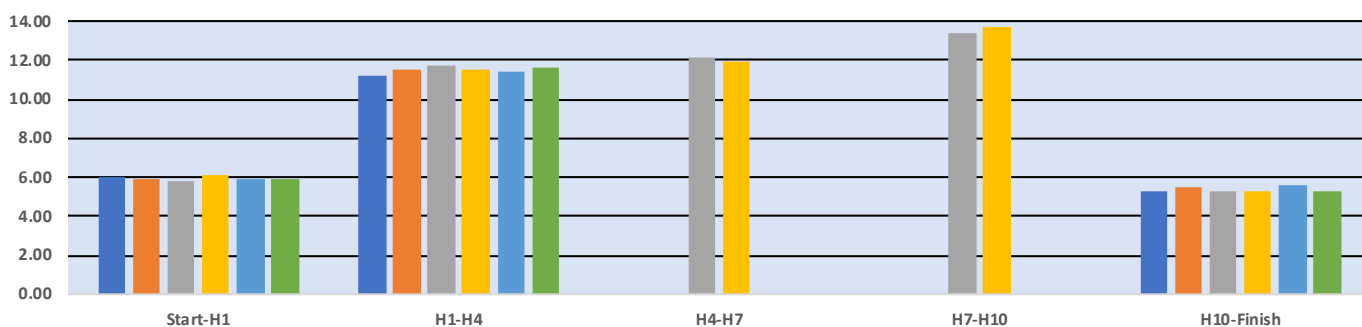
Heat 4

				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Abuaku, Joshua (GER) (1996)	time			6.03	9.83	13.50	17.27	21.03	25.10		33.77	38.36	43.03		48.32	5 / 1			
	reaction time	0.207	interval		3.80	3.67	3.77	3.76	4.07		8.67	4.59	4.67	5.29	PB		11.24		
	velocity			7.46	9.21	9.54	9.28	9.31	8.60		8.07	7.63	7.49	7.56	8.28		9.34		
	H1 lead leg	L	strides	20	13	13	13	13	13			14	14	18	131				
Allen, CJ (USA) (1995)	time			5.90	9.73	13.50	17.36	21.13	25.17		33.70	38.23	42.90		48.36	9 / 2			
	reaction time	0.167	interval		3.83	3.77	3.86	3.77	4.04		8.53	4.53	4.67	5.46			11.46		
	velocity			7.63	9.14	9.28	9.07	9.28	8.66		8.21	7.73	7.49	7.33	8.27		9.16		
	H1 lead leg	L	strides	20	13	13	13	13	13			14	14	17	130				
Clarke, Roshawn (JAM) (2004)	time			5.83	9.70	13.53	17.53	21.43	25.46	29.67	33.90	38.36	43.06		48.39	3 / 3			
	reaction time	0.183	interval		3.87	3.83	4.00	3.90	4.03	4.21	4.23	4.46	4.70	5.33			11.70	12.14	13.39
	velocity			7.72	9.04	9.14	8.75	8.97	8.68	8.31	8.27	7.85	7.45	7.50	8.27		8.97	8.65	7.84
	H1 lead leg	L	strides	22	14	14	13	14	14	14	14	15	15	18.2	167.2				
Nathaniel, Ezekiel (NGR) (2003)	time			6.10	10.03	13.83	17.56	21.33	25.33	29.53	33.90	38.53	43.23		48.47	8 / 4			
	reaction time	0.210	interval		3.93	3.80	3.73	3.77	4.00	4.20	4.37	4.63	4.70	5.24			11.46	11.97	13.70
	velocity			7.38	8.91	9.21	9.38	9.28	8.75	8.33	8.01	7.56	7.45	7.63	8.25		9.16	8.77	7.66
	H1 lead leg	R	strides	21	13	13	13	13	13	13	14	14	14	17	158				
Watrin, Julien (BEL) (1992)	time			5.93	9.70	13.46	17.30	21.06	25.07		33.63	38.27	43.10		48.72	6 / 5			
	reaction time	0.230	interval		3.77	3.76	3.84	3.76	4.01		8.56	4.64	4.83	5.62			11.37		
	velocity			7.59	9.28	9.31	9.11	9.31	8.73		8.18	7.54	7.25	7.12	8.21		9.23		
	H1 lead leg	R	strides	20	13	13	13	13	13			14	14	19	132				
Lambrugh, Mario (ITA) (1992)	time			5.90	9.86	13.66	17.56	21.40	25.53		34.40	39.03	43.73		49.05	1 / 6			
	reaction time	0.129	interval		3.96	3.80	3.90	3.84	4.13		8.87	4.63	4.70	5.32			11.66		
	velocity			7.63	8.84	9.21	8.97	9.11	8.47		7.89	7.56	7.45	7.52	8.15		9.01		
	H1 lead leg	R	strides	22	14	14	14	14	14			15	15	18.5	140.5				



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=W4r-yvIQ5wI&t=72s>

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

Men's 400m Hurdles

Date 2023.08.20

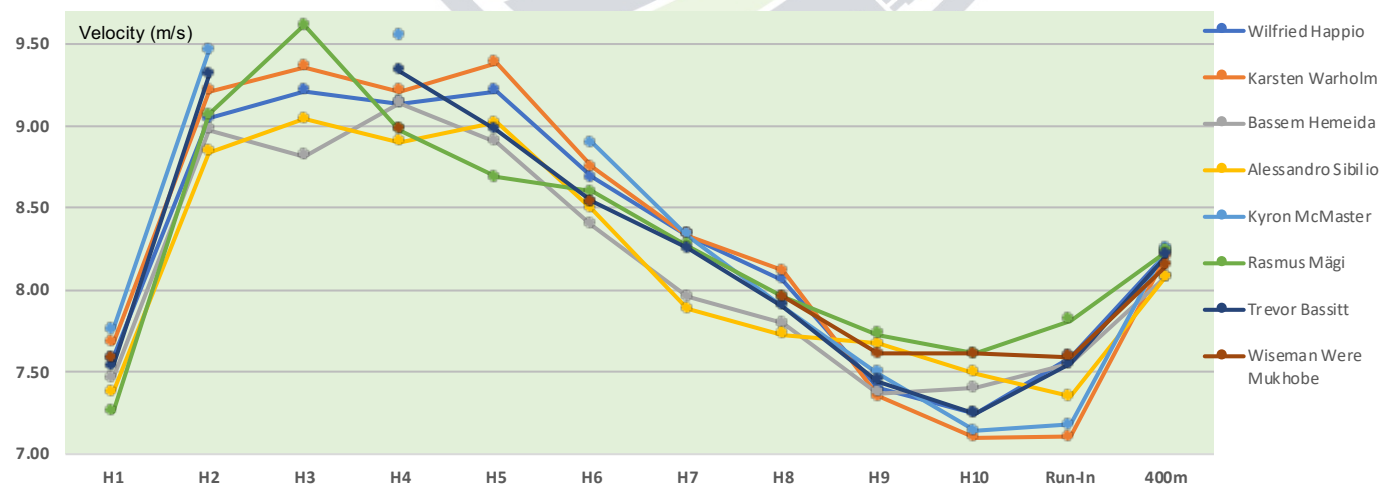
Heat 3

			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		5.93	9.80	13.60	17.43	21.23	25.26	29.46	33.80	38.53	43.36		48.63	4 / 1			
	reaction time	0.172														11.50	12.03	13.90
	interval		7.59	9.04	9.21	9.14	9.21	8.68	8.33	8.06	7.40	7.25	7.59	8.23		9.13	8.73	7.55
	velocity																	
Warholm, Karsten (NOR) (1996)	time		5.86	9.66	13.40	17.20	20.93	24.93	29.13	33.44	38.20	43.13		48.76	3 / 2			
	reaction time	0.166														11.34	11.93	14.00
	interval		7.68	9.21	9.36	9.21	9.38	8.75	8.33	8.12	7.35	7.10	7.10	8.20		9.26	8.80	7.50
	velocity																	
Hemeida, Bassem (QAT) (2000)	time		6.03	9.93	13.90	17.73	21.66	25.83	30.23	34.72	39.47	44.20		49.50	2 / 3			
	reaction time	0.156														11.70	12.50	13.97
	interval		7.46	8.97	8.82	9.14	8.91	8.39	7.95	7.80	7.37	7.40	7.55	8.08		8.97	8.40	7.52
	velocity																	
Sibilio, Alessandro (ITA) (1999)	time		6.10	10.06	13.93	17.86	21.74	25.86	30.30	34.83	39.39	44.06		49.50	5 / 4			
	reaction time	0.178														11.76	12.44	13.76
	interval		7.38	8.84	9.04	8.91	9.02	8.50	7.88	7.73	7.68	7.49	7.35	8.08		8.93	8.44	7.63
	velocity																	

Date 2023.08.20

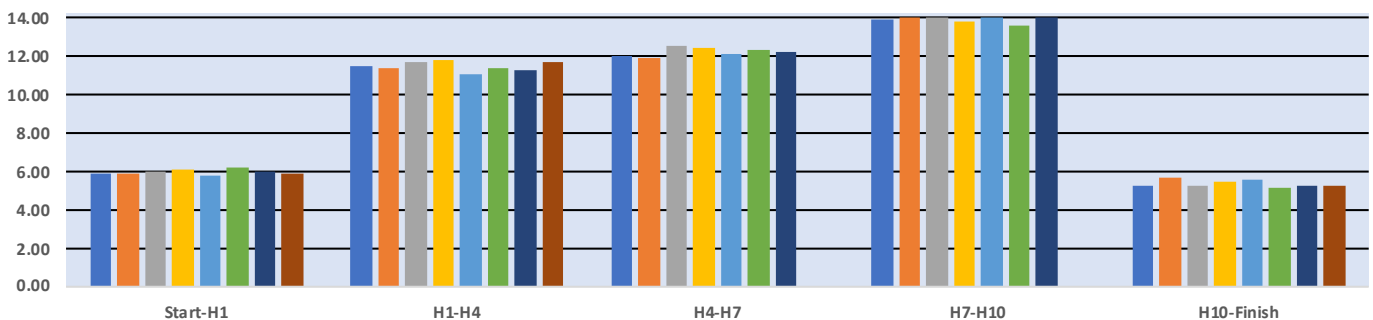
Heat 2

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McMaster, Kyron (IVB) (1997)	time		5.80	9.50		16.83		24.70	28.90	33.33	38.00	42.90		48.47	4 / 1			
	reaction time	0.156														11.03	12.07	14.00
	interval		7.76	3.70		7.33		7.87	4.20	4.43	4.67	4.90	5.57	8.25		9.52	8.70	7.50
	velocity																	
Mägi, Rasmus (EST) (1992)	time		6.20	10.06	13.70	17.60	21.63	25.70	29.93	34.33	38.86	43.46		48.58	7 / 2			
	reaction time	0.205														11.40	12.33	13.53
	interval		7.26	9.07	9.62	8.97	8.68	8.60	8.27	7.95	7.73	7.61	7.81	8.23		9.21	8.52	7.76
	velocity																	
Bassitt, Trevor (USA) (1998)	time		5.97	9.73		17.23	21.13	25.23	29.47	33.90	38.60	43.43		48.73	8 / 3			
	reaction time	0.164														11.26	12.24	13.96
	interval		7.54	9.31		9.33	8.97	8.54	8.25	7.90	7.45	7.25	7.55	8.21		9.33	8.58	7.52
	velocity																	
Mukhobe, Wiseman Were (KEN) (199)	time		5.93			17.63		25.83		34.63	39.23	43.83		49.10	1 / 4			
	reaction time	0.199														11.70		
	interval		7.59			8.97		8.54		7.95	7.61	7.61	7.59	8.15		8.97		
	velocity																	



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: Heat 3 - Gun Flash

Heat 2 - First Movement

Source: <https://www.youtube.com/watch?v=W4r-vvIQ5wI&t=72s>

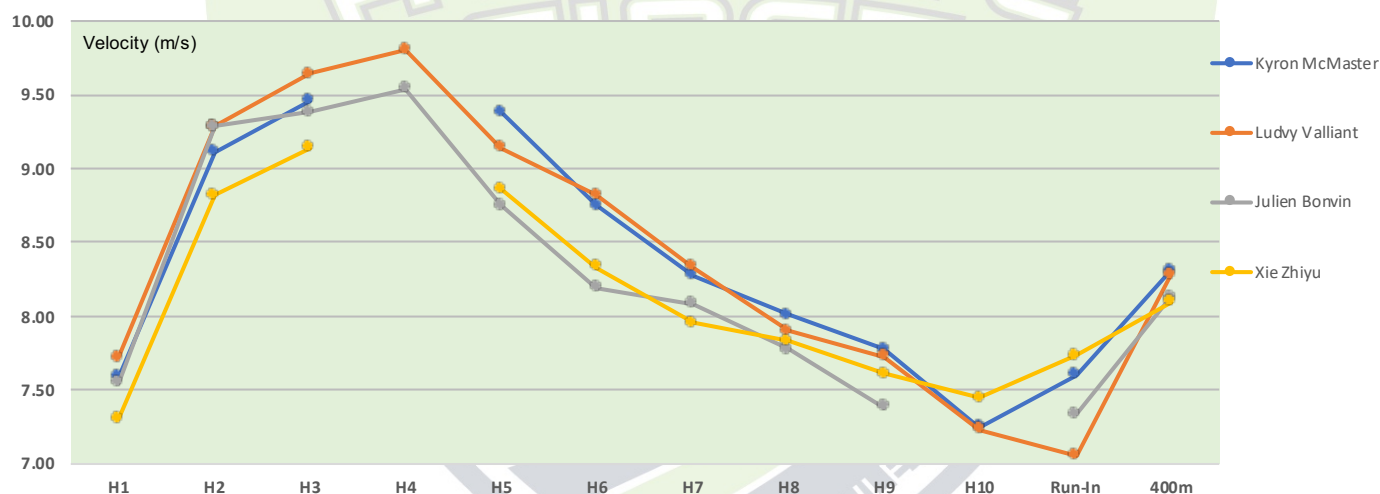
2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

Men's 400m Hurdles

Date 2023.08.20

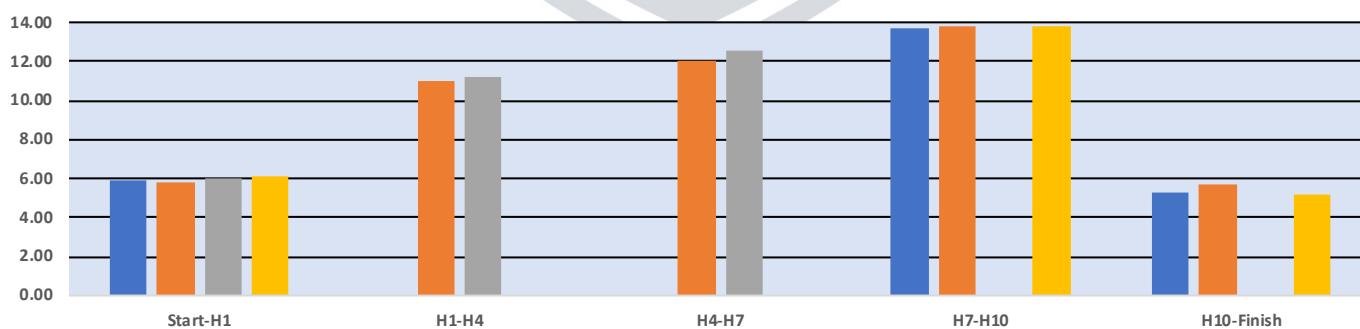
Heat 1

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
dos Santos, Alison (BRA) (2000)	time		5.93	9.77	13.47		20.93	24.93	29.16	33.53	38.03	42.86		48.12	2 / 1			
	reaction time	0.167																
	interval			3.84	3.70		7.46	4.00	4.23	4.37	4.50	4.83	5.26					13.70
	velocity		7.59	9.11	9.46		9.38	8.75	8.27	8.01	7.78	7.25	7.60	8.31				7.66
Vaillant, Ludvy (FRA) (1995)	time		5.83	9.60	13.23	16.80	20.63	24.60	28.80	33.23	37.76	42.60		48.27	3 / 2			
	reaction time	0.182																
	interval			3.77	3.63	3.57	3.83	3.97	4.20	4.43	4.53	4.84	5.67			10.97	12.00	13.80
	velocity		7.72	9.28	9.64	9.80	9.14	8.82	8.33	7.90	7.73	7.23	7.05	8.29		9.57	8.75	7.61
Bonvin, Julien (SUI) (1999)	time		5.96	9.73	13.46	17.13	21.13	25.40	29.73	34.23	38.97			49.19	5 / 3			
	reaction time	0.188																
	interval			3.77	3.73	3.67	4.00	4.27	4.33	4.50	4.74		10.22			11.17	12.60	
	velocity		7.55	9.28	9.38	9.54	8.75	8.20	8.08	7.78	7.38		7.34	8.13		9.40	8.33	
Xie Zhiyu (CHN) (2000)	time		6.16	10.13	13.96		21.86	26.06	30.46	34.93	39.53	44.23		49.40	8 / 4			
	reaction time	0.207																
	interval			3.97	3.83		7.90	4.20	4.40	4.47	4.60	4.70	5.17					13.77
	velocity		7.31	8.82	9.14		8.86	8.33	7.95	7.83	7.61	7.45	7.74	8.10				7.63
	H1 lead leg	L																
	strides		21	13	13		13	14	14	14	14		17	119				



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=W4r-yvIQ5wI&t=72s>

2023 Herculis Meeting International d'Athlétisme (Monaco, MON)

Men's 400m Hurdles

Date 2023.07.21

FINAL

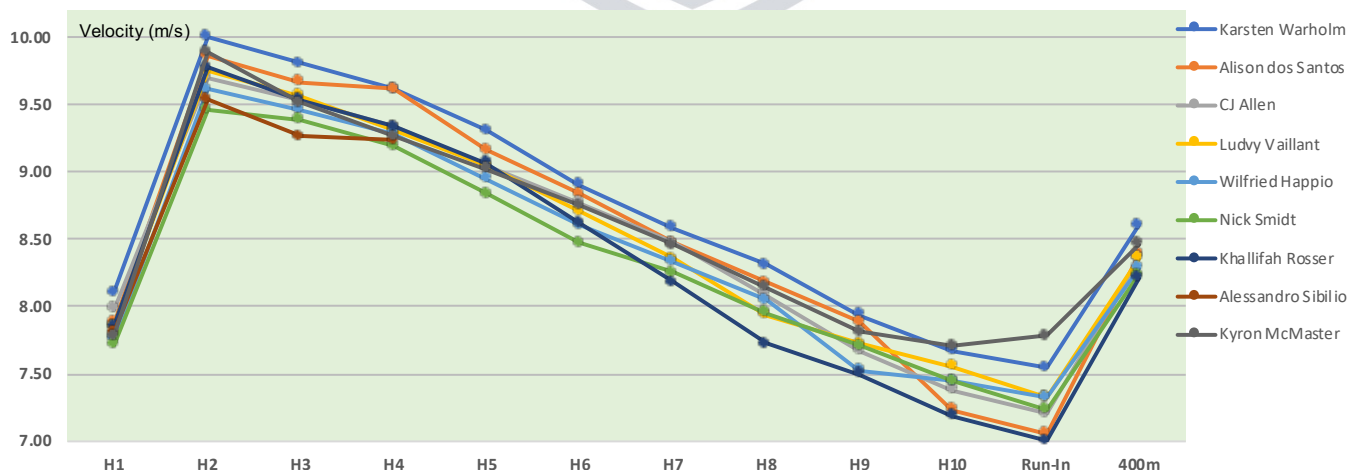
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Warholm, Karsten (NOR) (1996)	time		5.55	9.05	12.62	16.26	20.02	23.95	28.03	32.24	36.65	41.21		46.51	7 / 1			
	reaction time	0.146		3.50	3.57	3.64	3.76	3.93	4.08	4.21	4.41	4.56	5.30			10.71	11.77	13.18
	interval															9.80	8.92	7.97
	velocity		8.11	10.00	9.80	9.62	9.31	8.91	8.58	8.31	7.94	7.68	7.55	8.60				
dos Santos, Alison (BRA) (2000)	time		5.71	9.26	12.88	16.52	20.34	24.30	28.43	32.71	37.15	41.99		47.66	6 / 2			
	reaction time	0.169		3.55	3.62	3.64	3.82	3.96	4.13	4.28	4.44	4.84	5.67			10.81	11.91	13.56
	interval			9.86	9.67	9.62	9.16	8.84	8.47	8.18	7.88	7.23	7.05	8.39		9.71	8.82	7.74
	velocity		7.88	9.86	9.56	9.33	9.04	8.77	8.35	8.08	7.68	7.38	7.21	8.36				
Allen, CJ (USA) (1995)	time		5.64	9.25	12.92	16.67	20.54	24.53	28.66	32.99	37.55	42.29		47.84	5 / 3			
	reaction time	0.148		3.61	3.67	3.75	3.87	3.99	4.13	4.33	4.56	4.74	5.55			11.03	11.99	13.63
	interval			9.70	9.54	9.33	9.04	8.77	8.47	8.08	7.68	7.38	7.21	8.36		9.52	8.76	7.70
	velocity		7.98	9.70	9.54	9.33	9.04	8.77	8.47	8.08	7.68	7.38	7.21	8.36				
Vaillant, Ludvy (FRA) (1995)	time		5.73	9.32	12.98	16.74	20.61	24.63	28.82	33.23	37.76	42.39		47.85	2 / 4			
	reaction time	0.158		3.59	3.66	3.76	3.87	4.02	4.19	4.41	4.53	4.63	5.46			11.01	12.08	13.57
	interval			9.75	9.56	9.31	9.04	8.71	8.35	7.94	7.73	7.56	7.33	8.36		9.54	8.69	7.74
	velocity		7.85	9.75	9.56	9.31	9.04	8.71	8.35	7.94	7.73	7.56	7.33	8.36				
Happio, Wilfried (FRA) (1998)	time		5.80	9.44	13.14	16.91	20.82	24.89	29.09	33.44	38.09	42.79		48.25	4 / 5			
	reaction time	0.149		3.64	3.70	3.77	3.91	4.07	4.20	4.35	4.65	4.70	5.46			11.11	12.18	13.70
	interval			9.62	9.46	9.28	8.95	8.60	8.33	8.05	7.53	7.45	7.33	8.29		9.45	8.62	7.66
	velocity		7.76	9.62	9.46	9.28	8.95	8.60	8.33	8.05	7.53	7.45	7.33	8.29				
Smidt, Nick (NED) (1997)	time		5.83	9.53	13.26	17.07	21.03	25.16	29.40	33.80	38.34	43.04		48.57	8 / 6			
	reaction time	0.167		3.70	3.73	3.81	3.96	4.13	4.24	4.40	4.54	4.70	5.53			11.24	12.33	13.64
	interval			9.46	9.38	9.19	8.84	8.47	8.25	7.95	7.71	7.45	7.23	8.24		9.34	8.52	7.70
	velocity		7.72	9.46	9.38	9.19	8.84	8.47	8.25	7.95	7.71	7.45	7.23	8.24				
Rosser, Khallifah (USA) (1995)	time		5.73	9.31	12.98	16.73	20.59	24.65	28.93	33.46	38.13	43.00		48.71	1 / 7			
	reaction time	0.172		3.58	3.67	3.75	3.86	4.06	4.28	4.53	4.67	4.87	5.71			11.00	12.20	14.07
	interval			9.78	9.54	9.33	9.07	8.62	8.18	7.73	7.49	7.19	7.01	8.21		9.55	8.61	7.46
	velocity		7.85	9.78	9.54	9.33	9.07	8.62	8.18	7.73	7.49	7.19	7.01	8.21				
Sibilio, Alessandro (ITA) (1999)	time		5.76	9.43	13.21	17.00								dnf	3 / --			
	reaction time	0.126		3.67	3.78	3.79										11.24		
	interval			9.54	9.26	9.23										9.34		
	velocity		7.81	9.54	9.26	9.23												
McMaster, Kyron (IVB) (1997)	time		5.78	9.32	13.00	16.78	20.66	24.66	28.80	33.10	37.58	42.12		47.26	6 / 1			
	reaction time	0.210		3.54	3.68	3.78	3.88	4.00	4.14	4.30	4.48	4.54	5.14			11.00	12.02	13.32
	interval			9.89	9.51	9.26	9.02	8.75	8.45	8.14	7.81	7.71	7.78	8.46		9.55	8.74	7.88
	velocity		7.79	9.89	9.51	9.26	9.02	8.75	8.45	8.14	7.81	7.71	7.78	8.46				
H1 lead leg	time																	
	interval																	
	velocity																	
	strides																	

2023 P-T-S Meeting (Banská Bystrica, SVK) (TV Analysis)

Date 2023.07.20

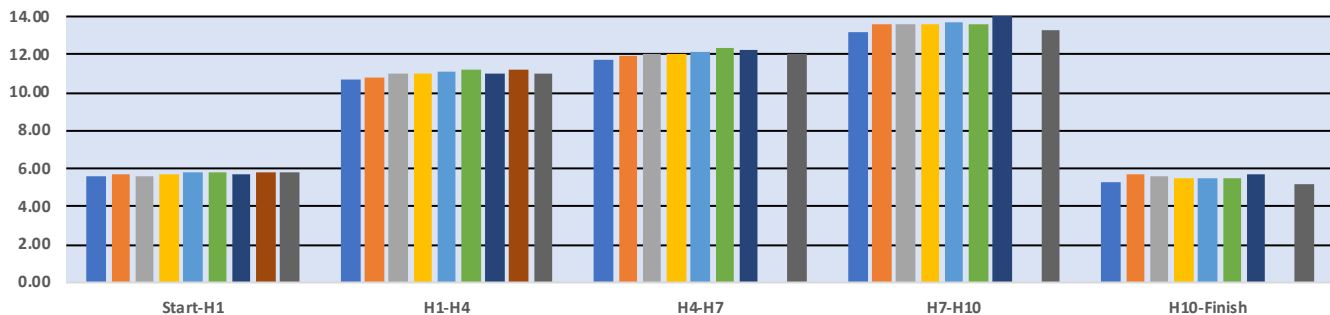
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McMaster, Kyron (IVB) (1997)	time		5.78	9.32	13.00	16.78	20.66	24.66	28.80	33.10	37.58	42.12		47.26	6 / 1			
	reaction time	0.210		3.54	3.68	3.78	3.88	4.00	4.14	4.30	4.48	4.54	5.14			11.00	12.02	13.32
	interval			9.89	9.51	9.26	9.02	8.75	8.45	8.14	7.81	7.71	7.78	8.46		9.55	8.74	7.88
	velocity		7.79	9.89	9.51	9.26	9.02	8.75	8.45	8.14	7.81	7.71	7.78	8.46				
H1 lead leg	time																	
	interval																	
	velocity																	
	strides																	



Time Intervals (s)

Hurdle Phases



Herculis Meeting International d'Athlétisme
Source: Omega Timing (Fri 21 Jul 2023 20:09) - diamond league race analysis
<https://www.omegatiming.com/File/0002030B0102040101FFFFFFFFFFFF4D.pdf>
Video: <https://www.youtube.com/watch?v=ICT3lqsBSLQ>

P-T-S Meeting
Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: Gun Flash
Source: <https://www.youtube.com/watch?v=mV7VwTdbu7s>

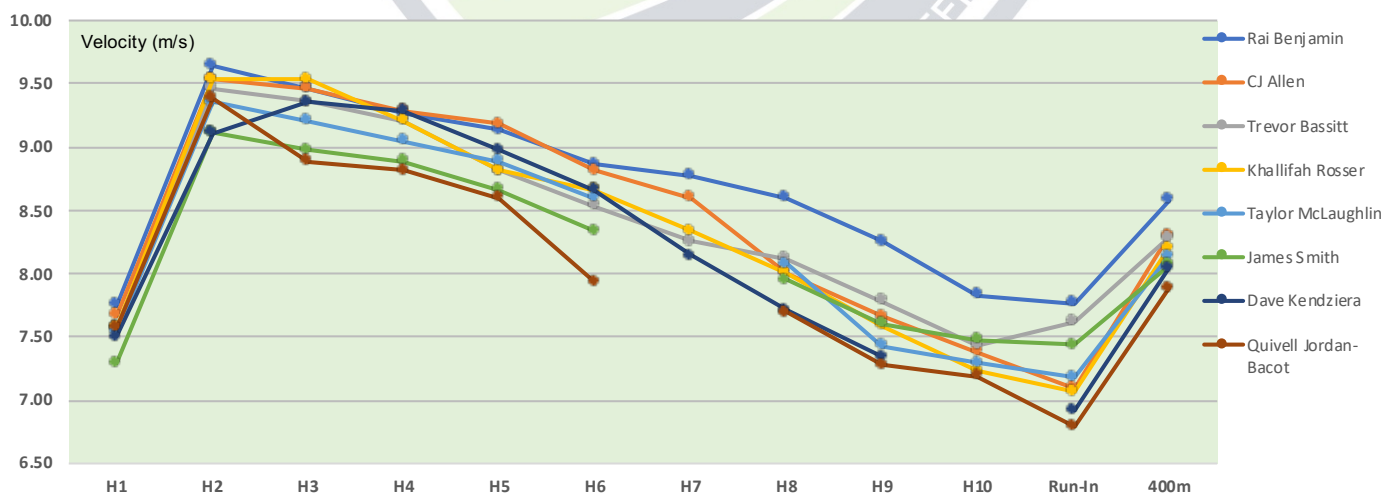
2023 USATF National Championships (Eugene, OR) (TV Analysis)

Men's 400m Hurdles

Date 2023.07.09

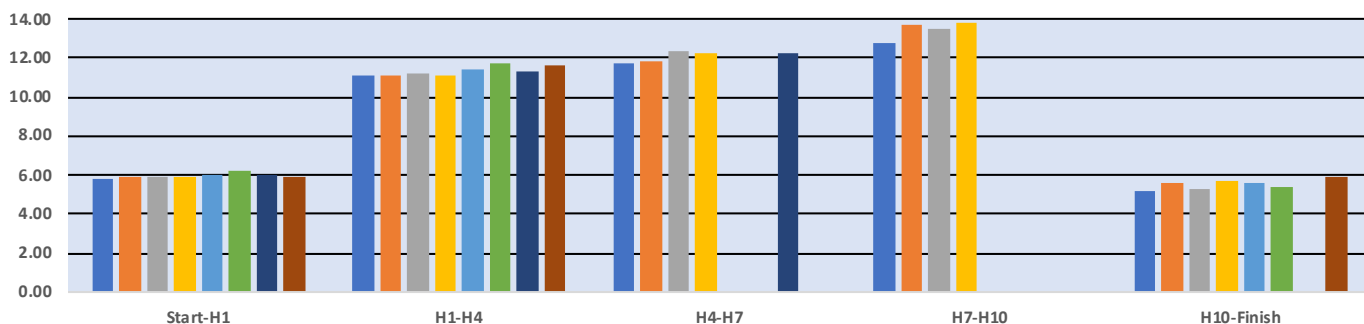
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Benjamin, Rai (USA) (1997)	time		5.81	9.44	13.14	16.92	20.75	24.70	28.69	32.76	37.00	41.47		46.62	5 / 1			
	reaction time												5.15			11.11	11.77	12.78
	interval velocity		7.75	9.64	9.46	9.26	9.14	8.86	8.77	8.60	8.25	7.83	7.77	8.58		9.45	8.92	8.22
	H1 lead leg	R	20	13	13	13	13	13	13	13	13	13	17	154				
Allen, CJ (USA) (1995)	time		5.87	9.54	13.24	17.01	20.82	24.79	28.86	33.23	37.80	42.54		48.18	4 / 2			
	reaction time												5.64			11.14	11.85	13.68
	interval velocity		7.67	9.54	9.46	9.28	9.19	8.82	8.60	8.01	7.66	7.38	7.09	8.30		9.43	8.86	7.68
	H1 lead leg	L	20	13	13	13	13	13	13	13	14	14	17.7	156.7				
Bassitt, Trevor (USA) (1998)	time		5.94	9.64	13.38	17.18	21.15	25.25	29.49	33.80	38.30	43.01		48.26	6 / 3			
	reaction time												5.25			11.24	12.31	13.52
	interval velocity		7.58	9.46	9.36	9.21	8.82	8.54	8.25	8.12	7.78	7.43	7.62	8.29		9.34	8.53	7.77
	H1 lead leg	R	20	13	13	12	12	13	13	13	14	14	17	154				
Rosser, Khallifah (USA) (1995)	time		5.94	9.61	13.28	17.08	21.05	25.09	29.29	33.66	38.27	43.11		48.77	7 / 4			
	reaction time												5.66			11.14	12.21	13.82
	interval velocity		7.58	9.54	9.54	9.21	8.82	8.66	8.33	8.01	7.59	7.23	7.07	8.20		9.43	8.60	7.60
	H1 lead leg	R	21	13	13	13	13	13	13	14	14	15	18	160				
McLaughlin, Taylor (USA) (1997)	time		5.97	9.71	13.51	17.38	21.32	25.39		34.06	38.77	43.57		49.14	1 / 5			
	reaction time									8.67	4.71	4.80	5.57			11.41		
	interval velocity		7.54	9.36	9.21	9.04	8.88	8.60		8.07	7.43	7.29	7.18	8.14		9.20		
	H1 lead leg	R	21	13	13	13	13	13		15	15	18	134					
Smith, James (USA) (2000)	time		6.17	10.01	13.91	17.85	21.89	26.09		34.90	39.50	44.18		49.56	3 / 6			
	reaction time									8.81	4.60	4.68	5.38			11.68		
	interval velocity		7.29	9.11	8.97	8.88	8.66	8.33		7.95	7.61	7.48	7.43	8.07		8.99		
	H1 lead leg	L	21	13	13	13	13			15	15		103					
Kendziera, Dave (USA) (1994)	time		6.00	9.84	13.58	17.35	21.25	25.29	29.59	34.13	38.90			49.74	8 / 7			
	reaction time												10.84			11.35	12.24	
	interval velocity		7.50	9.11	9.36	9.28	8.97	8.66	8.14	7.71	7.34		6.92	8.04		9.25	8.58	
	H1 lead leg	L	21	14	13	13	13		14	14	15		117					
Jordan-Bacot, Quivell (USA) (1999)	time		5.94	9.67	13.61	17.58	21.65	26.06		35.16	39.97	44.84		50.73	2 / 8			
	reaction time									9.10	4.81	4.87	5.89			11.64		
	interval velocity		7.58	9.38	8.88	8.82	8.60	7.94		7.69	7.28	7.19	6.79	7.88		9.02		
	H1 lead leg	L	21	13	13	13	13			15	15		103					



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=kPW-B3T5nAA>

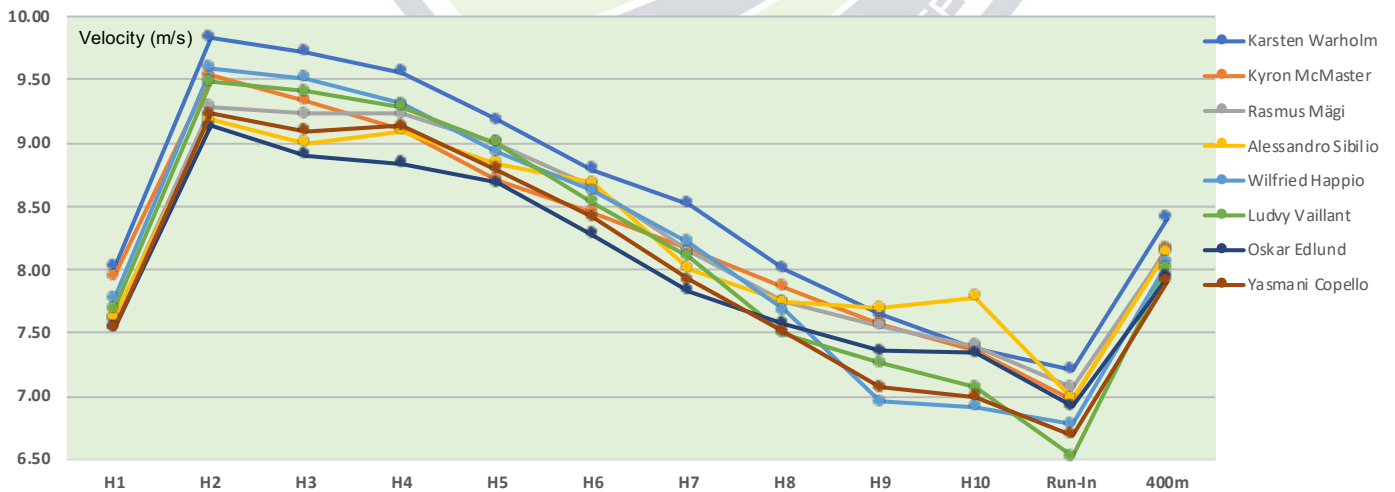
2023 Bauhaus Galan (Stockholm, SWE)

Men's 400m Hurdles

Date 2023.07.02

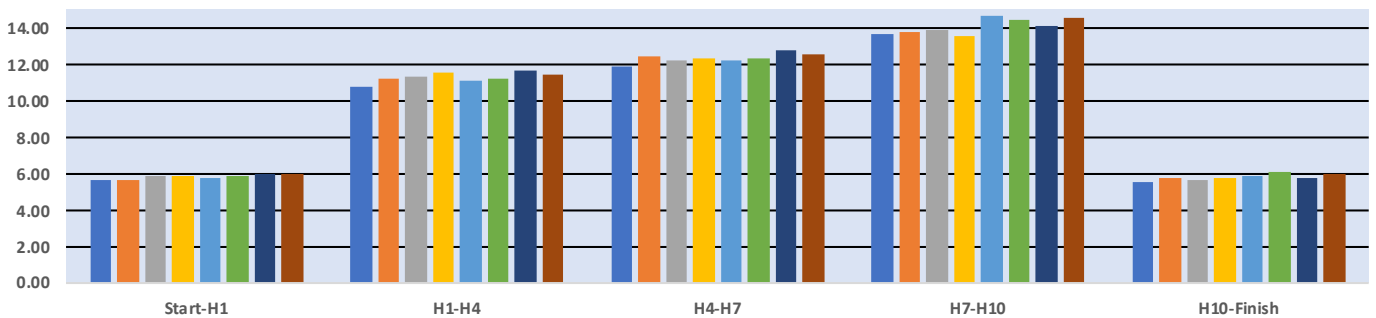
FINAL

			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		5.61	9.17	12.77	16.43	20.24	24.22	28.33	32.70	37.28	42.02		47.57	8 / 1			
	reaction time	0.156																
	interval		8.02	3.56	3.60	3.66	3.81	3.98	4.11	4.37	4.58	4.74	5.55			10.82	11.90	13.69
	velocity		8.02	9.83	9.72	9.56	9.19	8.79	8.52	8.01	7.64	7.38	6.97	8.41		9.70	8.82	7.67
McMaster, Kyron (IVB) (1997)	time		5.66	9.33	13.08	16.92	20.94	25.08	29.37	33.82	38.44	43.20		48.94	7 / 2			
	reaction time	0.147																
	interval		7.95	3.67	3.75	3.84	4.02	4.14	4.29	4.45	4.62	4.76	5.74			11.26	12.45	13.83
	velocity		7.95	9.54	9.33	9.11	8.71	8.45	8.16	7.87	7.58	7.35	6.97	8.17		9.33	8.43	7.59
Mägi, Rasmus (EST) (1992)	time		5.92	9.69	13.48	17.27	21.16	25.20	29.50	34.02	38.65	43.38		49.04	3 / 3			
	reaction time	0.165																
	interval		7.60	3.77	3.79	3.79	3.89	4.04	4.30	4.52	4.63	4.73	5.66			11.35	12.23	13.88
	velocity		7.60	9.28	9.23	9.00	8.66	8.14	7.74	7.56	7.40	7.15	6.97	8.16		9.25	8.59	7.56
Sibilio, Alessandro (ITA) (1999)	time		5.90	9.71	13.60	17.45	21.41	25.44	29.81	34.33	38.88	43.38		49.11	5 / 4			
	reaction time	0.150																
	interval		7.63	3.81	3.89	3.85	3.96	4.03	4.26	4.52	4.55	4.50	5.73			11.55	12.36	13.57
	velocity		7.63	9.19	9.00	9.09	8.84	8.68	8.01	7.74	7.69	7.78	6.98	8.14		9.09	8.50	7.74
Happio, Wilfried (FRA) (1998)	time		5.79	9.44	13.12	16.88	20.80	24.86	29.12	33.68	38.71	43.77		49.67	6 / 5			
	reaction time	0.151																
	interval		7.77	3.65	3.68	3.76	3.92	4.06	4.26	4.56	5.03	5.06	5.90			11.09	12.24	14.65
	velocity		7.77	9.59	9.51	9.31	8.93	8.62	8.22	7.68	6.96	6.92	6.78	8.05		9.47	8.58	7.17
Vaillant, Ludvy (FRA) (1995)	time		5.85	9.54	13.26	17.03	20.92	25.02	29.34	34.01	38.83	43.78		49.91	4 / 6			
	reaction time	0.199																
	interval		7.69	3.69	3.72	3.77	3.89	4.10	4.32	4.67	4.82	4.95	6.13			11.18	12.31	14.44
	velocity		7.69	9.49	9.41	9.28	9.00	8.54	8.10	7.49	7.26	7.07	6.53	8.01		9.39	8.53	7.27
Edlund, Oskar (SWE) (2002)	time		5.97	9.80	13.73	17.69	21.72	25.95	30.42	35.04	39.80	44.57		50.35	1 / 7			
	reaction time	0.177																
	interval		7.54	3.83	3.93	3.96	4.03	4.23	4.47	4.62	4.76	4.77	5.78			11.72	12.73	14.15
	velocity		7.54	9.14	8.91	8.84	8.68	8.27	7.83	7.58	7.35	7.34	6.92	7.94		8.96	8.25	7.42
Copello, Yasmani (TUR) (1987)	time		5.97	9.76	13.61	17.44	21.42	25.58	30.00	34.66	39.61	44.61		50.59	2 / 8			
	reaction time	0.186																
	interval		7.54	3.79	3.85	3.83	3.98	4.16	4.42	4.66	4.95	5.00	5.98			11.47	12.56	14.61
	velocity		7.54	9.23	9.09	9.14	8.79	8.41	7.92	7.51	7.07	7.00	6.69	7.91		9.15	8.36	7.19



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Sun 2 Jul 2023 19:36) - diamond league race analysis

<https://www.omegatiming.com/File/0002030901020B0101FFFFFFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=SBKIT2SBLzY>

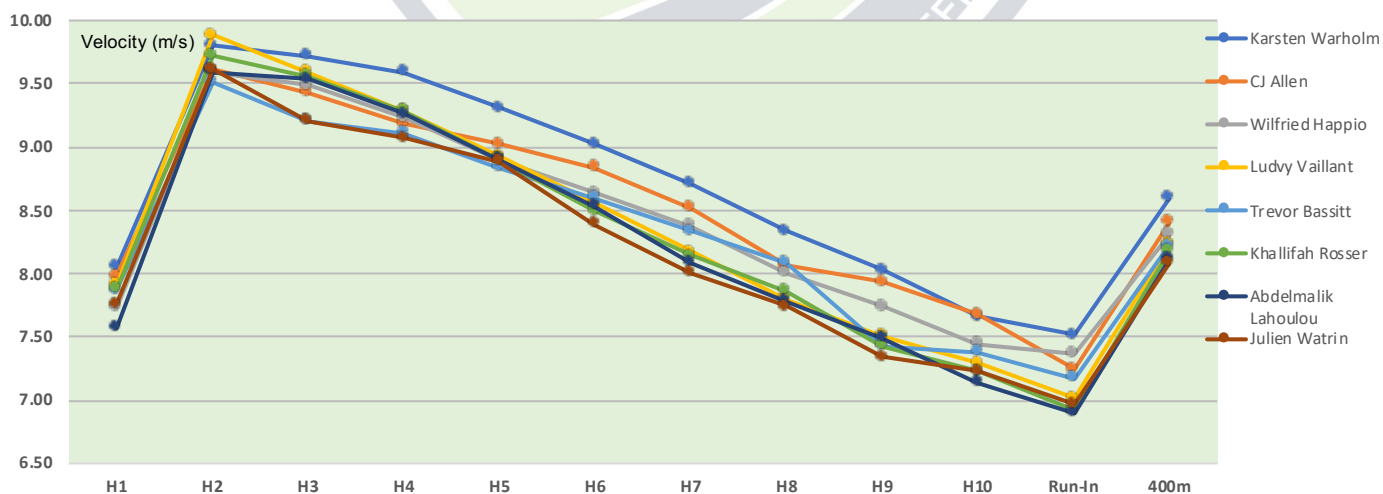
2023 Bislett Games (Oslo, NOR)

Men's 400m Hurdles

Date 2023.06.15

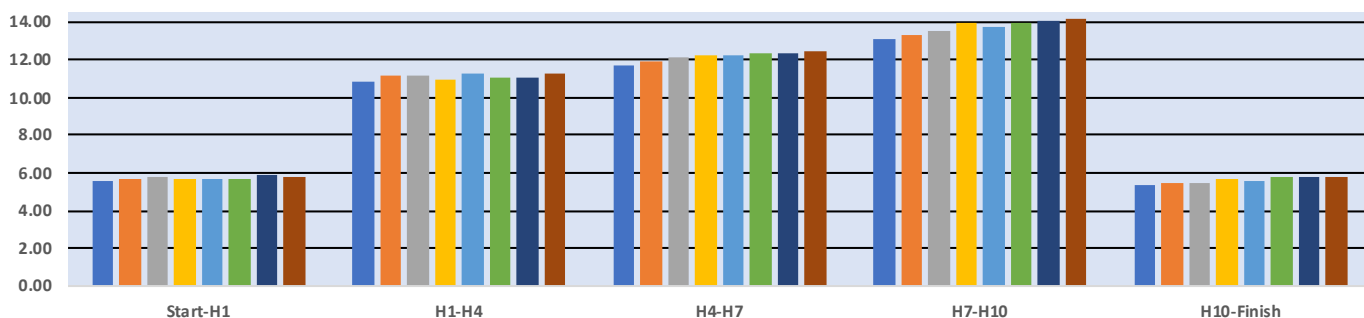
FINAL

			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		5.59	9.16	12.76	16.41	20.17	24.05	28.07	32.27	36.63	41.20		46.52	7 / 1			
	reaction time	0.162																
	interval		8.05	3.57	3.60	3.65	3.76	3.88	4.02	4.20	4.36	4.57	5.32			10.82	11.66	13.13
	velocity		8.05	9.80	9.72	9.59	9.31	9.02	8.71	8.33	8.03	7.66	7.52	8.60		9.70	9.01	8.00
Allen, CJ (USA) (1995)	time		5.64	9.28	12.99	16.80	20.68	24.64	28.75	33.09	37.50	42.06		47.58	6 / 2			
	reaction time	0.170																
	interval		7.98	3.64	3.71	3.81	3.88	3.96	4.11	4.34	4.41	4.56	5.52	PB		11.16	11.95	13.31
	velocity		7.98	9.62	9.43	9.19	9.02	8.84	8.52	8.06	7.94	7.68	7.25	8.41		9.41	8.79	7.89
Happio, Wilfried (FRA) (1998)	time		5.82	9.47	13.16	16.95	20.88	24.93	29.11	33.48	38.00	42.70		48.13	5 / 3			
	reaction time	0.159																
	interval		7.73	3.65	3.69	3.79	3.93	4.05	4.18	4.37	4.52	4.70	5.43			11.13	12.16	13.59
	velocity		7.73	9.59	9.49	9.23	8.91	8.64	8.37	8.01	7.74	7.45	7.37	8.31		9.43	8.63	7.73
Vaillant, Ludvy (FRA) (1995)	time		5.69	9.23	12.88	16.65	20.57	24.66	28.94	33.43	38.09	42.89		48.59	2 / 4			
	reaction time	0.155																
	interval		7.91	3.54	3.65	3.77	3.92	4.09	4.28	4.49	4.66	4.80	5.70			10.96	12.29	13.95
	velocity		7.91	9.89	9.59	9.28	8.93	8.56	8.18	7.80	7.51	7.29	7.02	8.23		9.58	8.54	7.53
Bassitt, Trevor (USA) (1998)	time		5.72	9.40	13.20	17.04	21.00	25.07	29.27	33.60	38.31	43.05		48.63	4 / 5			
	reaction time	0.185																
	interval		7.87	3.68	3.80	3.84	3.96	4.07	4.20	4.33	4.71	4.74	5.58			11.32	12.23	13.78
	velocity		7.87	9.51	9.21	9.11	8.84	8.60	8.33	8.08	7.43	7.38	7.17	8.23		9.28	8.59	7.62
Rosser, Khallifah (USA) (1995)	time		5.71	9.31	12.97	16.74	20.67	24.79	29.09	33.54	38.25	43.09		48.87	3 / 6			
	reaction time	0.172																
	interval		7.88	3.60	3.66	3.77	3.93	4.12	4.30	4.45	4.71	4.84	5.78			11.03	12.35	14.00
	velocity		7.88	9.72	9.56	9.28	8.91	8.50	8.14	7.87	7.43	7.23	6.92	8.18		9.52	8.50	7.50
Lahoulou, Abdelmalik (ALG) (1992)	time		5.94	9.59	13.26	17.04	20.97	25.07	29.40	33.90	38.57	43.47		49.27	8 / 7			
	reaction time	0.178																
	interval		7.58	3.65	3.67	3.78	3.93	4.10	4.33	4.50	4.67	4.90	5.80			11.10	12.36	14.07
	velocity		7.58	9.59	9.54	9.26	8.91	8.54	8.08	7.78	7.49	7.14	6.90	8.12		9.46	8.50	7.46
Watrin, Julien (BEL) (1992)	time		5.80	9.44	13.24	17.10	21.04	25.21	29.58	34.10	38.87	43.71		49.45	1 / 8			
	reaction time	0.209																
	interval		7.76	3.64	3.80	3.86	3.94	4.17	4.37	4.52	4.77	4.84	5.74			11.30	12.48	14.13
	velocity		7.76	9.62	9.21	9.07	8.88	8.39	8.01	7.74	7.34	7.23	6.97	8.09		9.29	8.41	7.43



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Thu 15 Jun 2023 21:44) - diamond league race analysis

<https://www.omegatiming.com/File/0002030701010D0101FFFFFFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=q8ZUH-drYes>

Biomechanical Analysis

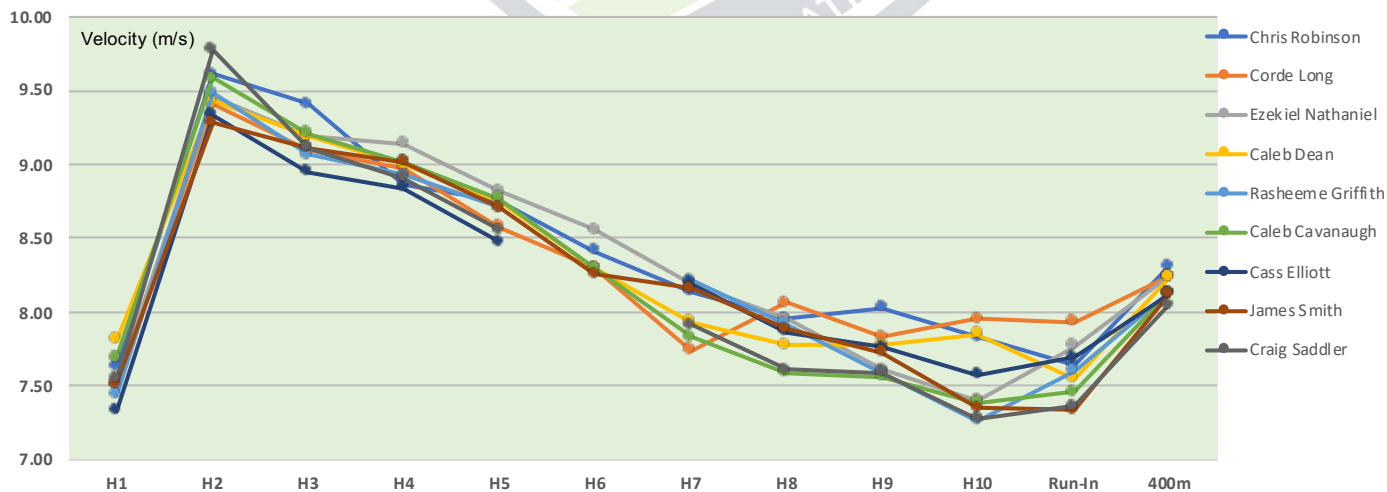
2023 NCAA Championships (Austin, TX) (TV Analysis)

Men's 400m Hurdles

Date 2023.06.09

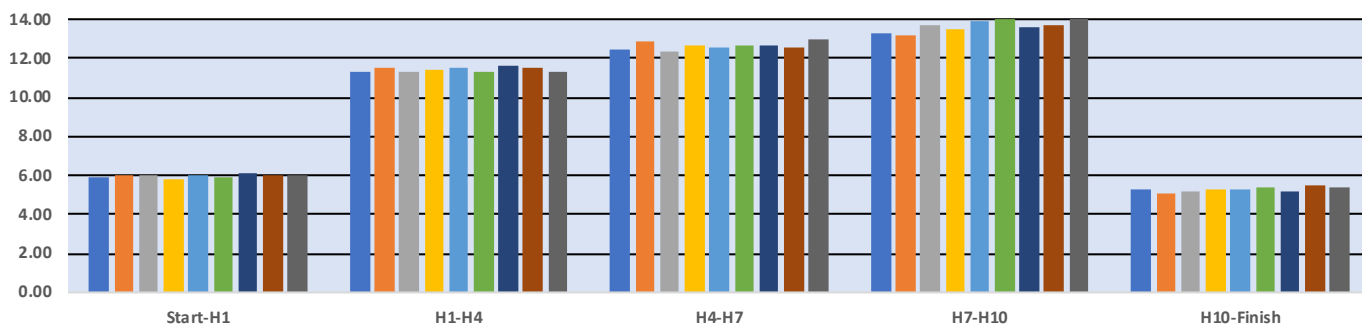
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Robinson, Chris (USA) (2001)	time		5.89	9.53	13.25	17.20	21.20	25.36	29.66	34.06	38.42	42.89		48.12	6 / 1			
	reaction time																	
	interval			3.64	3.72	3.95	4.00	4.16	4.30	4.40	4.36	4.47	5.23	PB		11.31	12.46	13.23
	velocity		7.64	9.62	9.41	8.86	8.75	8.41	8.14	7.95	8.03	7.83	7.65	8.31		9.28	8.43	7.94
Long, Corde (USA) (2002)	time		5.99	9.71	13.56	17.46	21.54	25.76	30.28	34.62	39.09	43.49		48.53	5 / 2			
	reaction time																	
	interval			3.72	3.85	3.90	4.08	4.22	4.52	4.34	4.47	4.40	5.04	PB		11.47	12.82	13.21
	velocity		7.51	9.41	9.09	8.97	8.58	8.29	7.74	8.06	7.83	7.95	7.94	8.24		9.15	8.19	7.95
Nathaniel, Ezekiel (NGR) (2003)	time		5.99	9.69	13.50	17.33	21.30	25.39	29.66	34.06	38.66	43.39		48.54	8 / 3			
	reaction time																	
	interval			3.70	3.81	3.83	3.97	4.09	4.27	4.40	4.60	4.73	5.15			11.34	12.33	13.73
	velocity		7.51	9.46	9.19	9.14	8.82	8.56	8.20	7.95	7.61	7.40	7.77	8.24		9.26	8.52	7.65
Dean, Caleb (USA) (2001)	time		5.76	9.47	13.28	17.17	21.17	25.39	29.80	34.30	38.80	43.26		48.56	7 / 4			
	reaction time																	
	interval			3.71	3.81	3.89	4.00	4.22	4.41	4.50	4.50	4.46	5.30			11.41	12.63	13.46
	velocity		7.81	9.43	9.19	9.00	8.75	8.29	7.94	7.78	7.78	7.85	7.55	8.24		9.20	8.31	7.80
Griffith, Rasheeme (BAR) (2000)	time		6.05	9.74	13.60	17.52	21.54		30.06	34.48	39.09	43.91		49.17	3 / 5			
	reaction time																	
	interval			3.69	3.86	3.92	4.02		8.52	4.42	4.61	4.82	5.26			11.47	12.54	13.85
	velocity		7.44	9.49	9.07	8.93	8.71		8.22	7.92	7.59	7.26	7.60	8.14		9.15	8.37	7.58
Cavanaugh, Caleb (USA) (2001)	time		5.85	9.50	13.30	17.18	21.17	25.39	29.86	34.47	39.10	43.84		49.20	9 / 6			
	reaction time																	
	interval			3.65	3.80	3.88	3.99	4.22	4.47	4.61	4.63	4.74	5.36			11.33	12.68	13.98
	velocity		7.69	9.59	9.21	9.02	8.77	8.29	7.83	7.59	7.56	7.38	7.46	8.13		9.27	8.28	7.51
Elliott, Cass (USA) (2000)	time		6.14	9.89	13.80	17.76	21.89		30.43	34.88	39.39	44.01		49.21	2 / 7			
	reaction time																	
	interval			3.75	3.91	3.96	4.13		8.54	4.45	4.51	4.62	5.20			11.62	12.67	13.58
	velocity		7.33	9.33	8.95	8.84	8.47		8.20	7.87	7.76	7.58	7.69	8.13		9.04	8.29	7.73
Smith, James (USA) (2000)	time		5.99	9.76	13.60	17.48	21.50	25.74	30.03	34.47	39.00	43.76		49.21	4 / 8			
	reaction time																	
	interval			3.77	3.84	3.88	4.02	4.24	4.29	4.44	4.53	4.76	5.45	PB		11.49	12.55	13.73
	velocity		7.51	9.28	9.11	9.02	8.71	8.25	8.16	7.88	7.73	7.35	7.34	8.13		9.14	8.37	7.65
Saddler, Craig (USA)	time		5.96	9.54	13.38	17.31	21.40		30.25	34.85	39.46	44.27		49.70	1 / 9			
	reaction time																	
	interval			3.58	3.84	3.93	4.09		8.85	4.60	4.61	4.81	5.43			11.35	12.94	14.02
	velocity		7.55	9.78	9.11	8.91	8.56		7.91	7.61	7.59	7.28	7.37	8.05		9.25	8.11	7.49



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=0E8BFbQS0ao>

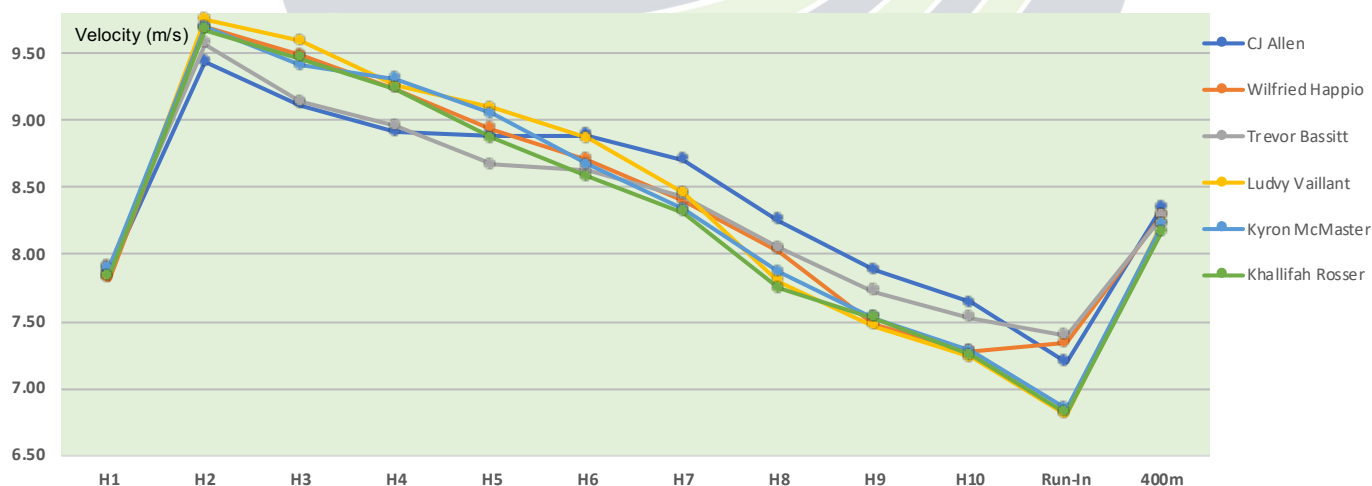
2023 Meeting de Paris (Paris, FRA)

400m Hurdles

Date: 2023.06.09

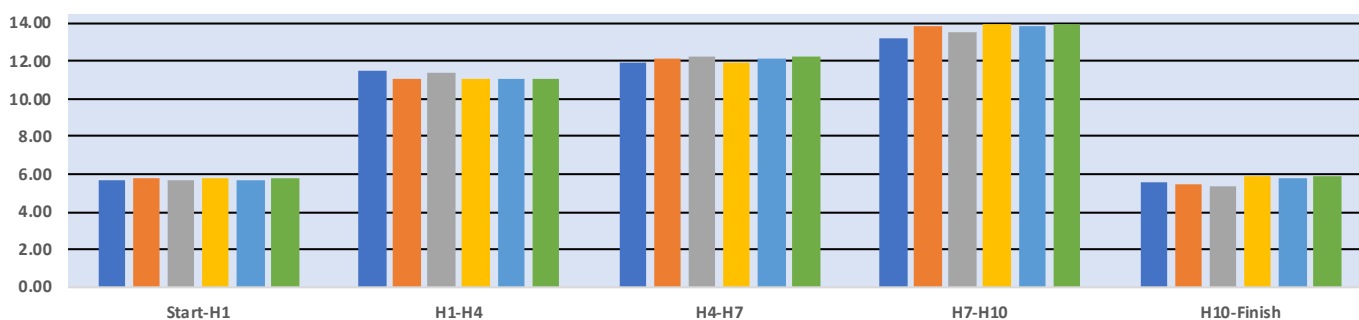
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Allen, CJ (USA) (1995)	time		5.72	9.43	13.27	17.20	21.14	25.08	29.10	33.34	37.78	42.36		47.92	7 / 1			
	reaction time	0.138																
	interval		7.87	3.71	3.84	3.93	3.94	3.94	4.02	4.24	4.44	4.58	5.56			11.48	11.90	13.26
	velocity		7.87	9.43	9.11	8.91	8.88	8.88	8.71	8.25	7.88	7.64	7.19	8.35		9.15	8.82	7.92
Happio, Wilfried (FRA) (1998)	time		5.76	9.37	13.06	16.85	20.77	24.79	28.96	33.32	38.00	42.81		48.26	6 / 2			
	reaction time	0.156																
	interval		7.81	3.61	3.69	3.79	3.92	4.02	4.17	4.36	4.68	4.81	5.45			11.09	12.11	13.85
	velocity		7.81	9.70	9.49	9.23	8.93	8.71	8.39	8.03	7.48	7.28	7.34	8.29		9.47	8.67	7.58
Bassitt, Trevor (USA) (1998)	time		5.69	9.35	13.18	17.09	21.13	25.19	29.34	33.69	38.22	42.87		48.28	4 / 3			
	reaction time	0.164																
	interval		7.91	3.66	3.83	3.91	4.04	4.06	4.15	4.35	4.53	4.65	5.41			11.40	12.25	13.53
	velocity		7.91	9.56	9.14	8.95	8.66	8.62	8.43	8.05	7.73	7.53	7.39	8.29		9.21	8.57	7.76
Vaillant, Ludvy (FRA) (1995)	time		5.74	9.33	12.98	16.76	20.61	24.56	28.70	33.19	37.88	42.72		48.60	2 / 4			
	reaction time	0.153																
	interval		7.84	3.59	3.65	3.78	3.85	3.95	4.14	4.49	4.69	4.84	5.88			11.02	11.94	14.02
	velocity		7.84	9.75	9.59	9.26	9.09	8.86	8.45	7.80	7.46	7.23	6.80	8.23		9.53	8.79	7.49
McMaster, Kyron (IVB) (1997)	time		5.70	9.31	13.03	16.79	20.66	24.70	28.90	33.35	38.00	42.81		48.65	8 / 5			
	reaction time	0.157																
	interval		7.89	3.61	3.72	3.76	3.87	4.04	4.20	4.45	4.65	4.81	5.84			11.09	12.11	13.91
	velocity		7.89	9.70	9.41	9.31	9.04	8.66	8.33	7.87	7.53	7.28	6.85	8.22		9.47	8.67	7.55
Rosser, Khallifah (USA) (1995)	time		5.74	9.36	13.06	16.85	20.80	24.88	29.09	33.61	38.26	43.09		48.96	3 / 6			
	reaction time	0.143																
	interval		7.84	3.62	3.70	3.79	3.95	4.08	4.21	4.52	4.65	4.83	5.87			11.11	12.24	14.00
	velocity		7.84	9.67	9.46	9.23	8.86	8.58	8.31	7.74	7.53	7.25	6.81	8.17		9.45	8.58	7.50



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Fri 09 Jun 2023 21:07) - diamond league race analysis

<https://www.omegatiming.com/File/000203060101080101FFFFFFFFFFFF4D.pdf>Video: https://www.youtube.com/watch?v=teHrleAkm_8

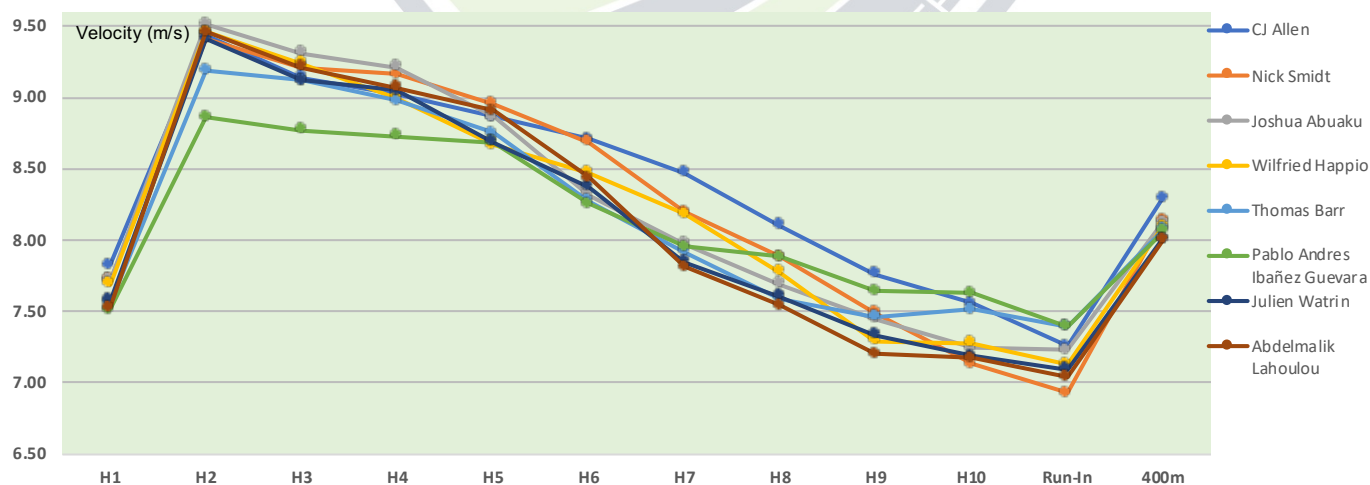
2023 FBK Games (Hengelo, NED)

Men's 400m Hurdles

Date 2023.06.04

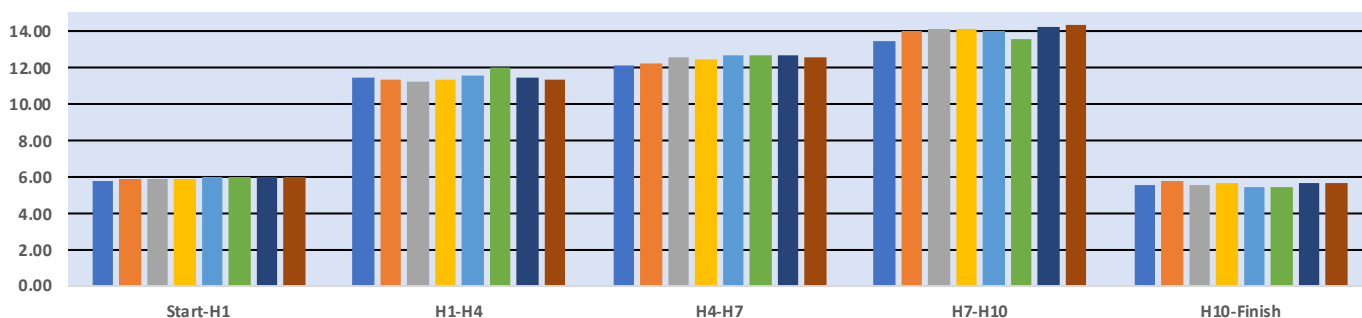
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Allen, CJ (USA) (1995)	time		5.75	9.46	13.29	17.17	21.12	25.14	29.27	33.59	38.10	42.73		48.24	6 / 1			
	reaction time	0.166														11.42	12.10	13.46
	interval		7.83	3.71	3.83	3.88	3.95	4.02	4.13	4.32	4.51	4.63	5.51			9.19	8.68	7.80
	velocity																	
Smidt, Nick (NED) (1997)	time		5.83	9.55	13.35	17.17	21.08	25.11	29.38	33.82	38.49	43.40		49.17	5 / 2			
	reaction time	0.186														11.34	12.21	14.02
	interval		7.72	3.72	3.80	3.82	3.91	4.03	4.27	4.44	4.67	4.91	5.77			9.26	8.60	7.49
	velocity																	
Abuaku, Joshua (GER) (1996)	time		5.83	9.51	13.27	17.07	21.02	25.23	29.62	34.17	38.87	43.70		49.23	8 / 3			
	reaction time	0.207														11.24	12.55	14.08
	interval		7.72	3.68	3.76	3.80	3.95	4.21	4.39	4.55	4.70	4.83	5.53			9.34	8.37	7.46
	velocity																	
Happio, Wilfried (FRA) (1998)	time		5.85	9.55	13.34	17.23	21.27	25.40	29.68	34.18	38.98	43.79		49.40	7 / 4			
	reaction time	0.158														11.38	12.45	14.11
	interval		7.69	3.70	3.79	3.89	4.04	4.13	4.28	4.50	4.80	4.81	5.61			9.23	8.43	7.44
	velocity																	
Barr, Thomas (IRL) (1992)	time		5.95	9.76	13.60	17.50	21.50	25.73	30.15	34.76	39.45	44.11		49.52	2 / 5			
	reaction time	0.167														11.55	12.65	13.96
	interval		7.56	3.81	3.84	3.90	4.00	4.23	4.42	4.61	4.69	4.66	5.41			9.09	8.30	7.52
	velocity																	
Ibañez Guevara, Pablo Andres (ESA)	time		5.99	9.94	13.93	17.94	21.97	26.21	30.61	35.05	39.63	44.22		49.63	3 / 6			
	reaction time	0.156														11.95	12.67	13.61
	interval		7.51	3.95	3.99	4.01	4.03	4.24	4.40	4.44	4.58	4.59	5.41			8.79	8.29	7.71
	velocity																	
Watrin, Julien (BEL) (1992)	time		5.94	9.66	13.50	17.37	21.40	25.58	30.04	34.64	39.41	44.28		49.92	4 / 7			
	reaction time	0.242														11.43	12.67	14.24
	interval		7.58	3.72	3.84	3.87	4.03	4.18	4.46	4.60	4.77	4.87	5.64			9.19	8.29	7.37
	velocity																	
Lahoulou, Abdelmalik (ALG) (1992)	time		5.98	9.68	13.48	17.34	21.27	25.42	29.90	34.54	39.40	44.28		49.96	1 / 8			
	reaction time	0.173														11.36	12.56	14.38
	interval		7.53	3.70	3.80	3.86	3.93	4.15	4.48	4.64	4.86	4.88	5.68			9.24	8.36	7.30
	velocity																	
H1 lead leg	time																	
	interval																	
	velocity																	
	strides																	



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Sun 4 Jun 2023 19:46) - continental tour race analysis
<https://www.omegatiming.com/File/000203010102090101FFFFFFFFFFFF4D.pdf>

Video: <https://www.youtube.com/watch?v=s1vdEfr0TL0>

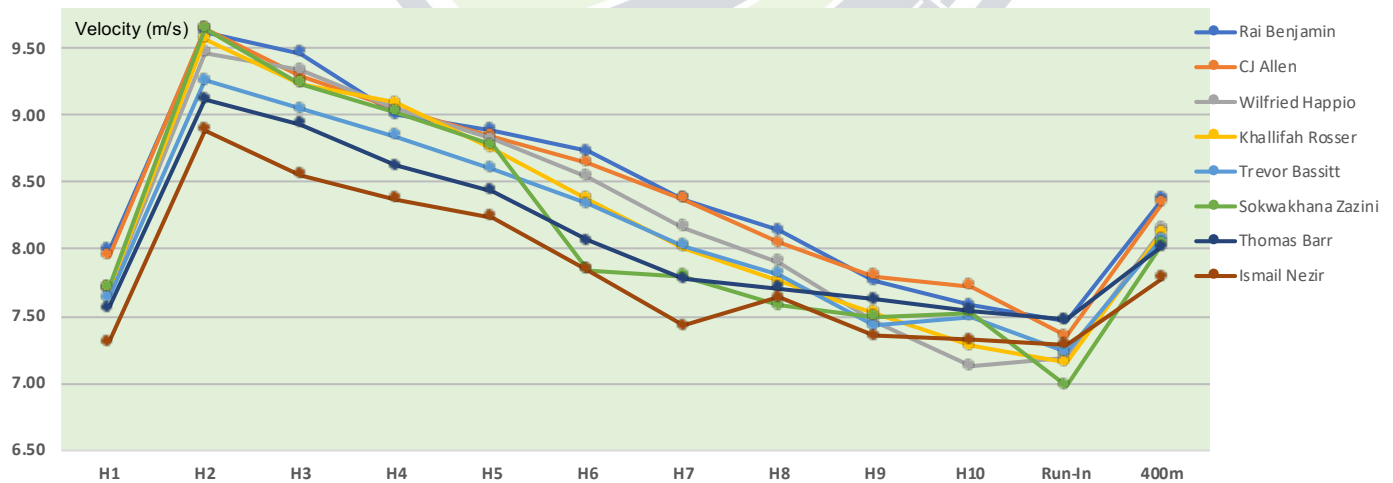
2023 Doha Diamond League (Doha, QAT)

Men's 400m Hurdles

Date 2023.05.05

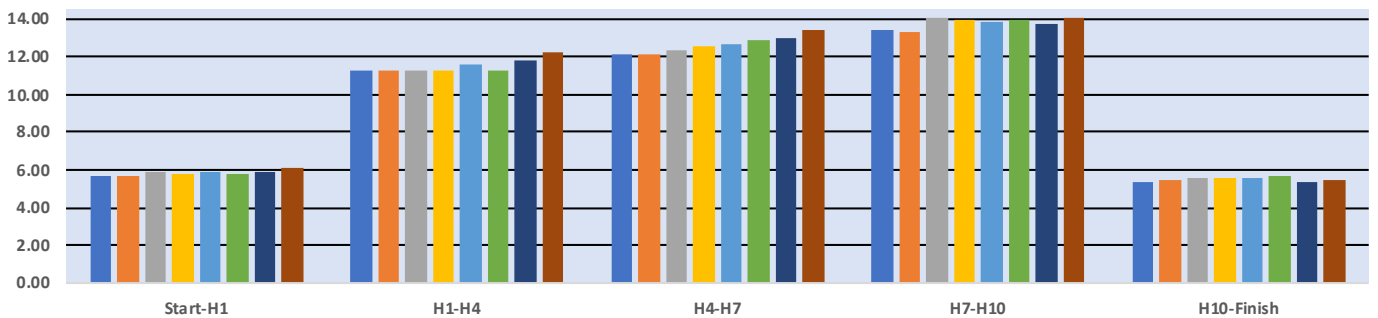
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Benjamin, Rai (USA) (1997)	time		5.63	9.27	12.97	16.86	20.80	24.81	28.99	33.29	37.80	42.42		47.78	6 / 1			
	reaction time	0.169																
	interval		7.99	3.64	3.70	3.89	3.94	4.01	4.18	4.30	4.51	4.62	5.36			11.23	12.13	13.43
	velocity		7.99	9.62	9.46	9.00	8.88	8.73	8.37	8.14	7.76	7.58	7.46	8.37		9.35	8.66	7.82
Allen, CJ (USA) (1995)	time		5.66	9.29	13.06	16.93	20.89	24.94	29.12	33.47	37.96	42.49		47.93	3 / 2			
	reaction time	0.144																
	interval		7.95	3.63	3.77	3.87	3.96	4.05	4.18	4.35	4.49	4.53	5.44	PB		11.27	12.19	13.37
	velocity		7.95	9.64	9.28	9.04	8.84	8.64	8.37	8.05	7.80	7.73	7.35	8.35		9.32	8.61	7.85
Happio, Wilfried (FRA) (1998)	time		5.85	9.55	13.30	17.17	21.14	25.24	29.53	33.96	38.65	43.56		49.12	5 / 3			
	reaction time	0.156																
	interval		7.69	3.70	3.75	3.87	3.97	4.10	4.29	4.43	4.69	4.91	5.56			11.32	12.36	14.03
	velocity		7.69	9.46	9.33	9.04	8.82	8.54	8.16	7.90	7.46	7.13	7.19	8.14		9.28	8.50	7.48
Rosser, Khallifah (USA) (1995)	time		5.84	9.50	13.29	17.14	21.14	25.32	29.69	34.20	38.85	43.66		49.25	4 / 4			
	reaction time	0.161																
	interval		7.71	3.66	3.79	3.85	4.00	4.18	4.37	4.51	4.65	4.81	5.59			11.30	12.55	13.97
	velocity		7.71	9.56	9.23	9.09	8.75	8.37	8.01	7.76	7.53	7.28	7.16	8.12		9.29	8.37	7.52
Bassitt, Trevor (USA) (1998)	time		5.89	9.67	13.54	17.50	21.57	25.77	30.13	34.61	39.32	43.99		49.52	7 / 5			
	reaction time	0.158																
	interval		7.64	3.78	3.87	3.88	4.07	4.20	4.36	4.48	4.71	4.67	5.53			11.61	12.63	13.86
	velocity		7.64	9.26	9.04	8.84	8.60	8.33	8.03	7.81	7.43	7.49	7.23	8.08		9.04	8.31	7.58
Zazini, Sokwakhana (RSA) (2000)	time		5.83	9.46	13.25	17.13	21.12	25.58	30.07	34.69	39.36	44.01		49.74	1 / 6			
	reaction time	0.170																
	interval		7.72	3.63	3.79	3.88	3.99	4.46	4.49	4.62	4.67	4.65	5.73			11.30	12.94	13.94
	velocity		7.72	9.64	9.23	9.02	8.77	7.85	7.80	7.58	7.49	7.53	6.98	8.04		9.29	8.11	7.53
Barr, Thomas (IRL) (1992)	time		5.95	9.79	13.71	17.77	21.92	26.26	30.76	35.30	39.89	44.53		49.88	8 / 7			
	reaction time	0.159																
	interval		7.56	3.84	3.92	4.06	4.15	4.34	4.50	4.54	4.59	4.64	5.35			11.82	12.99	13.77
	velocity		7.56	9.11	8.93	8.62	8.43	8.06	7.78	7.71	7.63	7.54	7.48	8.02		8.88	8.08	7.63
Nezir, Ismail (TUR) (2003)	time		6.16	10.10	14.19	18.37	22.62	27.08	31.79	36.37	41.13	45.91		51.40	2 / 8			
	reaction time	0.195																
	interval		7.31	3.94	4.09	4.18	4.25	4.46	4.71	4.58	4.76	4.78	5.49			12.21	13.42	14.12
	velocity		7.31	8.88	8.56	8.37	8.24	7.85	7.43	7.64	7.35	7.32	7.29	7.78		8.60	7.82	7.44



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Fri 05 May 2023 19:39) - diamond league race analysis

https://doha.diamondleague.com/live/libraries/universal/components/modules/pdfviewer/viewer.html?file=https://livecache.sportresult.com/node/binaryData/ATH_PROD/DOHA2023/PDF_ATHM400MHURDDJAMOND---FNL-000100--_C78.PDF?h=kCSolWSlodtQezKCaQ4vpcRIQWY=
Video: <https://www.youtube.com/watch?v=AQhysxO05mU>

Women's 400m Hurdles

2023 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 - 2023 London Athletics Meet (London, GBR)																	
date	23-Jul	time	6.25	10.26	14.30	18.43	22.65	27.05	31.58	36.26	41.09	45.88	51.45	6 / 1			
reaction time	0.187	interval		4.01	4.04	4.13	4.22	4.40	4.53	4.68	4.83	4.79	5.57	AR PB	12.18	13.15	14.30
		velocity	7.20	8.73	8.66	8.47	8.29	7.95	7.73	7.48	7.25	7.31	7.18	7.77	8.62	7.98	7.34
H1 lead leg	L	strides	22	14	14	14	14	14	14	15	15	15	19	170			
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 - 2023 World Athletics Championships (Budapest, HUN) (TV Analysis)																	
date	24-Aug	time	6.37	10.44	14.41	18.41	22.66	27.03	31.53	36.24	41.07	46.01	51.70	6 / 1			
reaction time	0.202	interval		4.07	4.14	4.00	4.25	4.37	4.50	4.71	4.83	4.94	5.69		12.04	13.12	14.48
		velocity	7.06	8.60	8.82	8.75	8.24	8.01	7.78	7.43	7.25	7.09	7.03	7.74	8.72	8.00	7.25
H1 lead leg	L	strides	22	14	14	14	14	14	14	15	15	15	18.5	169.5			
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 - 2023 Prefontaine Classic (Eugene, OR)																	
date	17-Sep	time	6.25	10.32	14.46	18.63	22.96	27.45	32.03	36.74	41.54	46.44	51.98	6 / 1			
reaction time	0.158	interval		4.07	4.14	4.17	4.33	4.49	4.58	4.71	4.80	4.90	5.54		12.38	13.40	14.41
		velocity	7.20	8.60	8.45	8.39	8.08	7.80	7.64	7.43	7.29	7.14	7.22	7.70	8.48	7.84	7.29
H1 lead leg	L	strides	22	14	14	14	14	14	14	15	15	15	18.2	169.2			
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 - 2023 Memorial van Damme (Brussels, BEL)																	
date	8-Sep	time	6.27	10.23	14.33	18.52	22.83	27.32	32.00	36.77	41.61	46.55	52.11	5 / 1			
reaction time	0.203	interval		3.96	4.10	4.19	4.31	4.49	4.68	4.77	4.84	4.94	5.56		12.25	13.48	14.55
		velocity	7.18	8.84	8.54	8.35	8.12	7.80	7.48	7.34	7.23	7.09	7.19	7.68	8.57	7.79	7.22
H1 lead leg	L	strides		14	14	14	14	14	14	15	15	15	18.2	147.2			
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 - 2023 Bislett Games (Oslo, NOR)																	
date	15-Jun	time	6.29	10.36	14.52	18.74	23.05	27.48	32.11	36.92	41.78	46.69	52.30	5 / 1			
reaction time	0.172	interval		4.07	4.16	4.22	4.31	4.43	4.63	4.81	4.86	4.91	5.61		12.45	13.37	14.58
		velocity	7.15	8.60	8.41	8.29	8.12	7.90	7.56	7.28	7.20	7.13	7.13	7.65	8.43	7.85	7.20
H1 lead leg	L	strides	22	14	14	14	14	14	14	15	15	15	18.5	169.5			
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 - 2023 Golden Gala Pietro Mennea (Firenze, ITA)																	
date	2-Jun	time	6.27	10.35	14.48	18.63	22.90	27.28	31.96	36.76	41.63	46.64	52.43	6 / 1			
reaction time	0.170	interval		4.08	4.13	4.15	4.27	4.38	4.68	4.80	4.87	5.01	5.79		12.36	13.33	14.68
		velocity	7.18	8.58	8.47	8.43	8.20	7.99	7.48	7.29	7.19	6.99	6.91	7.63	8.50	7.88	7.15
H1 lead leg	L	strides	22	14	14	14	14	14	14	15	15	15	19	170			
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 - 2023 Athletissima (Lausanne, SUI)																	
date	30-Jun	time	6.14	10.09	14.11	18.16	22.38	26.76	31.43	36.35	41.36	46.61	52.76	5 / 1			
reaction time	0.169	interval		3.95	4.02	4.05	4.22	4.38	4.67	4.92	5.01	5.25	6.15		12.02	13.27	15.18
		velocity	7.33	8.86	8.71	8.64	8.29	7.99	7.49	7.11	6.99	6.67	6.50	7.58	8.74	7.91	6.92
H1 lead leg	L	strides	22	14	14	14	14	14	14	15	15	15	19.7	170.7			
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 - 2023 Galà Dei Castelli (Bellinzona, ITA) (TV Analysis)																	
date	4-Sep	time	6.36	10.52	14.68	18.92	23.28	27.80	32.48	37.32	42.28	47.28	52.79	4 / 1			
reaction time		interval		4.16	4.16	4.24	4.36	4.52	4.68	4.84	4.96	5.00	5.51		12.56	13.56	14.80
		velocity	7.08	8.41	8.41	8.25	8.03	7.74	7.48	7.23	7.06	7.00	7.26	7.58	8.36	7.74	7.09
H1 lead leg	L	strides	22	14	14	14	14	14	14	15	15	15	18.2	169.2			
Little, Shamier (USA) (1995)		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 World Athletics Championships (Budapest, HUN) (TV Analysis)																	
date	24-Aug	time	6.24	10.41	14.58	18.68	23.02	27.46	31.96	36.64	41.54	46.81	52.80	5 / 2			
reaction time	0.181	interval		4.17	4.17	4.10	4.34	4.44	4.50	4.68	4.90	5.27	5.99		12.44	13.28	14.85
		velocity	7.21	8.39	8.39	8.54	8.06	7.88	7.78	7.48	7.14	6.64	6.68	7.58	8.44	7.91	7.07
H1 lead leg	R	strides	23	15	15	15	15	15	15	15	15	16	20	164			
Little, Shamier (USA) (1995)		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
Semi-Final 3 - 2023 World Athletics Championships (Budapest, HUN) (TV Analysis)																	
date	22-Aug	time	6.17	10.14	14.28	18.52	22.92	27.42	32.03	36.80	41.86	46.95	52.81	8 / 1			
reaction time	0.212	interval		3.97	4.14	4.24	4.40	4.50	4.61	4.77	5.06	5.09	5.86		12.35	13.51	14.92
		velocity	7.29	8.82	8.45	8.25	7.95	7.78	7.59	7.34	6.92	6.88	6.83	7.57	8.50	7.77	7.04
H1 lead leg	R	strides	23	15	15	15	15	15	15	15	16	16	19.2	179.2			
Clayton, Rushell (JAM) (1992)		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 World Athletics Championships (Budapest, HUN) (TV Analysis)																	
date	24-Aug	time	6.31	10.39	14.42	18.36	22.59	27.06	31.63	36.43	41.47	46.68	52.81	8 / 3			
reaction time	0.147	interval		4.08	4.03	3.94	4.23	4.47	4.57	4.80	5.04	5.21	6.13	PB	12.05	13.27	15.05
		velocity	7.13	8.58	8.68	8.88	8.27	7.83	7.66	7.29	6.94	6.72	6.53	7.57	8.71	7.91	6.98
H1 lead leg	L	strides	22	14	14	14	14	15	15	15	16	16	20	175			
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
Semi-Final 2 - 2023 World Athletics Championships (Budapest, HUN) (TV Analysis)																	
date	22-Aug	time	6.31	10.44	14.45	18.45	22.75	27.20	31.79	36.57	41.60	46.71	52.95	8 / 1			
reaction time	0.199	interval		4.13	4.01	4.00	4.30	4.45	4.59	4.78	5.03	5.11	6.24		12.14	13.34	14.92
		velocity	7.13	8.47	8.73	8.75	8.14	7.87	7.63	7.32	6.96	6.85	6.41	7.55	8.65	7.87	7.04
H1 lead leg	L	strides	22	14	14	14	14	14	14	15	15	15	18.5	169.5			
Adekoya, Kemi (BRN) (1993)		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2023 World Athletics Championships (Budapest, HUN) (TV Analysis)																	
date	24-Aug	time	6.34	10.41	14.48	18.55	22.82	27.23	31.73	36.64	41.74	47.18	53.09	7 / 4			
reaction time	0.207	interval		4.07	4.07	4.07	4.27	4.41	4.50	4.91	5.10	5.44	5.91	AR	12.21	13.18	15.45
		velocity	7.10	8.60	8.60	8.60	8.20	7.94	7.78	7.13	6.86	6.43	6.77	7.53	8.60	7.97	6.80
H1 lead leg	R	strides	23	15	15	15	15	15	15	16	16	17	20	182			
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 - 2023 IFAM Oordegem (Oordegem, BEL) (TV Analysis)																	
date	27-May	time	6.40	10.53	14.73	19.03	23.40	27.96	32.67	37.43		47.63	53.12	6 / 1			
reaction time		interval		4.13	4.20	4.30	4.37	4.56	4.71	4.76		10.20	5.49		12.63	13.64	14.96
		velocity	7.03	8.47	8.33	8.14	8.01	7.68	7.43	7.35		6.86	7.29	7.53	8.31	7.70	7.02
H1 lead leg	L	strides	22	14	14	14	14	14	14	15		16	19	156			

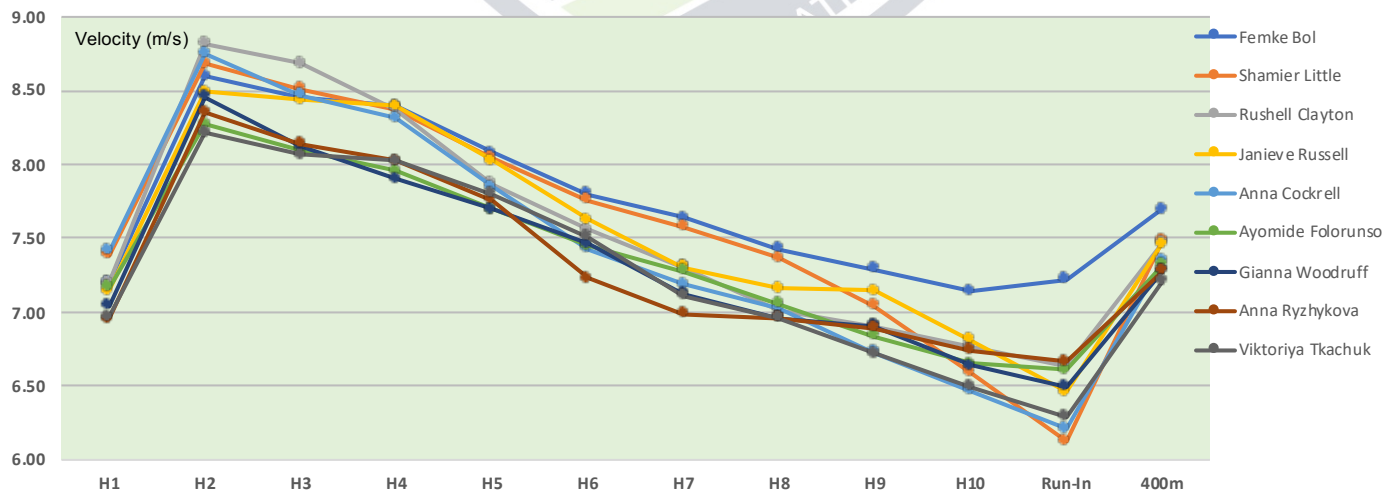
2023 Prefontaine Classic (Eugene, OR)

Women's 400m Hurdles

Date 2023.09.17

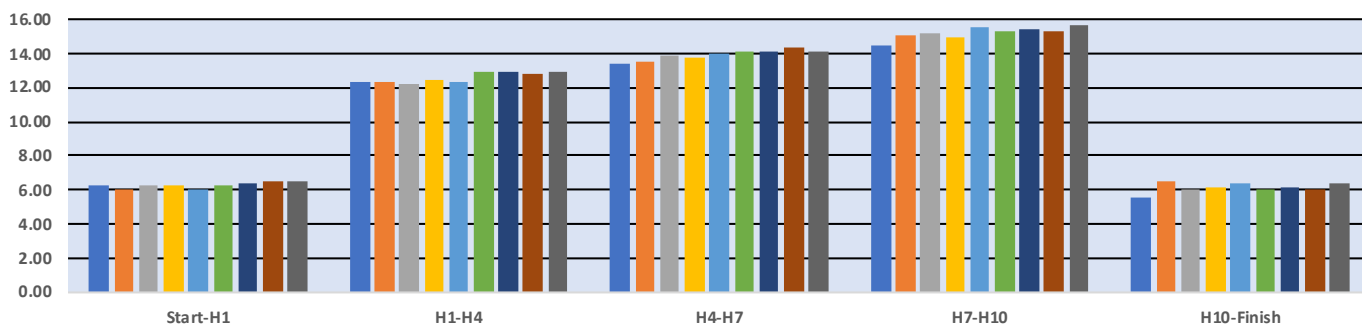
FINAL

			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		6.25	10.32	14.46	18.63	22.96	27.45	32.03	36.74	41.54	46.44		51.98	6 / 1			
	reaction time	0.158														12.38	13.40	14.41
	interval velocity		7.20	8.60	8.45	8.39	8.08	7.80	7.64	7.43	7.29	7.14	7.22	7.70		8.48	7.84	7.29
	H1 lead leg	L	22	14	14	14	14	14	14	15	15	15	18.2	169.2				
Little, Shamier (USA) (1995)	time		6.09	10.12	14.23	18.41	22.76	27.27	31.89	36.64	41.61	46.92		53.45	5 / 2			
	reaction time	0.169														12.32	13.48	15.03
	interval velocity		7.39	8.68	8.52	8.37	8.05	7.76	7.58	7.37	7.04	6.59	6.13	7.48		8.52	7.79	6.99
	H1 lead leg	R	23	15	15	14	14	15	15	15	16	16	20	178				
Clayton, Rushell (JAM) (1992)	time		6.25	10.22	14.25	18.43	22.88	27.51	32.30	37.29	42.36	47.53		53.56	7 / 3			
	reaction time	0.138														12.18	13.87	15.23
	interval velocity		7.20	8.82	8.68	8.37	7.87	7.56	7.31	7.01	6.90	6.77	6.63	7.47		8.62	7.57	6.89
	H1 lead leg	L	22	14	14	14	14	15	16	16	16	16	19	176				
Russell, Janieve (JAM) (1993)	time		6.30	10.42	14.57	18.74	23.10	27.69	32.48	37.37	42.27	47.41		53.60	3 / 4			
	reaction time	0.140														12.44	13.74	14.93
	interval velocity		7.14	8.50	8.43	8.39	8.03	7.63	7.31	7.16	7.14	6.81	6.46	7.46		8.44	7.64	7.03
	H1 lead leg	R	23	15			15	15	16	16	16	16	20	152				
Cockrell, Anna (USA) (1997)	time		6.07	10.07	14.20	18.41	22.87	27.58	32.45	37.43	42.63	48.04		54.48	4 / 5			
	reaction time	0.139														12.34	14.04	15.59
	interval velocity		7.41	8.75	8.47	8.31	7.85	7.43	7.19	7.03	6.73	6.47	6.21	7.34		8.51	7.48	6.74
	H1 lead leg	R	22	14			14	15	15	15	15	16		126				
Folorunso, Ayomide (ITA) (1996)	time		6.28	10.51	14.83	19.23	23.78	28.48	33.29	38.25	43.37	48.63		54.68	8 / 6			
	reaction time	0.182														12.95	14.06	15.34
	interval velocity		7.17	8.27	8.10	7.95	7.69	7.45	7.28	7.06	6.84	6.65	6.61	7.32		8.11	7.47	6.84
	H1 lead leg	L	23	15	15	15	16	16	16	16				132				
Woodruff, Gianna (PAN) (1993)	time		6.39	10.53	14.84	19.27	23.82	28.51	33.42	38.45	43.52	48.79		54.95	2 / 7			
	reaction time	0.192														12.88	14.15	15.37
	interval velocity		7.04	8.45	8.12	7.90	7.69	7.46	7.13	6.96	6.90	6.64	6.49	7.28		8.15	7.42	6.83
	H1 lead leg	L	22	14			15	15	15			17		98				
Ryzhykova, Anna (UKR) (1989)	time		6.47	10.66	14.96	19.32	23.83	28.67	33.68	38.71	43.79	48.98		54.98	1 / 8			
	reaction time	0.166														12.85	14.36	15.30
	interval velocity		6.96	8.35	8.14	8.03	7.76	7.23	6.99	6.96	6.89	6.74	6.67	7.28		8.17	7.31	6.86
	H1 lead leg	R	22	14			14	15	15			15		95				
Tkachuk, Viktoriya (UKR) (1994)	time		6.46	10.72	15.06	19.42	23.91	28.57	33.49	38.52	43.73	49.12		55.48	9 / 9			
	reaction time	0.218														12.96	14.07	15.63
	interval velocity		6.97	8.22	8.06	8.03	7.80	7.51	7.11	6.96	6.72	6.49	6.29	7.21		8.10	7.46	6.72
	H1 lead leg	L	22	15	15	15	15	15	16	16				129				



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Sun 17 Sep 2023 13:09) - diamond league race analysis

<https://www.omegatiming.com/File/0002031001010C0101FFFFFFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=IE2uq3jMAaU>

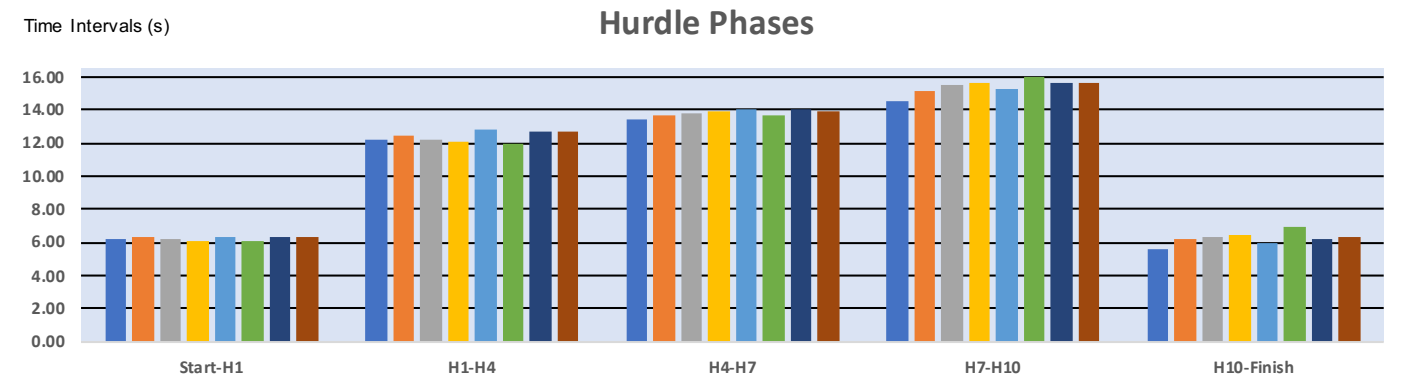
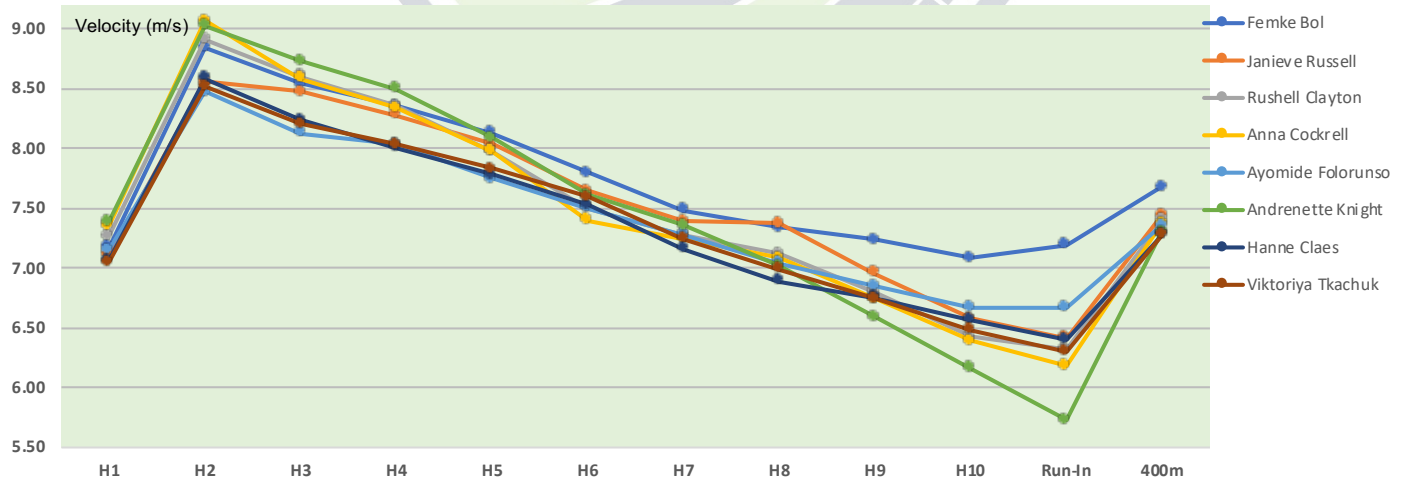
2023 Memorial van Damme (Brussels, BEL)

Women's 400m Hurdles

Date 2023.09.08

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		6.27	10.23	14.33	18.52	22.83	27.32	32.00	36.77	41.61	46.55		52.11	5 / 1			
	reaction time	0.203														12.25	13.48	14.55
	interval		7.18	3.96	4.10	4.19	4.31	4.49	4.68	4.77	4.84	4.94	5.56			8.57	7.79	7.22
	velocity																	
Russell, Janieve (JAM) (1993)	time		6.33	10.42	14.55	18.78	23.14	27.72	32.46	37.21	42.24	47.56		53.80	7 / 2			
	reaction time	0.153														12.45	13.68	15.10
	interval		7.11	4.09	4.13	4.23	4.36	4.58	4.74	4.75	5.03	5.32	6.24			8.43	7.68	6.95
	velocity																	
Clayton, Rushell (JAM) (1992)	time		6.19	10.12	14.19	18.38	22.77	27.44	32.25	37.17	42.32	47.77		54.10	6 / 3			
	reaction time	0.141														12.19	13.87	15.52
	interval		7.27	3.93	4.07	4.19	4.39	4.67	4.81	4.92	5.15	5.45	6.33			8.61	7.57	6.77
	velocity																	
Cockrell, Anna (USA) (1997)	time		6.12	9.98	14.06	18.26	22.65	27.38	32.21	37.15	42.34	47.82		54.29	2 / 4			
	reaction time	0.218														12.14	13.95	15.61
	interval		7.35	3.86	4.08	4.20	4.33	4.73	4.83	4.94	5.19	5.48	6.47			8.65	7.53	6.73
	velocity																	
Folorunso, Ayomide (ITA) (1996)	time		6.29	10.42	14.73	19.09	23.61	28.28	33.09	38.06	43.17	48.42		54.42	8 / 5			
	reaction time	0.213														12.80	14.00	15.33
	interval		7.15	4.13	4.31	4.12	4.33	4.67	4.81	4.97	5.11	5.25	6.00			8.20	7.50	6.85
	velocity																	
Knight, Andrenette (JAM) (1996)	time		6.09	9.97	13.98	18.10	22.43	27.03	31.79	36.78	42.09	47.77		54.75	3 / 6			
	reaction time	0.153														12.01	13.69	15.98
	interval		7.39	3.88	4.01	4.12	4.33	4.60	4.76	4.99	5.31	5.68	6.98			8.74	7.67	6.57
	velocity																	
Claes, Hanne (BEL) (1991)	time		6.37	10.45	14.70	19.07	23.57	28.22	33.11	38.19	43.37	48.70		54.95	4 / 7			
	reaction time	0.205														12.70	14.04	15.59
	interval		7.06	4.08	4.25	4.37	4.50	4.65	4.89	5.08	5.18	5.33	6.25			8.27	7.48	6.74
	velocity																	
Tkachuk, Viktoriya (UKR) (1994)	time		6.38	10.49	14.76	19.12	23.59	28.20	33.03	38.04	43.23	48.63		54.98	1 / 8			
	reaction time	0.217														12.74	13.91	15.60
	interval		7.05	4.11	4.27	4.36	4.47	4.61	4.83	5.01	5.19	5.40	6.35			8.24	7.55	6.73
	velocity																	
	time																	
	reaction time																	
	interval																	
	velocity																	



Source: Omega Timing (Fri 8 Sep 2023 20:53) - diamond league race analysis
<https://www.omegatiming.com/File/0002030E0101100101FFFFFFFFFFFF4D.pdf>
Video: <https://www.youtube.com/watch?v=2rc5vOA4lhl>

2023 Galà Dei Castelli (Bellinzona, ITA) (TV Analysis)

Women's 400m Hurdles

Date 2023.09.04

FINAL

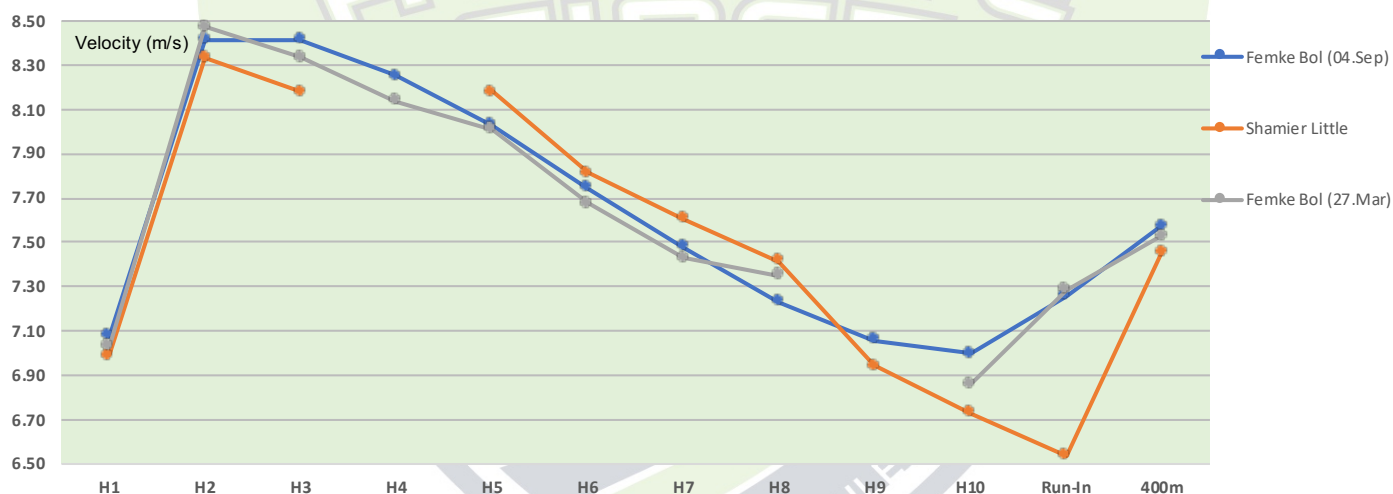
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Bol, Femke (NED) (2000)	time	6.36	10.52	14.68	18.92	23.28	27.80	32.48	37.32	42.28	47.28		52.79	4 / 1			
	reaction time																
	interval		4.16	4.16	4.24	4.36	4.52	4.68	4.84	4.96	5.00	5.51			12.56	13.56	14.80
	velocity	7.08	8.41	8.41	8.25	8.03	7.74	7.48	7.23	7.06	7.00	7.26	7.58		8.36	7.74	7.09
	H1 lead leg	L	22	14	14	14	14	14	15	15	15	18.2	169.2				
Little, Shamier (USA) (1995)	time	6.44	10.64	14.92		23.48	27.96	32.56	37.28	42.32	47.52		53.64	5 / 2			
	reaction time																
	interval		4.20	4.28		8.56	4.48	4.60	4.72	5.04	5.20	6.12					14.96
	velocity	6.99	8.33	8.18		8.18	7.81	7.61	7.42	6.94	6.73	6.54	7.46				7.02
	H1 lead leg	R	23	15	15		15	15	15	16	16	20	150				

2023 IFAM Oordegem (Oordegem, BEL) (TV Analysis)

Date 2023.05.27

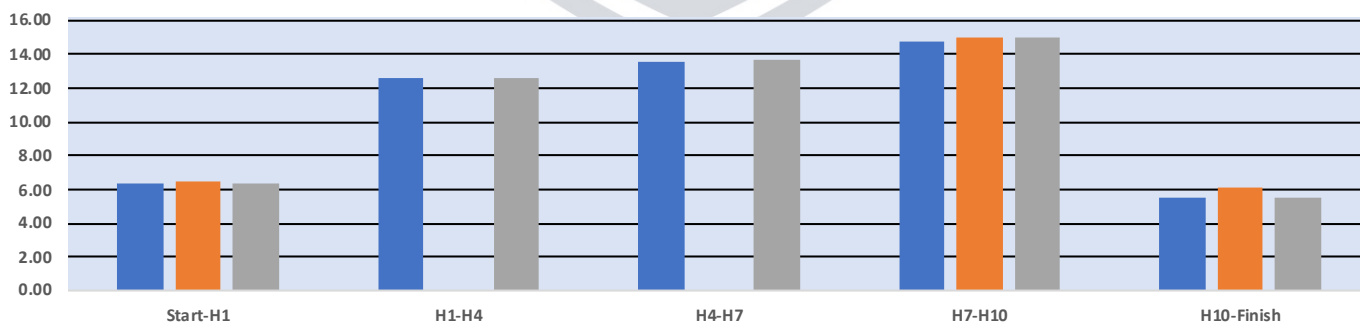
FINAL

		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	10.53	14.73	19.03	23.40	27.96	32.67	37.43		47.63		53.12	6 / 1			
	reaction time																
	interval		4.13	4.20	4.30	4.37	4.56	4.71	4.76		10.20	5.49			12.63	13.64	14.96
	velocity	7.03	8.47	8.33	8.14	8.01	7.68	7.43	7.35		6.86	7.29	7.53		8.31	7.70	7.02
	H1 lead leg	L	22	14	14	14	14	14	15		16	19	156				



Time Intervals (s)

Hurdle Phases



Galà Dei Castelli

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 30fps

Timing From: First Movement

Source: https://www.youtube.com/watch?v=HJ_Inh7Sg2B8

IFAM Oordegem

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=TIVzHU0zaCs>

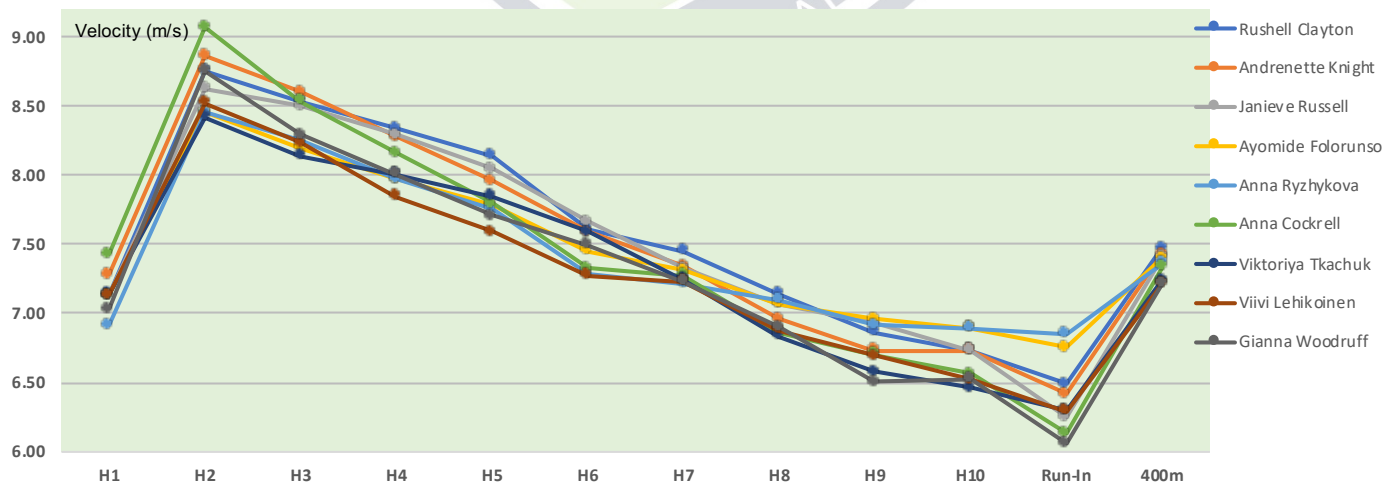
2023 Xiamen Diamond League (Xiamen, CHN)

Women's 400m Hurdles

Date 2023.09.02

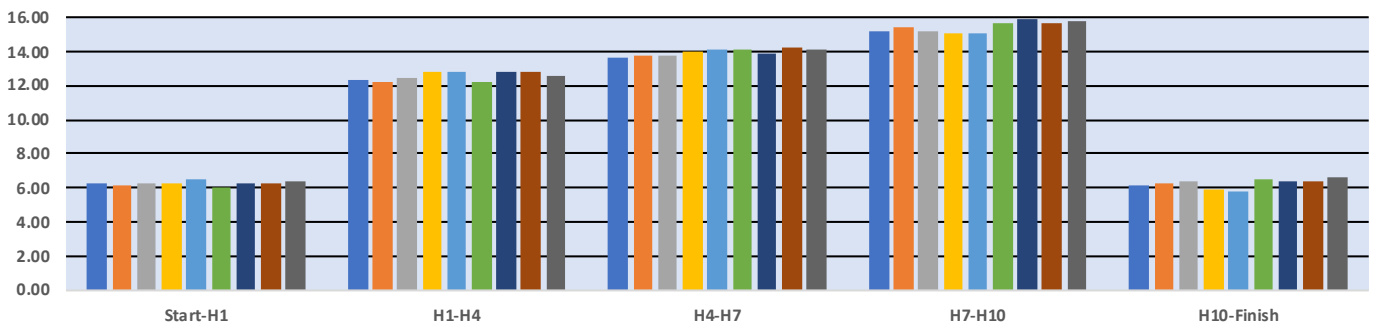
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Clayton, Rushell (JAM) (1992)	time		6.30	10.30	14.40	18.60	22.90	27.50	32.20	37.10	42.20	47.40		53.56	5 / 1			
	reaction time	0.138														12.30	13.60	15.20
	interval		7.14	8.75	8.54	8.20	4.30	4.60	4.70	4.90	5.10	5.20	6.16			8.54	7.72	6.91
	velocity																	
Knight, Andrenette (JAM) (1996)	time		6.18	10.13	14.20	18.43	22.83	27.44	32.21	37.24	42.44	47.64		53.87	7 / 2			
	reaction time	0.162														12.25	13.78	15.43
	interval		7.28	8.86	8.60	8.27	7.95	7.59	7.34	6.96	6.73	6.73	6.42	7.43		8.57	7.62	6.80
	velocity																	
Russell, Janieve (JAM) (1993)	time		6.31	10.37	14.49	18.71	23.06	27.63	32.41	37.36	42.41	47.61		54.01	6 / 3			
	reaction time	0.173														12.40	13.70	15.20
	interval		7.13	8.62	8.50	8.29	8.05	7.66	7.32	7.07	6.93	6.73	6.25	7.41		8.47	7.66	6.91
	velocity																	
Folorunso, Ayomide (ITA) (1996)	time		6.31	10.45	14.72	19.11	23.61	28.31	33.10	38.05	43.08	48.16		54.08	3 / 4			
	reaction time	0.185														12.80	13.99	15.06
	interval		7.13	8.45	8.20	7.97	7.78	7.45	7.31	7.07	6.96	6.89	6.76	7.40		8.20	7.51	6.97
	velocity																	
Ryzhykova, Anna (UKR) (1989)	time		6.51	10.65	14.89	19.28	23.79	28.59	33.44	38.37	43.43	48.51		54.35	1 / 5			
	reaction time	0.157														12.77	14.16	15.07
	interval		6.91	8.45	8.25	7.97	7.76	7.29	7.22	7.10	6.92	6.89	6.85	7.36		8.22	7.42	6.97
	velocity																	
Cockrell, Anna (USA) (1997)	time		6.06	9.92	14.02	18.31	22.80	27.58	32.39	37.49	42.71	48.04		54.56	4 / 6			
	reaction time	0.182														12.25	14.08	15.65
	interval		7.43	9.07	8.54	8.16	7.80	7.32	7.28	6.86	6.70	6.57	6.13	7.33		8.57	7.46	6.71
	velocity																	
Tkachuk, Viktoriya (UKR) (1994)	time		6.31	10.47	14.77	19.14	23.60	28.21	33.04	38.16	43.48	48.90		55.25	8 / 7			
	reaction time	0.201														12.83	13.90	15.86
	interval		7.13	8.41	8.14	8.01	7.85	7.59	7.25	6.84	6.58	6.46	6.30	7.24		8.18	7.55	6.62
	velocity																	
Lehikoinen, Viivi (FIN) (1999)	time		6.31	10.42	14.67	19.13	23.74	28.55	33.39	38.48	43.71	49.08		55.44	2 / 8			
	reaction time	0.215														12.82	14.26	15.69
	interval		7.13	8.52	8.24	7.85	7.59	7.28	7.23	6.88	6.69	6.52	6.29	7.22		8.19	7.36	6.69
	velocity																	
Woodruff, Gianna (PAN) (1993)	time		6.40	10.40	14.62	18.99	23.53	28.20	33.04	38.11	43.49	48.85		55.45	9 / 9			
	reaction time	0.219														12.59	14.05	15.81
	interval		7.03	8.75	8.29	8.01	7.71	7.49	7.23	6.90	6.51	6.53	6.06	7.21		8.34	7.47	6.64
	velocity																	



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Sat 2 Sep 2023 20:32) - diamond league race analysis

<https://www.omegatiming.com/File/0002031101010C0101FFFFFFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=uvCey9Wu7zc>

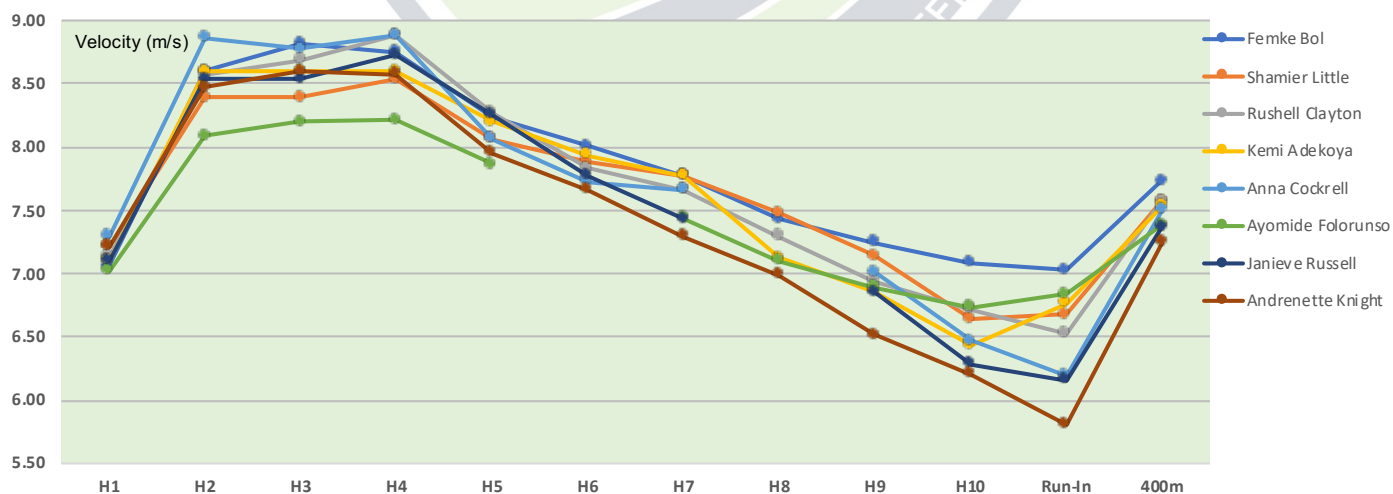
2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

Women's 400m Hurdles

Date 2023.08.24

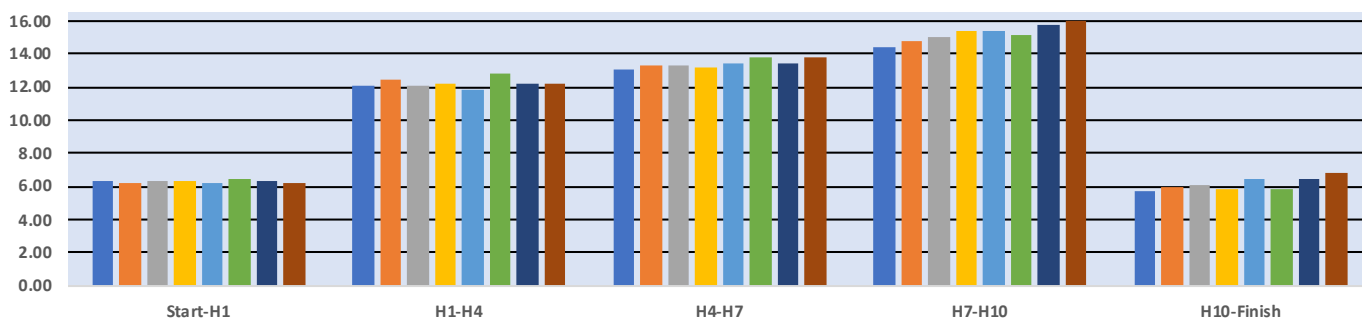
FINAL

			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		6.37	10.44	14.41	18.41	22.66	27.03	31.53	36.24	41.07	46.01		51.70	6 / 1			
	reaction time	0.202														12.04	13.12	14.48
	interval velocity		7.06	4.07	3.97	4.00	4.25	4.37	4.50	4.71	4.83	4.94	5.69			8.72	8.00	7.25
	H1 lead leg	L																
Little, Shamier (USA) (1995)	time		6.24	10.41	14.58	18.68	23.02	27.46	31.96	36.64	41.54	46.81		52.80	5 / 2			
	reaction time	0.181														12.44	13.28	14.85
	interval velocity		7.21	4.17	4.17	4.10	4.34	4.44	4.50	4.68	4.90	5.27	5.99			8.44	7.91	7.07
	H1 lead leg	R																
Clayton, Rushell (JAM) (1992)	time		6.31	10.39	14.42	18.36	22.59	27.06	31.63	36.43	41.47	46.68		52.81	8 / 3			
	reaction time	0.147														12.05	13.27	15.05
	interval velocity		7.13	4.08	4.03	3.94	4.23	4.47	4.57	4.80	5.04	5.21	6.13	PB		8.71	7.91	6.98
	H1 lead leg	L																
Adekoya, Kemi (BRN) (1993)	time		6.34	10.41	14.48	18.55	22.82	27.23	31.73	36.64	41.74	47.18		53.09	7 / 4			
	reaction time	0.207														12.21	13.18	15.45
	interval velocity		7.10	4.07	4.07	4.07	4.27	4.41	4.50	4.91	5.10	5.44	5.91	AR		8.60	7.97	6.80
	H1 lead leg	R																
Cockrell, Anna (USA) (1997)	time		6.17	10.12	14.11	18.05	22.39	26.92	31.49		41.47	46.88		53.34	9 / 5			
	reaction time	0.189														11.88	13.44	15.39
	interval velocity		7.29	4.33	3.99	3.94	4.34	4.53	4.57		9.98	5.41	6.46	PB		8.84	7.81	6.82
	H1 lead leg	R																
Folorunso, Ayomide (ITA) (1996)	time		6.41	10.74	15.01	19.27	23.72		33.13	38.06	43.14	48.34		54.19	2 / 6			
	reaction time	0.192														12.86	13.86	15.21
	interval velocity		7.02	4.33	4.27	4.26	4.45		9.41	4.93	5.08	5.20	5.85			8.16	7.58	6.90
	H1 lead leg	L																
Russell, Janieve (JAM) (1993)	time		6.34	10.44	14.54	18.55	22.79	27.29	32.00		42.21	47.78		54.28	3 / 7			
	reaction time	0.152														12.21	13.45	15.78
	interval velocity		7.10	4.10	4.10	4.01	4.24	4.50	4.71		10.21	5.57	6.50			8.60	7.81	6.65
	H1 lead leg	R																
Knight, Andrenette (JAM) (1996)	time		6.24	10.37	14.44	18.52	22.92	27.49	32.29	37.30	42.67	48.31		55.20	4 / 8			
	reaction time	0.158														12.28	13.77	16.02
	interval velocity		7.21	4.13	4.07	4.08	4.40	4.57	4.80	5.01	5.37	5.64	6.89			8.55	7.63	6.55
	H1 lead leg	R																



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=0DLYOvNtIU&t=26s>

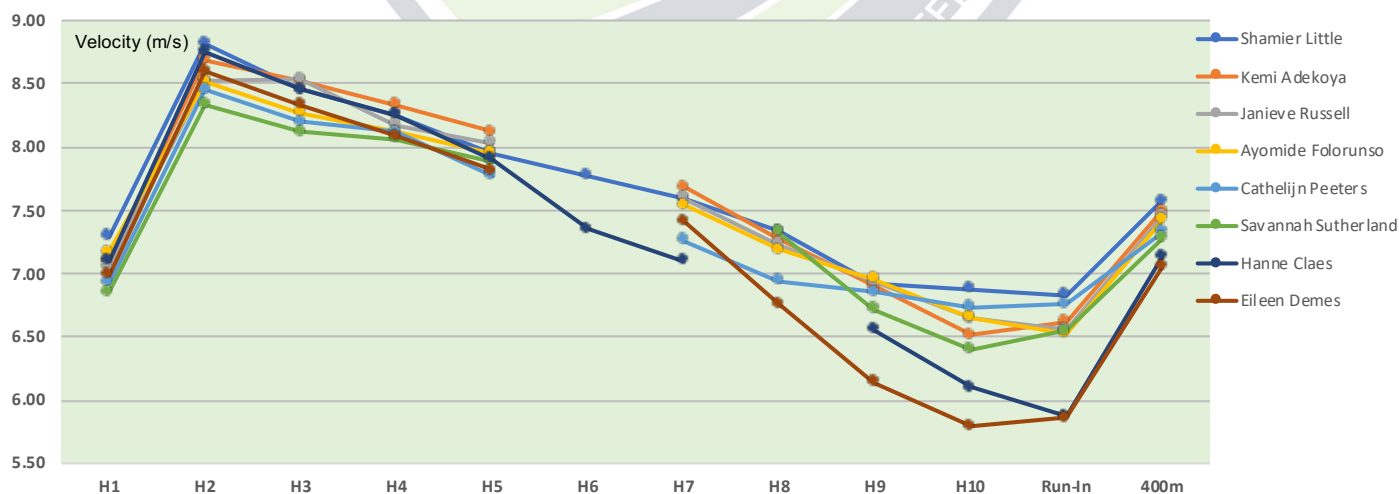
2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

Women's 400m Hurdles

Date 2023.08.22

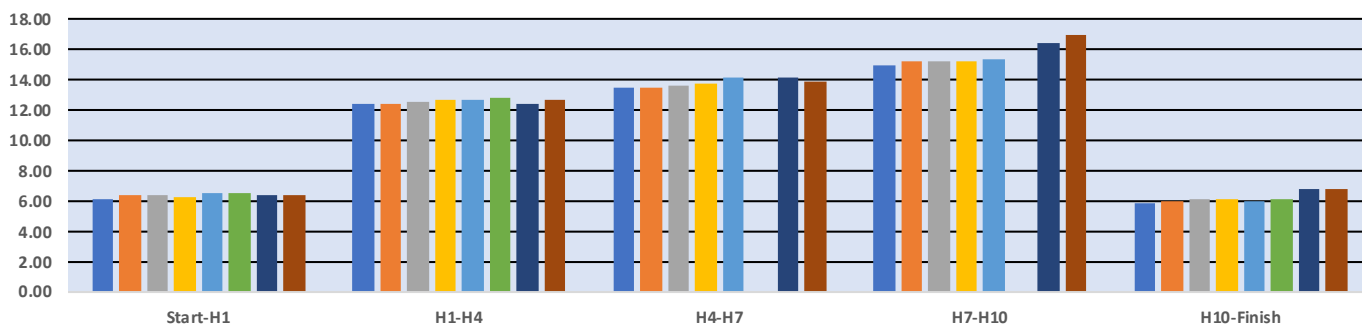
Semi-Final 3

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Little, Shamier (USA) (1995)	time		6.17	10.14	14.28	18.52	22.92	27.42	32.03	36.80	41.86	46.95		52.81	8 / 1			
	reaction time	0.212														12.35	13.51	14.92
	interval		7.29	3.97	4.14	4.24	4.40	4.50	4.61	4.77	5.06	5.09	5.86			8.50	7.77	7.04
	velocity		7.29	8.82	8.45	8.25	7.95	7.78	7.59	7.34	6.92	6.88	6.83	7.57				
Adekoya, Kemi (BRN) (1993)	time		6.34	10.37	14.48	18.68	22.99		32.10	36.91	41.98	47.35		53.39	6 / 2			
	reaction time	0.195														12.34	13.42	15.25
	interval		7.10	4.03	4.11	4.20	4.31		9.11	4.81	5.07	5.37	6.04	AR		8.51	7.82	6.89
	velocity		7.10	8.68	8.52	8.33	8.12		7.68	7.28	6.90	6.52	6.62	7.49				
Russell, Janieve (JAM) (1993)	time		6.37	10.48	14.58	18.86	23.22		32.43	37.27	42.32	47.59		53.69	7 / 3			
	reaction time	0.180														12.49	13.57	15.16
	interval		7.06	4.11	4.10	4.28	4.36		9.21	4.84	5.05	5.27	6.10			8.41	7.74	6.93
	velocity		7.06	8.52	8.54	8.18	8.03		7.60	7.23	6.93	6.64	6.56	7.45				
Folorunso, Ayomide (ITA) (1996)	time		6.27	10.38	14.61	18.92	23.32		32.60	37.47	42.50	47.76		53.89	5 / 4			
	reaction time	0.190														12.65	13.68	15.16
	interval		7.18	4.11	4.23	4.31	4.40		9.28	4.87	5.03	5.26	6.13	NR		8.30	7.68	6.93
	velocity		7.18	8.52	8.27	8.12	7.95		7.54	7.19	6.96	6.65	6.53	7.42				
Peeters, Cathelijn (NED) (1996)	time		6.50	10.64	14.91	19.22	23.72		33.36	38.40	43.51	48.71		54.63	4 / 5			
	reaction time	0.248														12.72	14.14	15.35
	interval		6.92	4.14	4.27	4.31	4.44		9.64	5.04	5.11	5.20	5.92			8.25	7.43	6.84
	velocity		6.92	8.45	8.20	8.12	7.78		7.26	6.94	6.85	6.73	6.76	7.32				
Sutherland, Savannah (CAN) (2003)	time		6.57	10.77	15.08	19.42	23.86		33.36	38.40	43.51	48.71		54.63	2 / 6			
	reaction time	0.214														12.85		
	interval		6.85	4.20	4.31	4.34	4.44		9.64	5.21	5.47	5.61	6.11			8.17		
	velocity		6.85	8.33	8.12	8.06	7.88		7.32	6.72	6.40	6.55	7.27					
Claes, Hanne (BEL) (1991)	time		6.34	10.34	14.48	18.72	23.15	27.91	32.84		43.51	49.25		56.06	9 / 7			
	reaction time	0.208														12.38	14.12	16.41
	interval		7.10	4.00	4.14	4.24	4.43	4.76	4.93		10.67	5.74	6.81			8.48	7.44	6.40
	velocity		7.10	8.75	8.45	8.25	7.90	7.35	7.10		6.56	6.10	5.87	7.14				
Demes, Eileen (GER) (1997)	time		6.44	10.51	14.71	19.04	23.52		32.96	38.14	43.84	49.88		56.71	3 / 8			
	reaction time	0.166														12.60	13.92	16.92
	interval		6.99	4.07	4.20	4.33	4.48		9.44	5.18	5.70	6.04	6.83			8.33	7.54	6.21
	velocity		6.99	8.60	8.33	8.08	7.81		7.42	6.76	6.14	5.79	5.86	7.05				
	H1 lead leg	R	22	15	15	15	15	16	16	16	16	17	20	148				



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=r0F4xRAp0A>

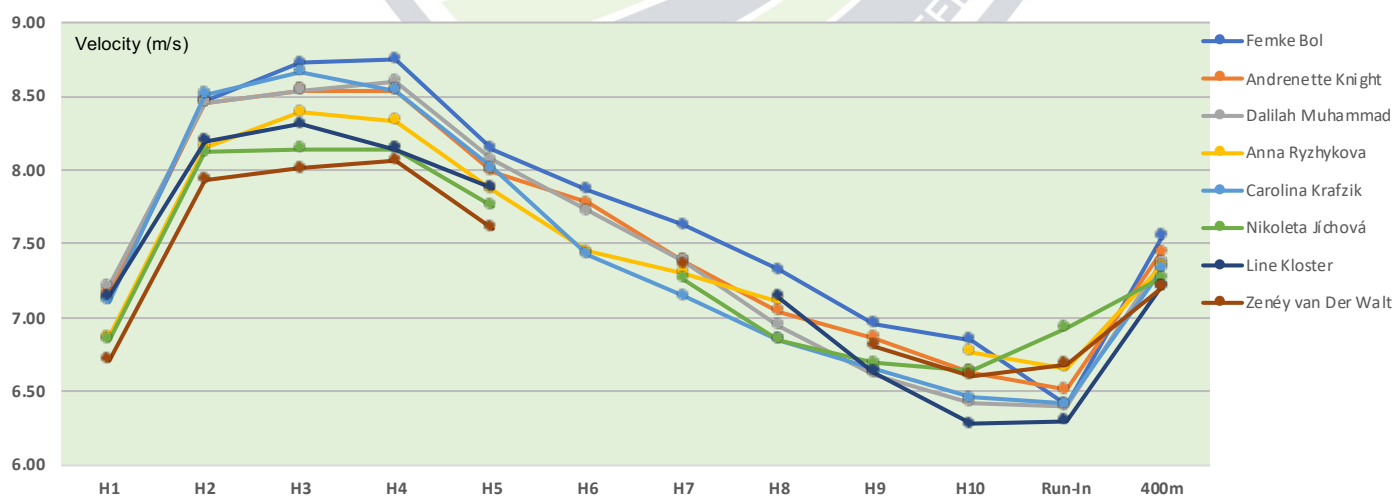
2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

Women's 400m Hurdles

Date 2023.08.22

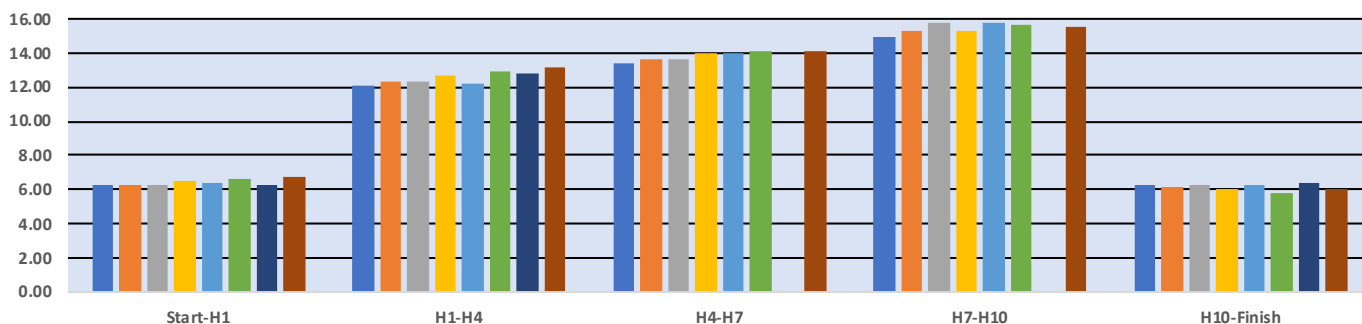
Semi-Final 2

			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		6.31	10.44	14.45	18.45	22.75	27.20	31.79	36.57	41.60	46.71		52.95	8 / 1			
	reaction time	0.199																
	interval		7.13	4.13	4.01	4.00	4.30	4.45	4.59	4.78	5.03	5.11	6.24			12.14	13.34	14.92
	velocity		7.13	8.47	8.73	8.75	8.14	7.87	7.63	7.32	6.96	6.85	6.41	7.55		8.65	7.87	7.04
	H1 lead leg	L	22	14	14	14	14	14	14	15	15	15	18.5	169.5				
Knight, Andrenette (JAM) (1996)	time		6.27	10.41	14.51	18.61	22.99	27.49	32.23	37.20	42.30	47.58		53.72	7 / 2			
	reaction time	0.163																
	interval		7.18	4.14	4.10	4.10	4.38	4.50	4.74	4.97	5.10	5.28	6.14			12.34	13.62	15.35
	velocity		7.18	8.45	8.54	8.54	7.99	7.78	7.38	7.04	6.86	6.63	6.51	7.45		8.51	7.71	6.84
	H1 lead leg	R	23	15	15	15	15	15	15	16	16	17	20	182				
Muhammad, Dalilah (USA) (1990)	time		6.24	10.38	14.48	18.55	22.89	27.42	32.16	37.20	42.49	47.94		54.19	6 / 3			
	reaction time	0.169																
	interval		7.21	4.14	4.10	4.07	4.34	4.53	4.74	5.04	5.29	5.45	6.25			12.31	13.61	15.78
	velocity		7.21	8.45	8.54	8.60	8.06	7.73	7.38	6.94	6.62	6.42	6.40	7.38		8.53	7.71	6.65
	H1 lead leg	R	22	14	14	15	15	15	15	15	16	16	19.7	176.7				
Ryzhykova, Anna (UKR) (1989)	time		6.55	10.84	15.01	19.21	23.66	28.36	33.15	38.07		48.41		54.42	9 / 4			
	reaction time	0.186																
	interval		4.29	4.17	4.20	4.45	4.70	4.79	4.92			10.34	6.01			12.66	13.94	15.26
	velocity		6.87	8.16	8.39	8.33	7.87	7.45	7.31	7.11		6.77	6.66	7.35		8.29	7.53	6.88
	H1 lead leg	R	22	14	14	14	14	15	15	15		15	19.2	157.2				
Krafzik, Carolina (GER) (1995)	time		6.33	10.44	14.48	18.58	22.95	27.66	32.56	37.67	42.93	48.35		54.58	5 / 5			
	reaction time	0.192																
	interval		4.11	4.04	4.10	4.37	4.71	4.90	5.11	5.26	5.42	6.23				12.25	13.98	15.79
	velocity		7.11	8.52	8.66	8.54	8.01	7.43	7.14	6.85	6.65	6.46	6.42	7.33		8.57	7.51	6.65
	H1 lead leg	L	23	15	15	15	15	17	17	17	17	17	21.7	189.7				
Jichová, Nikoleta (CZE) (2000)	time		6.57	10.88	15.18	19.48	23.99		33.63	38.74	43.97	49.24		55.01	4 / 6			
	reaction time	0.229																
	interval		4.31	4.30	4.30	4.51			9.64	5.11	5.23	5.27	5.77			12.91	14.15	15.61
	velocity		6.85	8.12	8.14	8.14	7.76		7.26	6.85	6.69	6.64	6.93	7.27		8.13	7.42	6.73
	H1 lead leg	R	22	15	15	15	15			16	16	16	20.7	150.7				
Kloster, Line (NOR) (1990)	time		6.30	10.57	14.78	19.08	23.52			38.23	43.51	49.08		55.43	2 / 7			
	reaction time	0.152																
	interval		4.27	4.21	4.30	4.44				14.71	5.28	5.57	6.35			12.78		
	velocity		7.14	8.20	8.31	8.14	7.88			7.14	6.63	6.28	6.30	7.22		8.22		
	H1 lead leg	R	22	14	14	15	15			16	16	17	20	149				
van Der Walt, Zenéy (RSA) (2000)	time		6.70	11.11	15.48	19.82	24.42		33.93		44.21	49.51		55.49	3 / 8			
	reaction time	0.212																
	interval		4.41	4.37	4.34	4.60			9.51		10.28	5.30	5.98			13.12	14.11	15.58
	velocity		6.72	7.94	8.01	8.06	7.61		7.36		6.81	6.60	6.69	7.21		8.00	7.44	6.74
	H1 lead leg	L	23	15	15	15	15			16		16	19.5	134.5				



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=XuWVBzvZ5ZA>

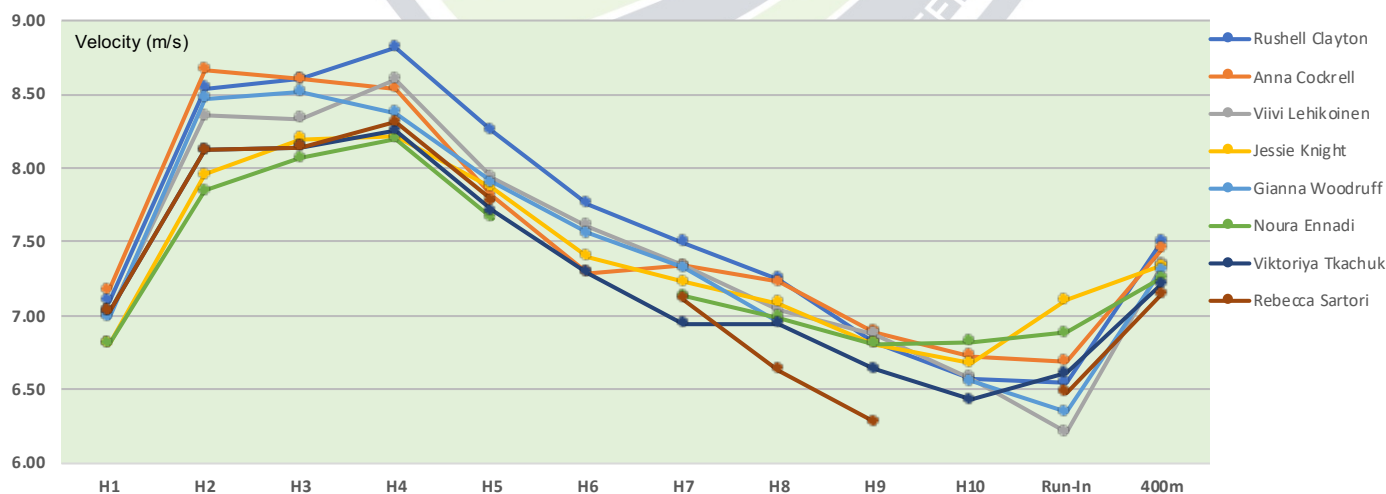
2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

Women's 400m Hurdles

Date 2023.08.22

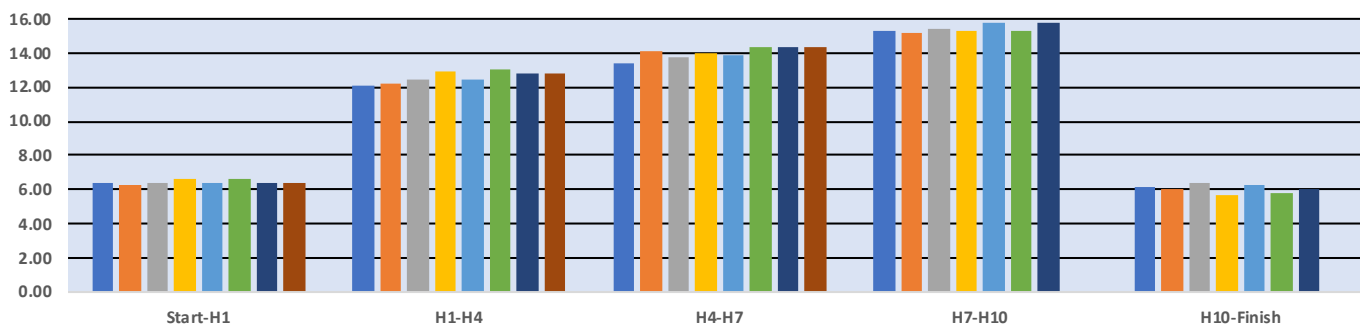
Semi-Final 1

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Clayton, Rushell (JAM) (1992)	time		6.34	10.44	14.51	18.48	22.72	27.23	31.90	36.73	41.86	47.19		53.30	5 / 1			
	reaction time	0.190																
	interval		7.10	4.10	4.07	3.97	4.24	4.51	4.67	4.83	5.13	5.33	6.11	PB		12.14	13.42	15.29
	velocity		7.10	8.54	8.60	8.82	8.25	7.76	7.49	7.25	6.82	6.57	6.55	7.50		8.65	7.82	6.87
Cockrell, Anna (USA) (1997)	time		6.27	10.31	14.38	18.48	22.96	27.76	32.53	37.37	42.45	47.65		53.63	7 / 2			
	reaction time	0.199																
	interval		7.18	4.04	4.07	4.10	4.48	4.80	4.77	4.84	5.08	5.20	5.98	PB		12.21	14.05	15.12
	velocity		7.18	8.66	8.60	8.54	7.81	7.29	7.34	7.23	6.89	6.73	6.69	7.46		8.60	7.47	6.94
Lehikoinen, Viivi (FIN) (1999)	time		6.42	10.61	14.81	18.88	23.29	27.89	32.66	37.63	42.72	48.04		54.48	4 / 3			
	reaction time	0.200																
	interval		7.01	4.19	4.20	4.07	4.41	4.60	4.77	4.97	5.09	5.32	6.44			12.46	13.78	15.38
	velocity		7.01	8.35	8.33	8.60	7.94	7.61	7.34	7.04	6.88	6.58	6.21	7.34		8.43	7.62	6.83
Knight, Jessie (GBR) (1994)	time		6.61	11.01	15.28	19.54	23.99	28.72	33.56	38.50	43.64	48.88		54.51	8 / 4			
	reaction time	0.187																
	interval		6.81	4.40	4.27	4.26	4.45	4.73	4.84	4.94	5.14	5.24	5.63			12.93	14.02	15.32
	velocity		6.81	7.95	8.20	8.22	7.87	7.40	7.23	7.09	6.81	6.68	7.10	7.34		8.12	7.49	6.85
Woodruff, Gianna (PAN) (1993)	time		6.44	10.57	14.68	18.86	23.29	27.92	32.70	37.73		48.41		54.71	9 / 5			
	reaction time	0.208																
	interval		4.13	4.11	4.11	4.18	4.43	4.63	4.78	5.03		10.68	6.30			12.42	13.84	15.71
	velocity		6.99	8.47	8.52	8.37	7.90	7.56	7.32	6.96		6.55	6.35	7.31		8.45	7.59	6.68
Ennadi, Noura (MAR) (1999)	time		6.61	11.07	15.41	19.68	24.25		34.06	39.07	44.21	49.34		55.15	2 / 6			
	reaction time	0.184																
	interval		4.46	4.34	4.27	4.57			9.81	5.01	5.14	5.13	5.81			13.07	14.38	15.28
	velocity		6.81	7.85	8.06	8.20	7.66		7.14	6.99	6.81	6.82	6.88	7.25		8.03	7.30	6.87
Tkachuk, Viktoriya (UKR) (1994)	time		6.40	10.71	15.01	19.25	23.79	28.59	33.63	38.67	43.94	49.38		55.43	6 / 7			
	reaction time	0.209																
	interval		4.31	4.30	4.24	4.54	4.80	5.04	5.04	5.27	5.44	6.05				12.85	14.38	15.75
	velocity		7.03	8.12	8.14	8.25	7.71	7.29	6.94	6.94	6.64	6.43	6.61	7.22		8.17	7.30	6.67
Sartori, Rebecca (ITA) (1997)	time		6.40	10.71	15.01	19.22	23.72		33.56	38.84	44.41			55.98	3 / 8			
	reaction time	0.213																
	interval		4.31	4.30	4.21	4.50			9.84	5.28	5.57		11.57			12.82	14.34	
	velocity		7.03	8.12	8.14	8.31	7.78		7.11	6.63	6.28		6.48	7.15		8.19	7.32	
	H1 lead leg	L	22	15	15	15	15		17	17	17	17		133				



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=Y6Gs0m1edYI>

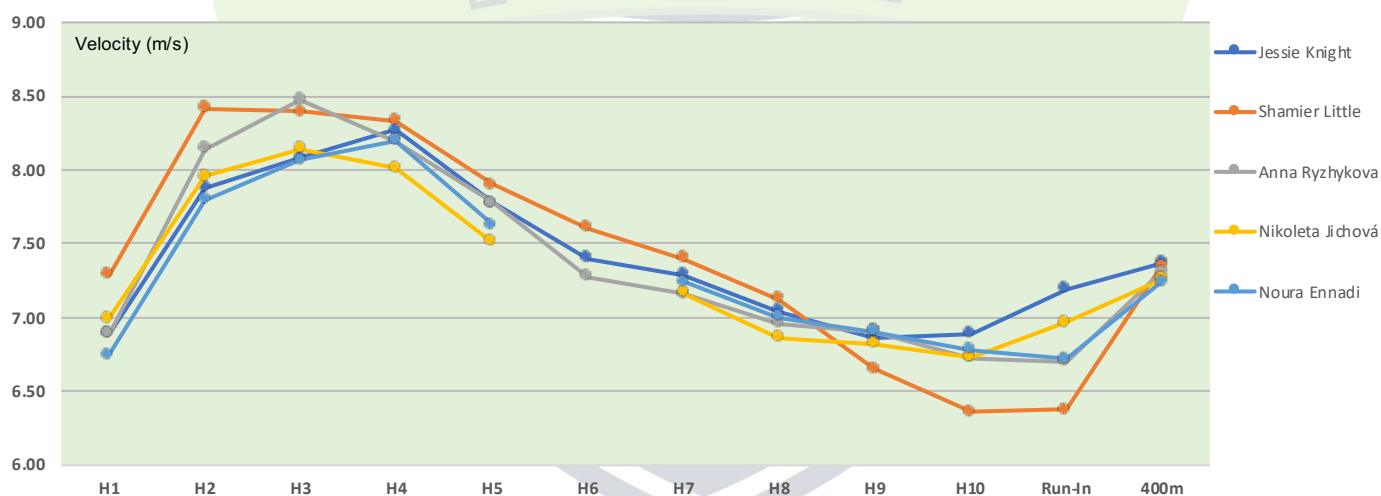
2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

Women's 400m Hurdles

Date 2023.08.21

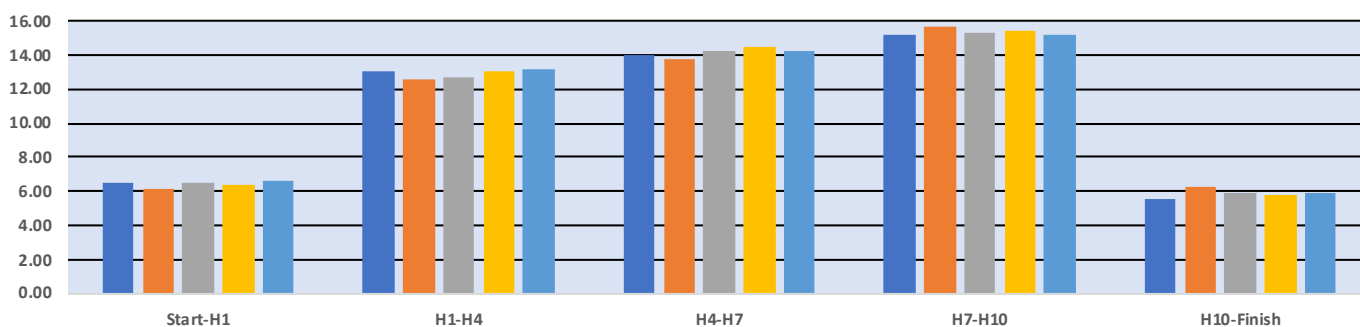
Heat 5

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Knight, Jessie (GBR) (1994)	time		6.53	10.97	15.30	19.53	24.03	28.76	33.56	38.53	43.63	48.71		54.27	8 / 1			
	reaction time	0.161																
	interval		6.89	4.44	4.33	4.23	4.50	4.73	4.80	4.97	5.10	5.08	5.56			13.00	14.03	15.15
	velocity		7.88	8.08	8.27	7.78	7.40	7.29	7.04	6.86	6.89	6.89	7.19	7.37		8.08	7.48	6.93
Little, Shamier (USA) (1995)	time		6.17	10.33	14.50	18.70	23.13	27.73	32.46	37.37	42.63	48.13		54.40	4 / 2			
	reaction time	0.215																
	interval		7.29	4.16	4.17	4.20	4.43	4.60	4.73	4.91	5.26	5.50	6.27			12.53	13.76	15.67
	velocity		8.41	8.39	8.33	7.90	7.61	7.40	7.13	6.65	6.36	6.38	7.35			8.38	7.63	6.70
Ryzhykova, Anna (UKR) (1989)	time		6.53	10.83	14.96	19.23	23.73	28.54	33.43	38.46	43.53	48.73		54.70	7 / 3			
	reaction time	0.186																
	interval		6.89	4.30	4.13	4.27	4.50	4.81	4.89	5.03	5.07	5.20	5.97			12.70	14.20	15.30
	velocity		8.14	8.47	8.20	7.78	7.28	7.16	6.96	6.90	6.73	6.73	7.31			8.27	7.39	6.86
Jíchová, Nikoleta (CZE) (2000)	time		6.43	10.83	15.13	19.50	24.16		33.93	39.03	44.16	49.36		55.10	3 / 4			
	reaction time	0.206							9.77	5.10	5.13	5.20	5.74			13.07	14.43	15.43
	interval		7.00	7.95	8.14	8.01	7.51		7.16	6.86	6.82	6.73	6.97	7.26		8.03	7.28	6.80
	velocity		22	15	15	15	15		16	17	17	17	21	153				
Ennadi, Noura (MAR) (1999)	time		6.67	11.16	15.50	19.77	24.36		34.03	39.03	44.10	49.26		55.21	2 / 5			
	reaction time	0.178							9.67	5.00	5.07	5.16	5.95			13.10	14.26	15.23
	interval		6.75	7.80	8.06	8.20	7.63		7.24	7.00	6.90	6.78	6.72	7.25		8.02	7.36	6.89
	velocity		24		15	15	15		17	17	17	17	20	140				



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=JAqk2zqOPzA>

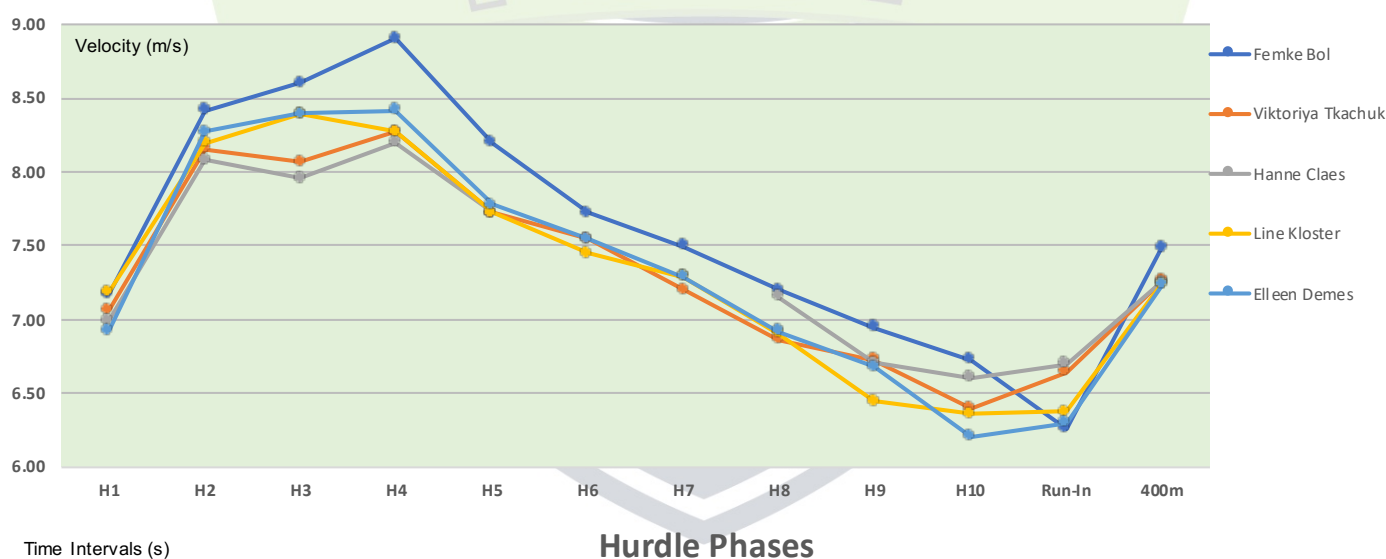
2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

Women's 400m Hurdles

Date 2023.08.21

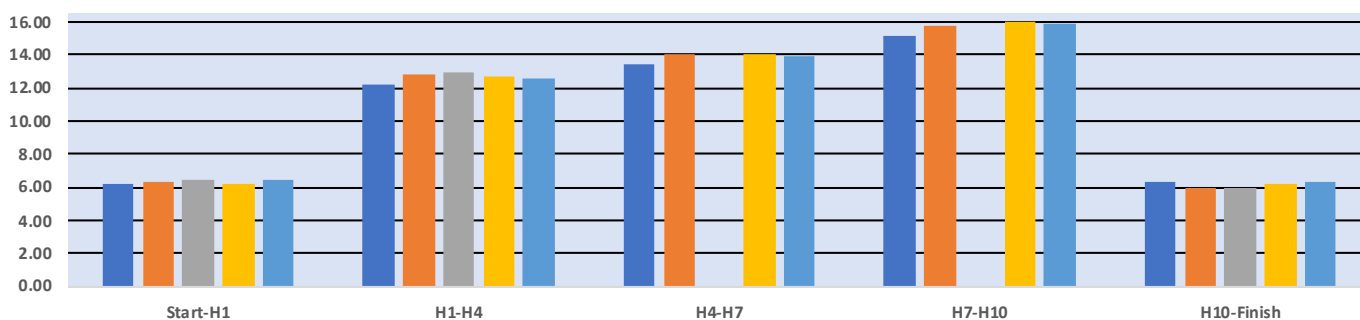
Heat 4

			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		6.27	10.43	14.50	18.43	22.70	27.23	31.90	36.76	41.80	47.00		53.39	4 / 1			
	reaction time	0.206											6.39			12.16	13.47	15.10
	interval		7.18	4.16	4.07	3.93	4.27	4.53	4.67	4.86	5.04	5.20	6.26	7.49		8.63	7.80	6.95
	velocity																	
	H1 lead leg	L	22	14	14	14	14	15	15	15	15	15	18.5	171.5				
Tkachuk, Viktoriya (UKR) (1994)	time		6.37	10.66	15.00	19.23	23.76	28.40	33.26	38.36	43.56	49.03		55.05	6 / 2			
	reaction time	0.201											6.02			12.86	14.03	15.77
	interval		7.06	4.29	4.34	4.23	4.53	4.64	4.86	5.10	5.20	5.47	6.64	7.27		8.16	7.48	6.66
	velocity																	
	H1 lead leg	L	22	15	15	15	15	15	16	16	16	17	20	182				
Claes, Hanne (BEL) (1991)	time		6.43	10.76	15.16	19.43	23.96			38.64	43.86	49.16		55.13	1 / 3			
	reaction time	0.193								14.68	5.22	5.30	5.97			13.00		
	interval		7.00	4.33	4.40	4.27	4.53			7.15	6.70	6.60	6.70	7.26		8.08		
	velocity																	
	H1 lead leg	R	23	8.08	7.95	8.20	7.73	15	15	17	17	17	20.5	137.5				
Kloster, Line (NOR) (1990)	time		6.26	10.53	14.70	18.93	23.46	28.16	32.96	38.03	43.46	48.96		55.23	9 / 4			
	reaction time	0.170								5.07	5.43	5.50	6.27			12.67	14.03	16.00
	interval		7.19	4.27	4.17	4.23	4.53	4.70	4.80	5.06	5.24	5.64	6.38	7.24		8.29	7.48	6.56
	velocity																	
	H1 lead leg	R	22	14	14	15	15	15	15	16	16	16	19.5	176.5				
Demes, Eileen (GER) (1997)	time		6.50	10.73	14.90	19.06	23.56	28.20	33.00	38.06	43.30	48.94		55.29	5 / 5			
	reaction time	0.169								5.24	5.64	6.35	PB			12.56	13.94	15.94
	interval		6.92	4.23	4.17	4.16	4.50	4.64	4.80	5.06	5.24	5.64	6.30	7.23		8.36	7.53	6.59
	velocity																	
	H1 lead leg	R	22	14	14	14	15	15	15	16	16	17	20	178				



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=JAqk2zqOPzA>

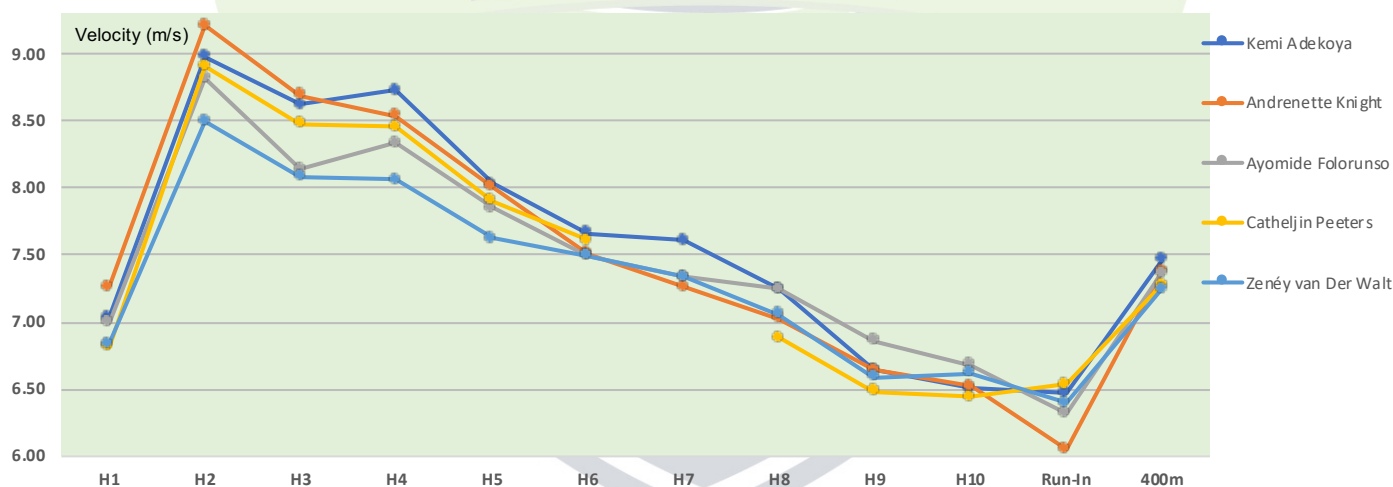
2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

Women's 400m Hurdles

Date 2023.08.21

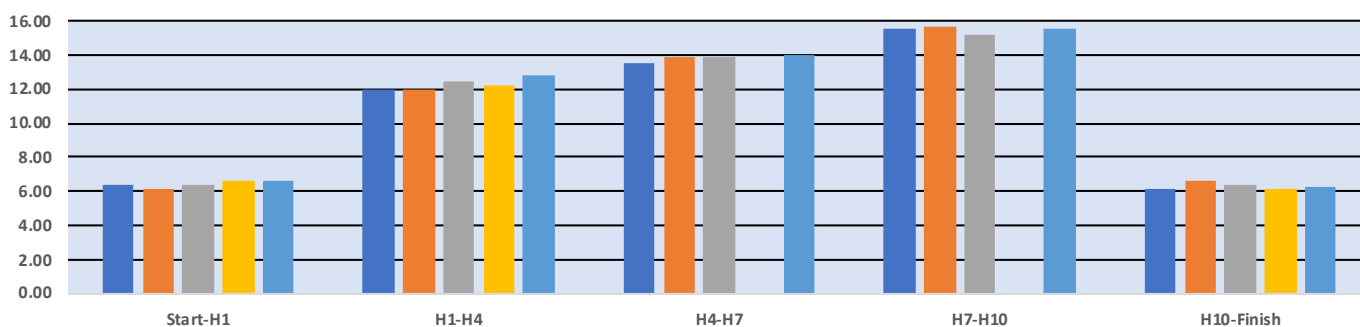
Heat 3

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Adekoya, Kemi (BRN) (1993)	time		6.40	10.30	14.36	18.37	22.73	27.30	31.90	36.73	42.00	47.38		53.56	8 / 1			
	reaction time	0.191																
	interval		7.03	3.90	4.06	4.01	4.36	4.57	4.60	4.83	5.27	5.38	6.18	AR		11.97	13.53	15.48
	velocity		8.97	8.62	8.73	8.03	7.66	7.61	7.25	6.64	6.51	6.47	7.47			8.77	7.76	6.78
Knight, Andrenette (JAM) (1996)	time		6.20	10.00	14.03	18.13	22.50	27.16	31.98	36.96	42.23	47.60		54.21	5 / 2			
	reaction time	0.165																
	interval		7.26	3.80	4.03	4.10	4.37	4.66	4.82	4.98	5.27	5.37	6.61			11.93	13.85	15.62
	velocity		9.21	8.68	8.54	8.01	7.51	7.26	7.03	6.64	6.52	6.05	7.38			8.80	7.58	6.72
Folorunso, Ayomide (ITA) (1996)	time		6.43	10.40	14.70	18.90	23.36	28.03	32.80	37.63	42.73	47.97		54.30	9 / 3			
	reaction time	0.189																
	interval		7.00	3.97	4.30	4.20	4.46	4.67	4.77	4.83	5.10	5.24	6.33			12.47	13.90	15.17
	velocity		8.82	8.14	8.33	7.85	7.49	7.34	7.25	6.86	6.68	6.32	7.37			8.42	7.55	6.92
Peeters, Cathelijn (NED) (1996)	time		6.60	10.53	14.66	18.80	23.23	27.83		38.00	43.40	48.83		54.95	2 / 4			
	reaction time	0.247								10.17	5.40	5.43	6.12			12.20		
	interval		6.82	3.93	4.13	4.14	4.43	4.60		6.88	6.48	6.45	6.54	7.28		8.61		
	velocity		8.91	8.47	8.45	7.90	7.61		6.88	6.48	6.45	6.54	7.28					
van Der Walt, Zenéy (RSA) (2000)	time		6.58	10.70	15.03	19.37	23.96	28.63	33.40	38.36	43.67	48.96		55.21	7 / 5			
	reaction time	0.203																
	interval		4.12	4.33	4.34	4.59	4.67	4.77	4.96	5.31	5.29	6.25				12.79	14.03	15.56
	velocity		8.84	8.50	8.08	8.06	7.63	7.49	7.34	7.06	6.59	6.62	6.40	7.25		8.21	7.48	6.75
	H1 lead leg	R	23	15	15	15	15	15	15	16	17	17	19.5	182.5				
	H1 lead leg	R	22	15	15	15	155		16	17	17	19.7	291.7					
	H1 lead leg	L	23	15	15	15	15	15	15	16	16	16	19.2	180.2				



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=JAqk2zqOPzA>

2023 World Athletics Championships (Budapest, HUN) (TV Analysis)

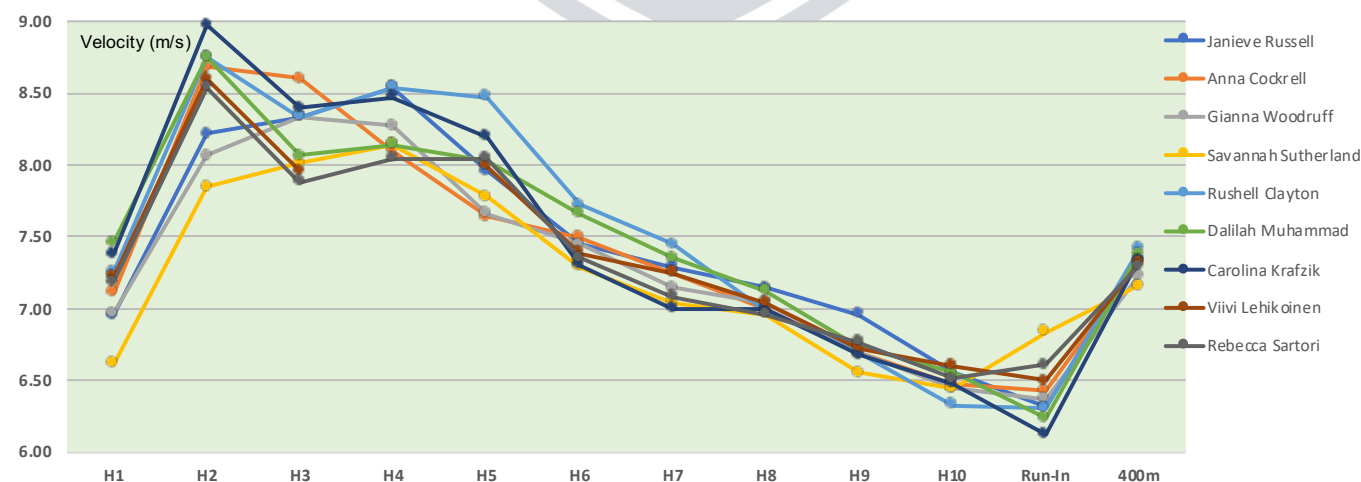
Women's 400m Hurdles

Date 2023.08.21

Women's 400m Hurdles			Date 2023.08.21											Heat 2				
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Russell, Janieve (JAM) (1993)	time		6.47	10.73	14.93	19.03	23.43	28.13	32.93	37.83	42.86	48.20		54.53	4 / 1			
	reaction time	0.164		4.26	4.20	4.10	4.40	4.70	4.80	4.90	5.03	5.34	6.33			12.56	13.90	15.27
	interval velocity		6.96	8.22	8.33	8.54	7.95	7.45	7.29	7.14	6.96	6.55	6.32	7.34		8.36	7.55	6.88
	H1 lead leg	R	23	15	15	15	15	16	16	16	16	17	20	184				
Cockrell, Anna (USA) (1997)	time		6.33	10.36	14.43	18.75	23.33	28.00	32.83	37.83	43.06	48.46		54.68	9 / 2			
	reaction time	0.211		4.03	4.07	4.32	4.58	4.67	4.83	5.00	5.23	5.40	6.22			12.42	14.08	15.63
	interval velocity		7.11	8.68	8.60	8.10	7.64	7.49	7.25	7.00	6.69	6.48	6.43	7.32		8.45	7.46	6.72
	H1 lead leg	R	22	14	14	15	15	15	15	15	16	16	19.2	176.2				
Woodruff, Gianna (PAN) (1993)	time		6.46	10.80	15.00	19.23	23.80	28.50	33.40	38.37	43.60	49.03		55.31	2 / 3			
	reaction time	0.171		4.34	4.20	4.23	4.57	4.70	4.90	4.97	5.23	5.43	6.28			12.77	14.17	15.63
	interval velocity		6.97	8.06	8.33	8.27	7.66	7.45	7.14	7.04	6.69	6.45	6.37	7.23		8.22	7.41	6.72
	H1 lead leg	L	22	15	15	15	15	15	16	16	17	17	19.7	182.7				
Sutherland, Savannah (CAN) (2003)	time		6.80	11.26	15.63	19.93	24.43	29.23	34.20	39.23	44.57	50.00		55.85	5 / 4			
	reaction time	0.227		4.46	4.37	4.30	4.50	4.80	4.97	5.03	5.34	5.43	5.85			13.13	14.27	15.80
	interval velocity		6.62	7.85	8.01	8.14	7.78	7.29	7.04	6.96	6.55	6.45	6.84	7.16		8.00	7.36	6.65
	H1 lead leg	R	23	15	15	15	15	16	16	16	17	17	20	185				

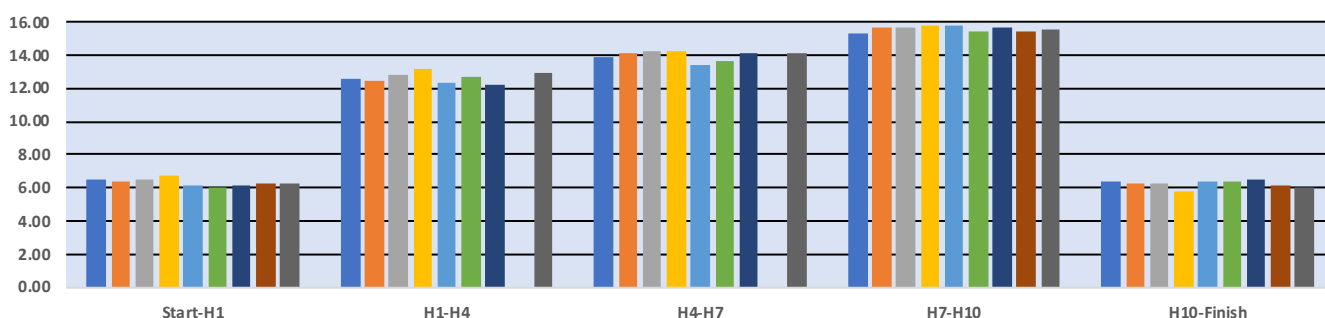
Date 2023.08.21

Date 2023.08.21														Heat 1				
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Clayton, Rushell (JAM) (1992)	time		6.20	10.20	14.40	18.50	22.63	27.16	31.86	36.87	42.10	47.63		53.97	3 / 1			
	reaction time	0.156																
	interval			4.00	4.20	4.10	4.13	4.53	4.70	5.01	5.23	5.53	6.34			12.30	13.36	15.77
	velocity		7.26	8.75	8.33	8.54	8.47	7.73	7.45	6.99	6.69	6.33	6.31	7.41		8.54	7.86	6.66
Muhammad, Dalilah (USA) (1990)	H1 lead leg	L	strides	22	14	14	14	15	15	16	16	17	19.7	176.7				
	time		6.03	10.03	14.37	18.67	23.03	27.60	32.36	37.27	42.46	47.80		54.21	5 / 2			
	reaction time	0.156																
	interval			4.00	4.34	4.30	4.36	4.57	4.76	4.91	5.19	5.34	6.41			12.64	13.69	15.44
velocity		7.46	8.75	8.06	8.14	8.03	7.66	7.35	7.13	6.74	6.55	6.24	7.38	8.31		7.67	6.80	
Krafzik, Carolina (GER) (1995)	H1 lead leg	R	strides	22	15	15	15	15	15	15	16	16	19	178				
	time		6.10	10.00	14.17	18.30	22.57	27.36	32.36	37.36	42.60	48.00		54.53	8 / 3			
	reaction time	0.190																
	interval			3.90	4.17	4.13	4.27	4.79	5.00	5.00	5.24	5.40	6.53			12.20	14.06	15.64
velocity		7.38	8.97	8.39	8.47	8.20	7.31	7.00	7.00	6.68	6.48	6.13	7.34	8.61		7.47	6.71	
Lehikoinen, Viivi (FIN) (1999)	H1 lead leg	L	strides	23	15	15	15	15	17	17	17	17	21.7	172.7				
	time		6.23	10.30	14.70		23.46	28.20	33.03	38.00	43.20	48.50		54.65	2 / 4			
	reaction time	0.181																
	interval			4.07	4.40		8.76	4.74	4.83	4.97	5.20	5.30	6.15					15.47
velocity		7.22	8.60	7.95		7.99	7.38	7.25	7.04	6.73	6.60	6.50	7.32				6.79	
Sartori, Rebecca (ITA) (1997)	H1 lead leg	R	strides	23	15	15	15	16	16	16	17	17	20	154				
	time		6.26	10.36	14.80	19.15	23.50	28.26	33.20	38.23	43.40	48.77		54.82	4 / 5			
	reaction time	0.203																
	interval			4.10	4.44	4.35	4.35	4.76	4.94	5.03	5.17	5.37	6.05	PB		12.89	14.05	15.57
velocity		7.19	8.54	7.88	8.05	8.05	7.35	7.09	6.96	6.77	6.52	6.61	7.30	8.15		7.47	6.74	
	H1 lead leg	L	strides	22	15	15	15	16	16	16	16	17	19.7	182.7				



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=JAqk2zgQPzA>

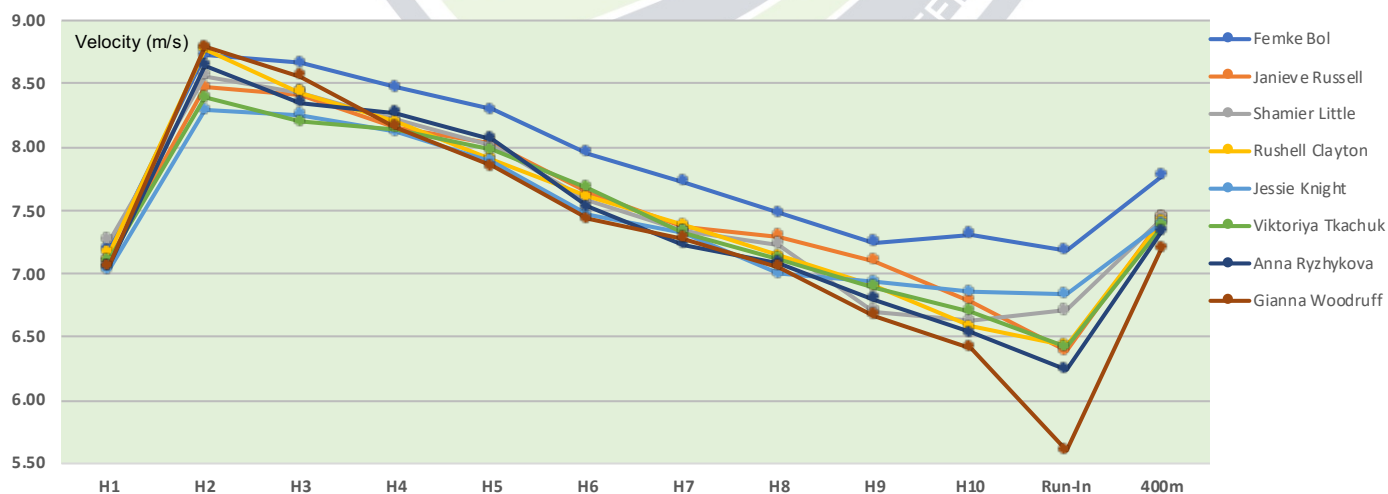
2023 London Athletics Meet (London, GBR)

Women's 400m Hurdles

Date 2023.07.23

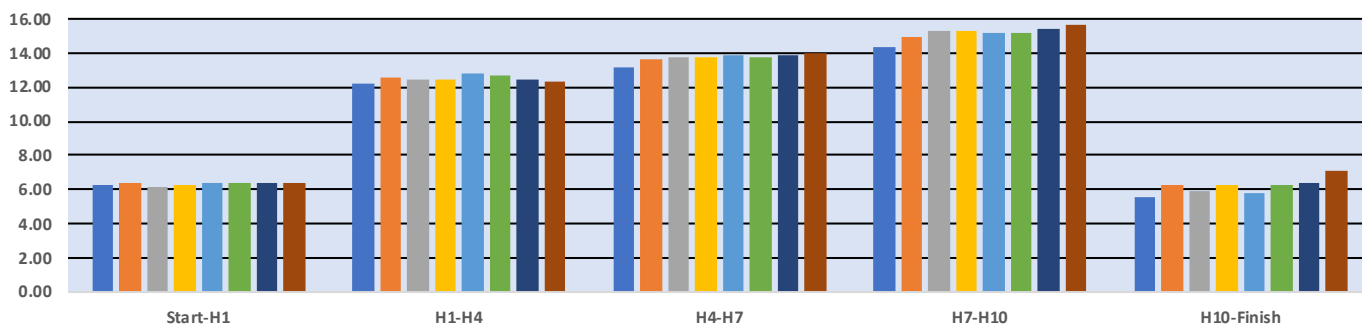
FINAL

			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		6.25	10.26	14.30	18.43	22.65	27.05	31.58	36.26	41.09	45.88		51.45	6 / 1			
	reaction time	0.187																
	interval		7.20	4.01	4.04	4.13	4.22	4.40	4.53	4.68	4.83	4.79	5.57	AR PB		12.18	13.15	14.30
	velocity		7.20	8.73	8.66	8.47	8.29	7.95	7.73	7.48	7.25	7.31	7.18	7.77		8.62	7.98	7.34
Russell, Janieve (JAM) (1993)	time		6.33	10.46	14.62	18.91	23.27	27.85	32.60	37.40	42.33	47.49		53.75	5 / 2			
	reaction time	0.148																
	interval		7.11	4.13	4.16	4.29	4.36	4.58	4.75	4.80	4.93	5.16	6.26			12.58	13.69	14.89
	velocity		7.11	8.47	8.41	8.16	8.03	7.64	7.37	7.29	7.10	6.78	6.39	7.44		8.35	7.67	7.05
Little, Shamier (USA) (1995)	time		6.20	10.29	14.44	18.70	23.07	27.69	32.46	37.30	42.52	47.80		53.76	4 / 3			
	reaction time	0.174																
	interval		7.26	4.09	4.15	4.26	4.37	4.62	4.77	4.84	5.22	5.28	5.96			12.50	13.76	15.34
	velocity		7.26	8.56	8.43	8.22	8.01	7.58	7.34	7.23	6.70	6.63	6.71	7.44		8.40	7.63	6.84
Clayton, Rushell (JAM) (1992)	time		6.28	10.27	14.42	18.69	23.12	27.72	32.46	37.36	42.43	47.75		53.97	3 / 4			
	reaction time	0.131																
	interval		7.17	3.99	4.15	4.27	4.43	4.60	4.74	4.90	5.07	5.32	6.22			12.41	13.77	15.29
	velocity		7.17	8.77	8.43	8.20	7.90	7.61	7.38	7.14	6.90	6.58	6.43	7.41		8.46	7.63	6.87
Knight, Jessie (GBR) (1994)	time		6.40	10.62	14.86	19.17	23.61	28.30	33.08	38.08	43.13	48.24		54.09	7 / 5			
	reaction time	0.182																
	interval		4.22	4.24	4.31	4.44	4.69	4.78	4.88	5.00	5.05	5.11	5.85	=PB		12.77	13.91	15.16
	velocity		7.03	8.29	8.25	8.12	7.88	7.46	7.32	7.00	6.93	6.85	6.84	7.40		8.22	7.55	6.93
Tkachuk, Viktoriya (UKR) (1994)	time		6.33	10.50	14.77	19.07	23.46	28.02	32.80	37.72	42.80	48.02		54.25	2 / 6			
	reaction time	0.152																
	interval		4.17	4.27	4.30	4.39	4.56	4.78	4.92	5.08	5.22	5.08	6.23			12.74	13.73	15.22
	velocity		7.11	8.39	8.20	8.14	7.97	7.68	7.32	7.11	6.89	6.70	6.42	7.37		8.24	7.65	6.90
Ryzhykova, Anna (UKR) (1989)	time		6.37	10.42	14.61	18.84	23.18	27.83	32.67	37.61	42.76	48.12		54.53	1 / 7			
	reaction time	0.166																
	interval		7.06	4.05	4.19	4.23	4.34	4.65	4.84	4.94	5.15	5.36	6.41			12.47	13.83	15.45
	velocity		7.06	8.64	8.35	8.27	8.06	7.53	7.23	7.09	6.80	6.53	6.24	7.34		8.42	7.59	6.80
Woodruff, Gianna (PAN) (1993)	time		6.37	10.35	14.44	18.73	23.19	27.90	32.71	37.67	42.92	48.38		55.52	8 / 8			
	reaction time	0.201																
	interval		7.06	3.98	4.09	4.29	4.46	4.71	4.81	4.96	5.25	5.46	7.14			12.36	13.98	15.67
	velocity		7.06	8.79	8.56	8.16	7.85	7.43	7.28	7.06	6.67	6.41	5.60	7.20		8.50	7.51	6.70



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Sun 23 Jul 2023 14:08) - diamond league race analysis

<https://www.omegaitiming.com/File/0002030C0101070101FFFFFFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=LkXU5aPIF5A>

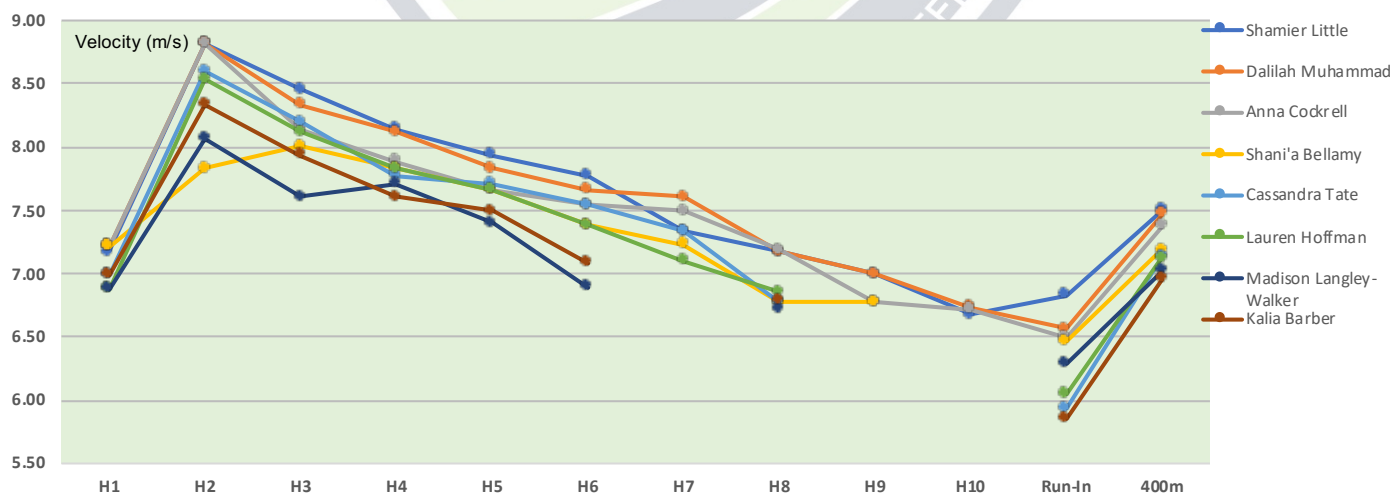
2023 USATF National Championships (Eugene, OR) (TV Analysis)

Women's 400m Hurdles

Date 2023.07.09

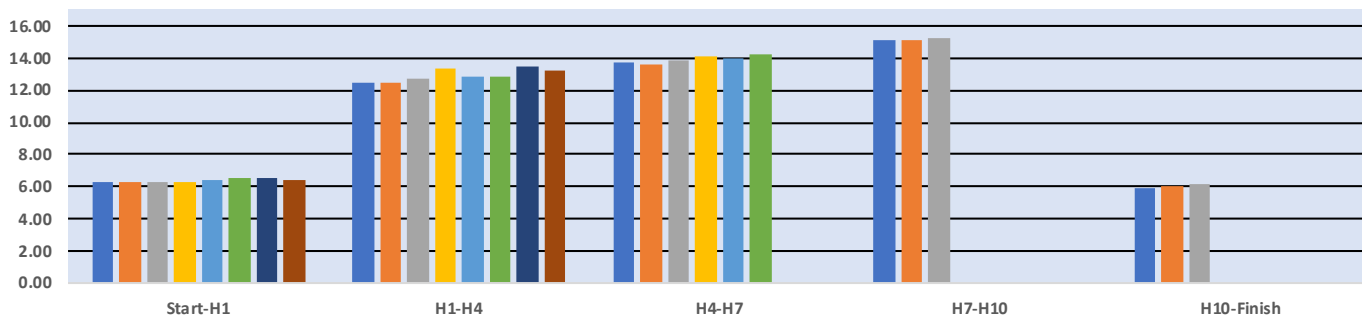
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Little, Shamier (USA) (1995)	time		6.27	10.24	14.38	18.68	23.09	27.59	32.36	37.24	42.24	47.48		53.34	5 / 1			
	reaction time															12.41	13.68	15.12
	interval			3.97	4.14	4.30	4.41	4.50	4.77	4.88	5.00	5.24	5.86			8.46	7.68	6.94
	velocity		7.18	8.82	8.45	8.14	7.94	7.78	7.34	7.17	7.00	6.68	6.83	7.50				
Muhammad, Dalilah (USA) (1990)	H1 lead leg	R																
	strides		23	15	15	15	15	15	16	16	16	16	20.2	182.2				
	time		6.24	10.21	14.41	18.72	23.19	27.76	32.36	37.24	42.24	47.44		53.53	4 / 2			
	reaction time															12.48	13.64	15.08
Cockrell, Anna (USA) (1997)	interval			3.97	4.20	4.31	4.47	4.57	4.60	4.88	5.00	5.20	6.09			8.41	7.70	6.96
	velocity		7.21	8.82	8.33	8.12	7.83	7.66	7.61	7.17	7.00	6.73	6.57	7.47				
	H1 lead leg	R																
	strides		22	15	15	15	15	15	15	15	16	16	19.5	178.5				
Bellamy, Shani'a (USA) (2002)	time		6.24	10.21	14.51	18.95	23.52	28.16	32.83	37.70	42.87	48.08		54.24	6 / 3			
	reaction time															12.71	13.88	15.25
	interval			3.97	4.30	4.44	4.57	4.64	4.67	4.87	5.17	5.21	6.16			8.26	7.56	6.89
	velocity		7.21	8.82	8.14	7.88	7.66	7.54	7.49	7.19	6.77	6.72	6.49	7.37				
Tate, Cassandra (USA) (1990)	H1 lead leg	R																
	strides		22	14	14	14	14	15	15	15	16	16	20	175				
Hoffman, Lauren (USA) (1999)	time		6.24	10.71	15.08	19.55	24.12	28.86	33.70	38.87	44.04			55.64	3 / 4			
	reaction time															13.31	14.15	
	interval			4.47	4.37	4.47	4.57	4.74	4.84	5.17	5.17		11.60			7.89	7.42	
	velocity		7.21	7.83	8.01	7.83	7.66	7.38	7.23	6.77	6.77		6.47	7.19				
Langley-Walker, Madison (USA) (1993)	H1 lead leg	L												114				
	strides		23	15	15	15	15	15	15	15	16							
Barber, Kaila (USA) (1993)	time		6.44	10.51	14.78	19.28	23.82	28.46	33.23	38.40				56.09	7 / 5			
	reaction time															12.84	13.95	
	interval			4.07	4.27	4.50	4.54	4.64	4.77	5.17			17.69			8.18	7.53	
	velocity		6.99	8.60	8.20	7.78	7.71	7.54	7.34	6.77			5.94	7.13				
Hoffman, Lauren (USA) (1999)	H1 lead leg	R												125				
	strides		22	14	14	15	15	15	15	15								
Langley-Walker, Madison (USA) (1993)	time		6.54	10.64	14.95	19.42	23.99	28.73	33.66	38.77				56.13	8 / 6			
	reaction time															12.88	14.24	
	interval			4.10	4.31	4.47	4.57	4.74	4.93	5.11			17.36			8.15	7.37	
	velocity		6.88	8.54	8.12	7.83	7.66	7.38	7.10	6.85			6.05	7.13				
Langley-Walker, Madison (USA) (1993)	H1 lead leg	L												137				
	strides		23	15	15	16	16	16	18	18								
Langley-Walker, Madison (USA) (1993)	time		6.54	10.88	15.48	20.02	24.75	29.83		40.24				56.94	2 / 7			
	reaction time															13.48		
	interval			4.34	4.60	4.54	4.73	5.08		10.41			16.70			7.79		
	velocity		6.88	8.06	7.61	7.71	7.40	6.89		6.72			6.29	7.02				
Barber, Kaila (USA) (1993)	H1 lead leg	R												89				
	strides		24	16	17	16	16											
Barber, Kaila (USA) (1993)	time		6.44	10.64	15.05	19.65	24.32	29.26		39.57				57.51	1 / 8			
	reaction time															13.21		
	interval			4.20	4.41	4.60	4.67	4.94		10.31			17.94			7.95		
	velocity		6.99	8.33	7.94	7.61	7.49	7.09		6.79			5.85	6.96				
Barber, Kaila (USA) (1993)	H1 lead leg	R												100				
	strides		23	15	15	15	15											



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=QdxnFlek1vE>

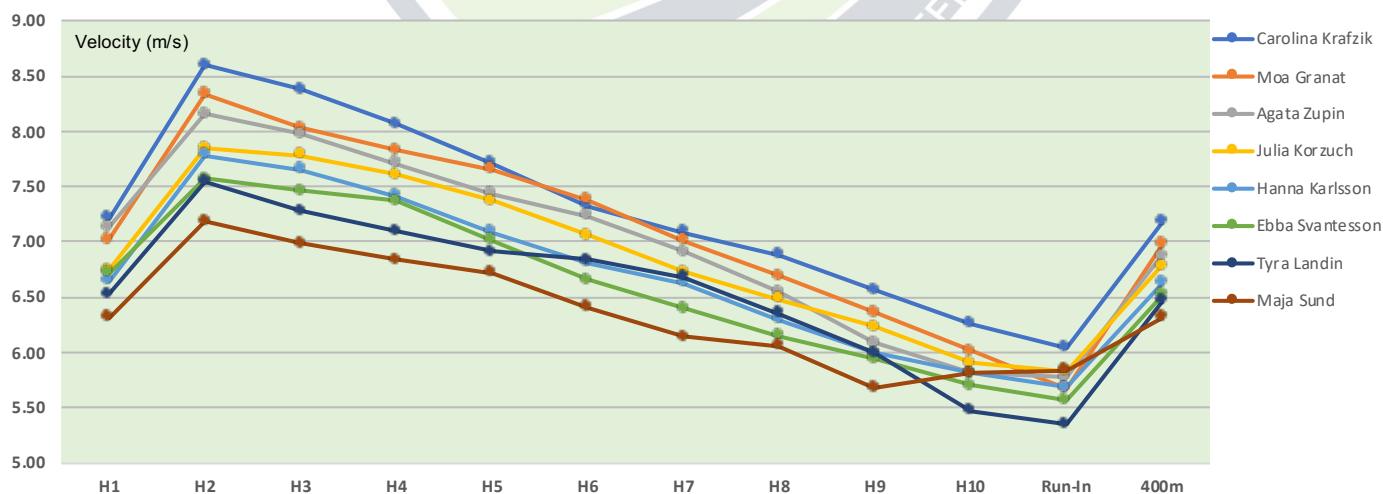
2023 Bauhaus Galan (Stockholm, SWE)

Women's 400m Hurdles

Date 2023.07.02

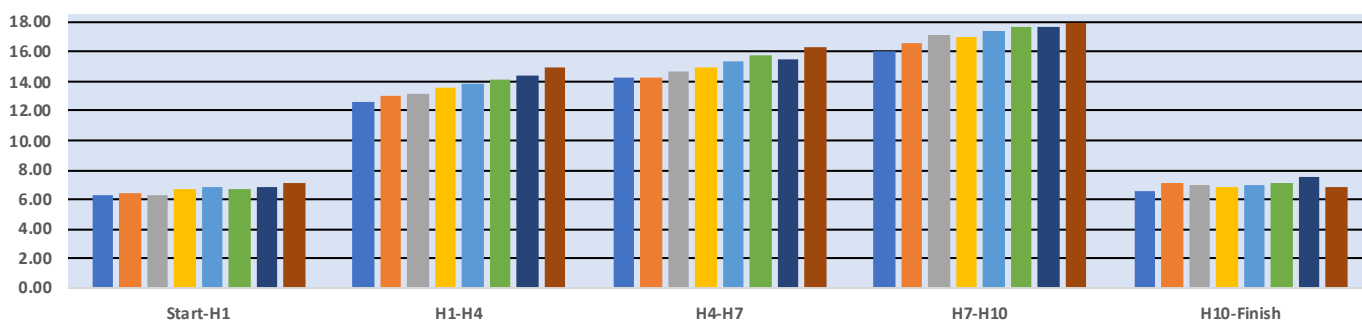
National FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Krafzik, Carolina (GER) (1995)	time		6.24	10.31	14.49	18.83	23.37	28.15	33.09	38.17	43.50	49.09		55.71	5 / 1			
	reaction time	0.178														12.59	14.26	16.00
	interval		7.21	8.60	8.37	8.06	7.71	7.32	7.09	6.89	6.57	6.26	6.04	7.18		8.34	7.36	6.56
	velocity													0				
Granat, Moa (SWE) (2004)	time		6.41	10.61	14.97	19.44	24.01	28.75	33.74	38.97	44.47	50.29		57.34	4 / 2			
	reaction time	0.144														13.03	14.30	16.55
	interval		7.02	8.33	8.03	7.83	7.66	7.38	7.01	6.69	6.36	6.01	5.67	6.98		8.06	7.34	6.34
	velocity													0				
Zupin, Agata (SLO) (1998)	time		6.31	10.60	14.99	19.53	24.24	29.08	34.14	39.49	45.24	51.26		58.18	7 / 3			
	reaction time	0.164														13.22	14.61	17.12
	interval		7.13	8.16	7.97	7.71	7.43	7.23	6.92	6.54	6.09	5.81	5.78	6.88		7.94	7.19	6.13
	velocity													0				
Korzuch, Julia (POL) (1995)	time		6.67	11.13	15.63	20.23	24.98	29.94	35.14	40.54	46.15	52.08		58.94	3 / 4			
	reaction time	0.138														13.56	14.91	16.94
	interval		6.75	7.85	7.78	7.61	7.37	7.06	6.73	6.48	6.24	5.90	5.83	6.79		7.74	7.04	6.20
	velocity													0				
Karlsson, Hanna (SWE) (2003)	time		6.77	11.27	15.84	20.56	25.50	30.64	35.92	41.48	47.32	53.34		60.37	6 / 5			
	reaction time	0.163														13.79	15.36	17.42
	interval		6.65	7.78	7.66	7.42	7.09	6.81	6.63	6.29	5.99	5.81	5.69	6.63		7.61	6.84	6.03
	velocity													0				
Svantesson, Ebba (SWE) (1997)	time		6.70	11.32	16.01	20.76	25.75	31.01	36.48	42.17	48.06	54.20		61.38	2 / 6			
	reaction time	0.176														14.06	15.72	17.72
	interval		6.72	7.58	7.46	7.37	7.01	6.65	6.40	6.15	5.94	5.70	5.57	6.52		7.47	6.68	5.93
	velocity													0				
Landin, Tyra (SWE) (2002)	time		6.89	11.53	16.34	21.27	26.33	31.45	36.69	42.20	48.04	54.43		61.90	8 / 7			
	reaction time	0.174														14.38	15.42	17.74
	interval		6.53	7.54	7.28	7.10	6.92	6.84	6.68	6.35	5.99	5.48	5.35	6.46		7.30	6.81	5.92
	velocity													0				
Sund, Maja (SWE) (2001)	time		7.12	11.99	17.00	22.12	27.33	32.79	38.49	44.26	50.42	56.44		63.29	1 / 8			
	reaction time	0.171														15.00	16.37	17.95
	interval		6.32	7.19	6.99	6.84	6.72	6.41	6.14	6.07	5.68	5.81	5.84	6.32		7.00	6.41	5.85
	velocity													0				



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Sun 2 Jul 2023 17:07) - diamond league race analysis

<https://www.omegatiming.com/File/000203090101040101EEEEEEEEEEEE4D.pdf>

Video: No Video Found

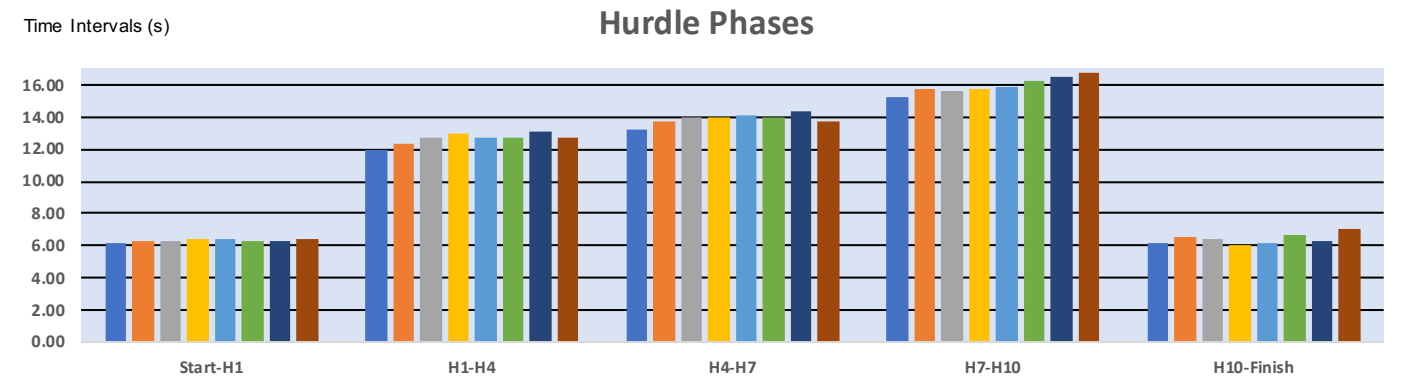
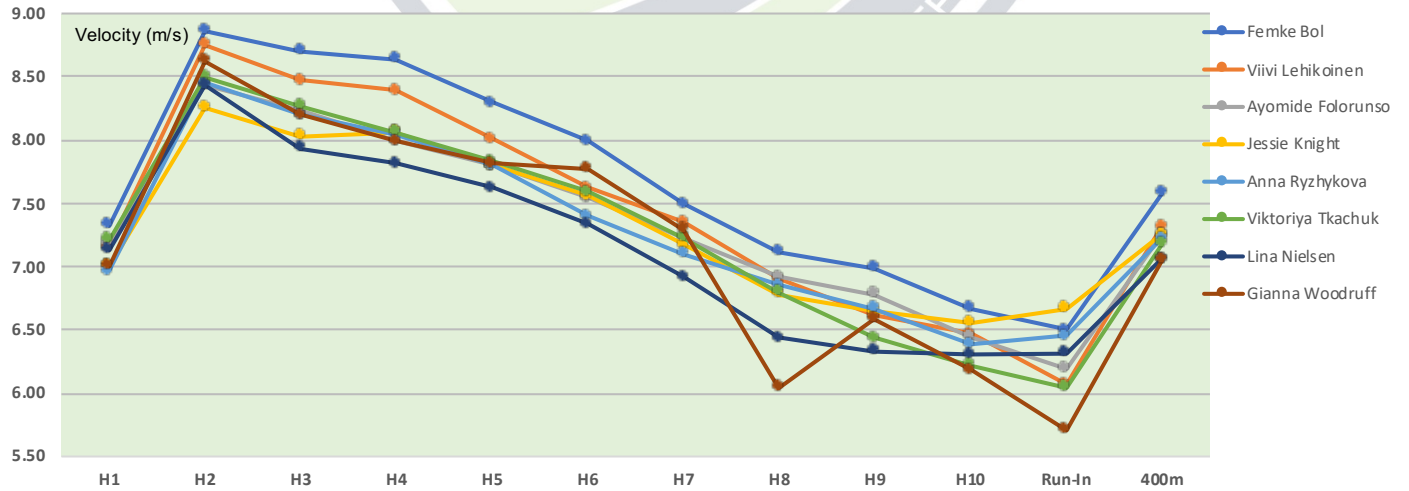
2023 Athletissima (Lausanne, SUI)

Women's 400m Hurdles

Date 2023.06.30

FINAL

													Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10							
Bol, Femke (NED) (2000)	time	6.14	10.09	14.11	18.16	22.38	26.76	31.43	36.35	41.36	46.61			52.76	5 / 1			
	reaction time	0.169											6.15			12.02	13.27	15.18
	interval		3.95	4.02	4.05	4.22	4.38	4.67	4.92	5.01	5.25		6.50			8.74	7.91	6.92
	velocity	7.33	8.86	8.71	8.64	8.29	7.99	7.49	7.11	6.99	6.67		6.50	7.58				
Lehikoinen, Viivi (FIN) (1999)	H1 lead leg	L											19.7	170.7				
	strides	22	14	14	14	14	14	14	15	15	15							
	time	6.29	10.29	14.42	18.59	22.96	27.55	32.31	37.38	42.67	48.08			54.67	4 / 2			
	reaction time	0.208											6.59			12.30	13.72	15.77
Folorunso, Ayomide (ITA) (1996)	interval		4.00	4.13	4.17	4.37	4.59	4.76	5.07	5.29	5.41		6.59			8.54	7.65	6.66
	velocity	7.15	8.75	8.47	8.39	8.01	7.63	7.35	6.90	6.62	6.47		6.07	7.32				
	H1 lead leg	R											21	141				
	strides	23	15				16	16	16	17	17							
Knight, Jessie (GBR) (1994)	time	6.26	10.41	14.66	19.04	23.53	28.17	33.01	38.07	43.23	48.66			55.12	8 / 3			
	reaction time	0.222											6.46			12.78	13.97	15.65
	interval		4.15	4.25	4.38	4.49	4.64	4.84	5.06	5.16	5.43		6.46			8.22	7.52	6.71
	velocity	7.19	8.43	8.24	7.99		7.54	7.23	6.92	6.78	6.45		6.19	7.26				
Ryzhykova, Anna (UKR) (1989)	H1 lead leg	L											21	155				
	strides	23	15			15	15	16	16	17	17							
	time	6.42	10.66	15.02	19.36	23.85	28.48	33.36	38.52	43.79	49.13			55.13	3 / 4			
	reaction time	0.178											6.00			12.94	14.00	15.77
Ryzhykova, Anna (UKR) (1989)	interval		4.24	4.36	4.34	4.49	4.63	4.88	5.16	5.27	5.34		6.00			8.11	7.50	6.66
	velocity	7.01	8.25	8.03	8.06	7.80	7.56	7.17	6.78	6.64	6.55		6.67	7.26				
	H1 lead leg	R											19	131				
	strides	22	14			14	15	15	16	16	16							
Woodruff, Gianna (PAN) (1993)	time	6.46	10.60	14.87	19.22	23.71	28.44	33.37	38.48	43.73	49.21			55.41	2 / 5			
	reaction time	0.175											6.20			12.76	14.15	15.84
	interval		4.14	4.27	4.35	4.47	4.61	4.84	5.15	5.44	5.63		6.20			8.23	7.42	6.63
	velocity	6.97	8.45	8.20	8.05	7.80	7.40	7.10	6.85	6.67	6.39		6.45	7.22				
Tkachuk, Viktoriya (UKR) (1994)	H1 lead leg	R											19.5	130.5				
	strides	22	14			14	15	15	15	15	16							
	time	6.24	10.36	14.59	18.93	23.40	28.01	32.85	38.00	43.44	49.07			55.69	7 / 6			
	reaction time	0.196											6.62			12.69	13.92	16.22
Nielsen, Lina (GBR) (1996)	interval		4.12	4.23	4.34	4.47	4.61	4.84	5.15	5.44	5.63		6.62			8.27	7.54	6.47
	velocity	7.21	8.50	8.27	8.06	7.83	7.59	7.23	6.80	6.43	6.22		6.04	7.18				
	H1 lead leg	L											21	169				
	strides	22	15			15	15	15	16	18	17							
Woodruff, Gianna (PAN) (1993)	time	6.31	10.46	14.87	19.35	23.94	28.71	33.77	39.21	44.74	50.29			56.62	1 / 7			
	reaction time	0.141											6.33			13.04	14.42	16.52
	interval		4.15	4.41	4.48	4.59	4.77	5.06	5.44	5.53	5.55		6.33			8.05	7.28	6.36
	velocity	7.13	8.43	7.94	7.81	7.63	7.34	6.92	6.43	6.33	6.31		6.32	7.06				
Woodruff, Gianna (PAN) (1993)	H1 lead leg	L											16	114				
	strides	22	15			15	15	15	16	16	16							
	time	6.42	10.48	14.75	19.13	23.61	28.11	32.91	38.70	44.01	49.67			56.68	6 / 8			
	reaction time	0.227											7.01			12.71	13.78	16.76
Woodruff, Gianna (PAN) (1993)	interval		4.06	4.27	4.38	4.48	4.50	4.80	5.79	5.31	5.66		7.01			8.26	7.62	6.26
	velocity	7.01	8.62	8.20	7.99	7.81		7.78	7.29	6.04	6.59		6.18	7.06				
	H1 lead leg	L											17	133				
	strides	22	15	15			15	15	17	17	17							



Source: Omega Timing (Fri 30 Jun 2023 21:36) - diamond league race analysis
<https://www.omegatiming.com/File/0002030801010D0101FFFFFFFFFFFF4D.pdf>
Video: <https://www.youtube.com/watch?v=PIDYWraVBoQ>

2023 Bislett Games (Oslo, NOR)

Women's 400m Hurdles

Date 2023.06.15

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	6.29	10.36	14.52	18.74	23.05	27.48	32.11	36.92	41.78	46.69		52.30	5 / 1			
	reaction time	0.172	interval		4.07	4.16	4.22	4.31	4.43	4.63	4.81	4.86	4.91	5.61			12.45	13.37	14.58
			velocity	7.15	8.60	8.41	8.29	8.12	7.90	7.56	7.28	7.20	7.13	7.13	7.65		8.43	7.85	7.20
	H1 lead leg	L	strides	22	14	14	14	14	14	14	15	15	15	18.5	169.5				
Clayton, Rushell (JAM) (1992)			time	6.34	10.36	14.47	18.72	23.10	27.70	32.46	37.42	42.53	47.76		53.84	6 / 2			
	reaction time	0.141	interval		4.02	4.11	4.25	4.38	4.60	4.76	4.96	5.11	5.23	6.08			12.38	13.74	15.30
			velocity	7.10	8.71	8.52	8.24	7.99	7.61	7.35	7.06	6.85	6.69	6.58	7.43		8.48	7.64	6.86
	H1 lead leg	L	strides	22	15	14	14	15	15	15	16	16	16	20	178				
Woodruff, Gianna (PAN) (1993)			time	6.36	10.44	14.72	19.15	23.66	28.29	33.11	38.17	43.30	48.43		54.46	4 / 3			
	reaction time	0.198	interval		4.08	4.28	4.43	4.51	4.63	4.82	5.06	5.13	5.13	6.03			12.79	13.96	15.32
			velocity	7.08	8.58	8.18	7.90	7.76	7.56	7.26	6.92	6.82	6.82	6.63	7.34		8.21	7.52	6.85
	H1 lead leg	L	strides	22	15	15	15	15	15	15	16	16	17	19	180				
Russell, Janieve (JAM) (1993)			time	6.39	10.53	14.73	19.08	23.55	28.27	33.05	38.08	43.27	48.56		54.91	3 / 4			
	reaction time	0.135	interval		4.14	4.20	4.35	4.47	4.72	4.78	5.03	5.19	5.29	6.35			12.69	13.97	15.51
			velocity	7.04	8.45	8.33	8.05	7.83	7.42	7.32	6.96	6.74	6.62	6.30	7.28		8.27	7.52	6.77
	H1 lead leg	L	strides	23	15	15	15	15	16	16	16	17	17	20	185				
Hall, Anna (USA) (2001)			time	6.28	10.39	14.61	18.91	23.42	28.12	33.02	38.01	43.32	49.09		55.28	8 / 5			
	reaction time	0.212	interval		4.11	4.22	4.30	4.51	4.70	4.90	4.99	5.31	5.77	6.19			12.63	14.11	16.07
			velocity	7.17	8.52	8.29	8.14	7.76	7.45	7.14	7.01	6.59	6.07	6.46	7.24		8.31	7.44	6.53
	H1 lead leg	L	strides	21	14	14	14	14	15	15	15	17		139					
Tkachuk, Viktoriya (UKR) (1994)			time	6.29	10.55	14.75	19.07	23.57	28.28	33.22	38.40	43.70	49.10		55.36	7 / 6			
	reaction time	0.171	interval		4.26	4.20	4.32	4.50	4.71	4.94	5.18	5.30	5.40	6.26			12.78	14.15	15.88
			velocity	7.15	8.22	8.33	8.10	7.78	7.43	7.09	6.76	6.60	6.48	6.39	7.23		8.22	7.42	6.61
	H1 lead leg	L	strides	24	15	15	15	15	15	16	16	17		148					
Ryzhykova, Anna (UKR) (1989)			time	6.52	10.68	14.96	19.34	23.87	28.65	33.54	38.57	43.80	49.25		55.53	1 / 7			
	reaction time	0.202	interval		4.16	4.28	4.38	4.53	4.78	4.89	5.03	5.23	5.45	6.28			12.82	14.20	15.71
			velocity	6.90	8.41	8.18	7.99	7.73	7.32	7.16	6.96	6.69	6.42	6.37	7.20		8.19	7.39	6.68
	H1 lead leg	R	strides	22	14	14	14	14	15	15	15	15	16	154					
Kloster, Line (NOR) (1990)			time	6.27	10.42	14.75	19.10	23.57	28.22	33.14	38.50	43.91	49.63		56.44	2 / 8			
	reaction time	0.150	interval		4.15	4.33	4.35	4.47	4.65	4.92	5.36	5.41	5.72	6.81			12.83	14.04	16.49
			velocity	7.18	8.43	8.08	8.05	7.83	7.53	7.11	6.53	6.47	6.12	5.87	7.09		8.18	7.48	6.37
	H1 lead leg	R	strides	22	15	15	15	15	15	16	16	17	17	163					

Biomechanical Analysis

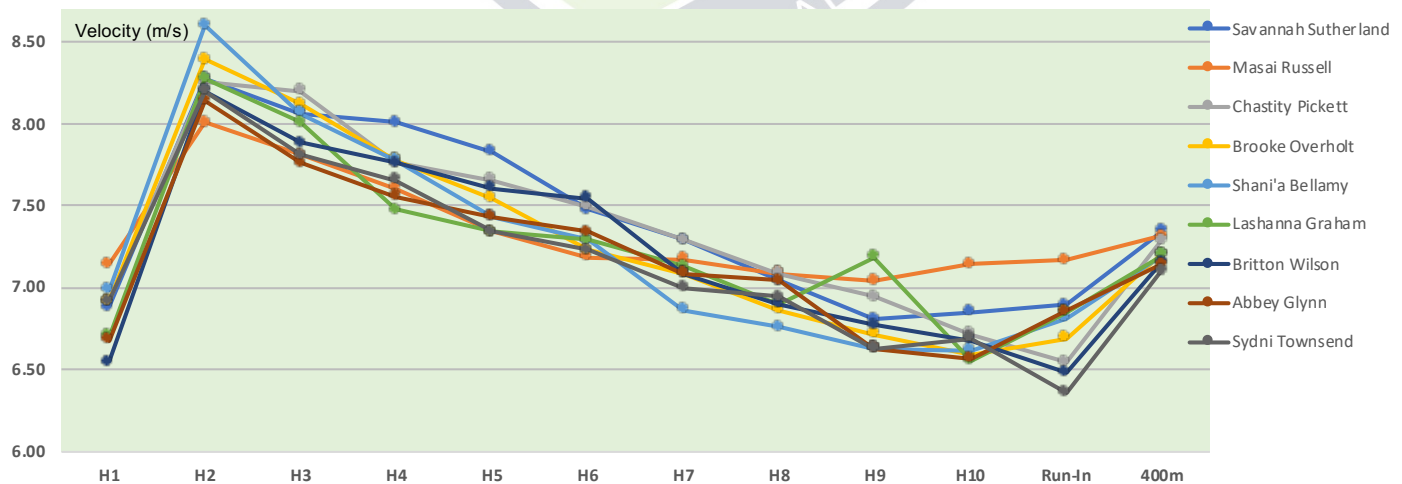
2023 NCAA Championships (Austin, TX) (TV Analysis)

Women's 400m Hurdles

Date 2023.06.10

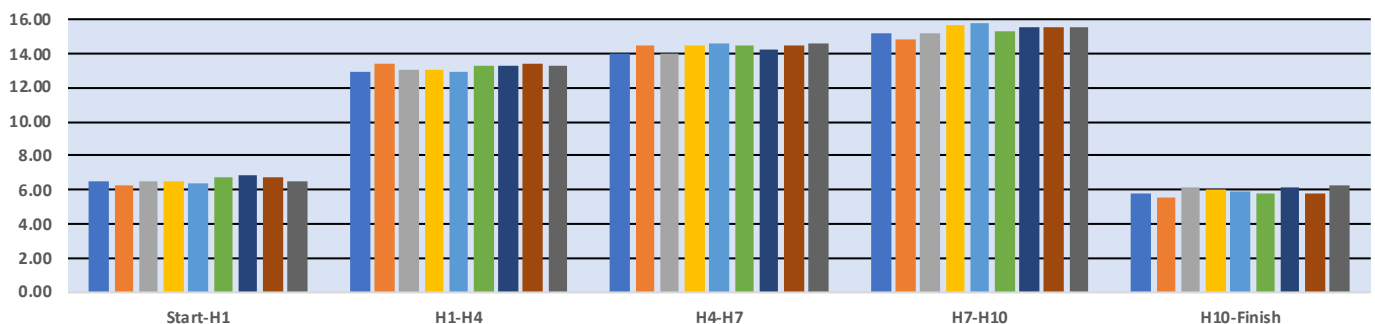
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Sutherland, Savannah (CAN) (2003)	time		6.54	10.77	15.11	19.48	23.95	28.63	33.43	38.40	43.54	48.65		54.45	7 / 1			
	reaction time																	
	interval			4.23	4.34	4.37	4.47	4.68	4.80	4.97	5.14	5.11	5.80	PB		12.94	13.95	15.22
	velocity		6.88	8.27	8.06	8.01	7.83	7.48	7.29	7.04	6.81	6.85	6.90	7.35		8.11	7.53	6.90
Russell, Masai (USA) (2000)	H1 lead leg	R	23	15	15	15	15	15	16	16	16	16	20	182				
	time		6.30	10.67	15.15	19.75	24.52	29.39	34.27	39.21	44.18	49.08		54.66	5 / 2			
	reaction time																	
	interval			4.37	4.48	4.60	4.77	4.87	4.88	4.94	4.97	4.90	5.58	PB		13.45	14.52	14.81
Pickett, Chastity (USA) (2001)	velocity		7.14	8.01	7.81	7.61	7.34	7.19	7.17	7.09	7.04	7.14	7.17	7.32		7.81	7.23	7.09
	H1 lead leg	R	24	16	16	16	16	16	16	17	17	17	21	192				
	time		6.50	10.74	15.01	19.52	24.09	28.76	33.56	38.50	43.54	48.75		54.86	8 / 3			
	reaction time																	
Overholt, Brooke (CAN) (2000)	interval			4.24	4.27	4.51	4.57	4.67	4.80	4.94	5.04	5.21	6.11	PB		13.02	14.04	15.19
	velocity		6.92	8.25	8.20	7.76	7.66	7.49	7.29	7.09	6.94	6.72	6.55	7.29		8.06	7.48	6.91
	H1 lead leg	L	22	14	14	14	14	15	15	15	15	15	15	171.2				
	strides																	
Bellamy, Shani'a (USA) (2002)	time		6.50	10.67	14.98	19.48	24.12	28.96	33.90	39.00	44.21	49.52		55.50	4 / 4			
	reaction time																	
	interval			4.17	4.31	4.50	4.64	4.84	4.94	5.10	5.21	5.31	5.98	PB		12.98	14.42	15.62
	velocity		6.92	8.39	8.12	7.78	7.54	7.23	7.09	6.86	6.72	6.59	6.69	7.21		8.09	7.28	6.72
Graham, Lashanna (JAM) (2000)	H1 lead leg	L	24	15	15	15	15	16	16	17	17	17	20	187				
	time		6.44	10.51	14.85	19.35	24.06	28.86	33.96	39.14	44.42	49.71		55.58	1 / 5			
	reaction time																	
	interval			4.07	4.34	4.50	4.71	4.80	5.10	5.18	5.28	5.29	5.87	PB		12.91	14.61	15.75
Wilson, Britton (USA) (2000)	velocity		6.99	8.60	8.06	7.78	7.43	7.29	6.86	6.76	6.63	6.62	6.81	7.20		8.13	7.19	6.67
	H1 lead leg	R	22	14	15	15	15	15	16	16	16	16	18.5	178.5				
	time		6.71	10.94	15.31	19.99	24.76	29.56	34.47	39.54	44.41	49.75		55.59	9 / 6			
	reaction time																	
Glynn, Abbey (USA) (2001)	interval			4.23	4.37	4.68	4.77	4.80	4.91	5.07	4.87	5.34	5.84	PB		13.28	14.48	15.28
	velocity		6.71	8.27	8.01	7.48	7.34	7.29	7.13	6.90	7.19	6.55	6.85	7.20		7.91	7.25	6.87
	H1 lead leg	L	22.14	15	15	15	15	15	15	16	15	16		159.14				
	strides																	
Townsend, Sydney (USA) (2000)	time		6.87	11.14	15.58	20.09	24.69	29.33	34.27	39.34	44.51	49.75		55.92	6 / 7			
	reaction time																	
	interval			4.27	4.44	4.51	4.60	4.64	4.94	5.07	5.17	5.24	6.17			13.22	14.18	15.48
	velocity		6.55	8.20	7.88	7.76	7.61	7.54	7.09	6.90	6.77	6.68	6.48	7.15		7.94	7.40	6.78
Glynn, Abbey (USA) (2001)	H1 lead leg	R	23	15	15	15	15	15	16	16	16	16		162				
	time		6.74	11.04	15.55	20.18	24.89	29.66	34.60	39.57	44.85	50.18		56.01	3 / 8			
	reaction time																	
	interval			4.30	4.51	4.63	4.71	4.77	4.94	4.97	5.28	5.33	5.83			13.44	14.42	15.58
Townsend, Sydney (USA) (2000)	velocity		6.68	8.14	7.76	7.56	7.43	7.34	7.09	7.04	6.63	6.57	6.86	7.14		7.81	7.28	6.74
	H1 lead leg	L	22	15	15	15	15	15	15	15	17	17		161				
	time		6.50	10.77	15.25	19.82	24.59	29.43	34.43	39.47	44.75	49.98		56.27	2 / 9			
	reaction time																	
Glynn, Abbey (USA) (2001)	interval			4.27	4.48	4.57	4.77	4.84	5.00	5.04	5.28	5.23	6.29			13.32	14.61	15.55
	velocity		6.92	8.20	7.81	7.66	7.34	7.23	7.00	6.94	6.63	6.69	6.36	7.11		7.88	7.19	6.75
	H1 lead leg	L	23	16	16	16	16	17	18	17	18	18		175				
	strides																	



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=0E8BFbQS0ao>

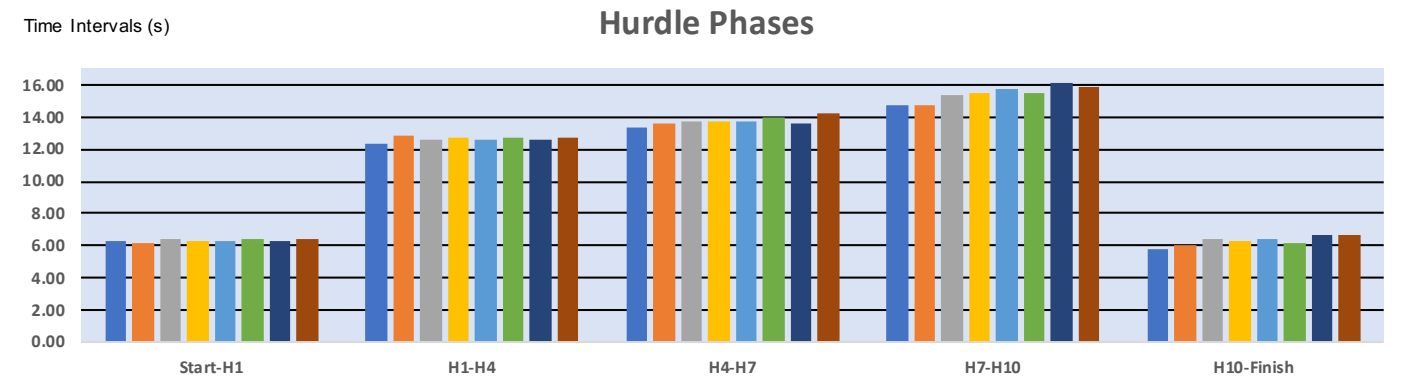
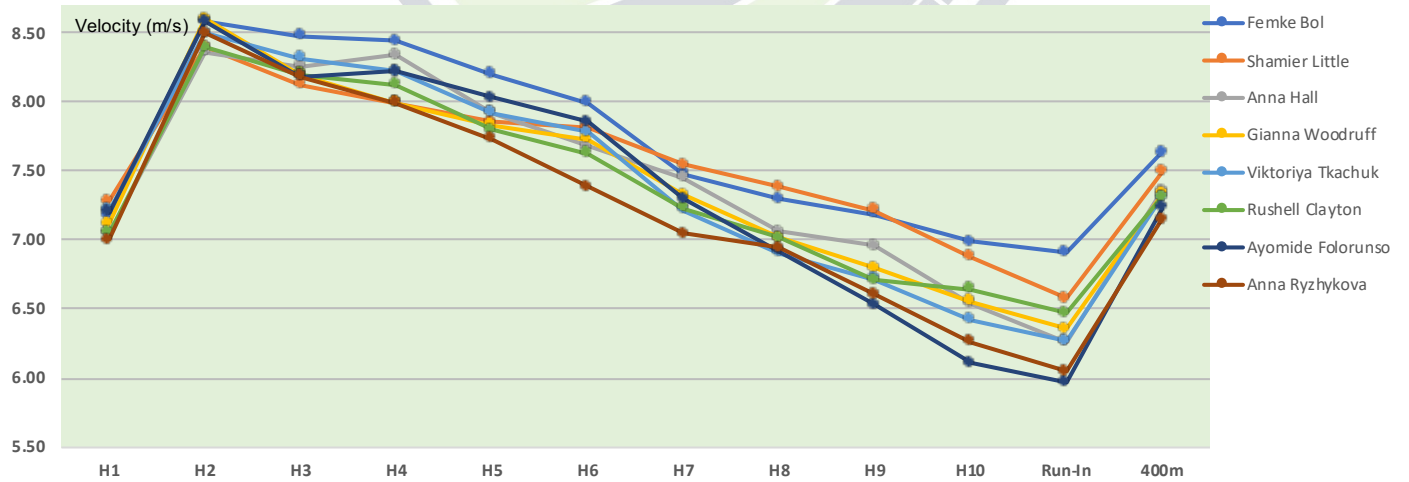
2023 Golden Gala Pietro Mennea (Firenze, ITA)

Women's 400m Hurdles

Date 2023.06.02

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			6.27	10.35	14.48	18.63	22.90	27.28	31.96	36.76	41.63	46.64		52.43	6 / 1			
	reaction time	0.170	interval														12.36	13.33	14.68
			velocity	7.18	4.08	4.13	4.15	4.27	4.38	4.68	4.80	4.87	5.01	5.79			8.50	7.88	7.15
	H1 lead leg	L	strides	22	14	14	14	14	14	14	15	15	15	19	170				
Little, Shamier (USA) (1995)	time			6.18	10.35	14.66	19.04	23.50	27.98	32.62	37.36	42.21	47.30		53.38	4 / 2			
	reaction time	0.153	interval														12.86	13.58	14.68
			velocity	7.28	4.17	4.31	4.38	4.46	4.48	4.64	4.74	4.85	5.09	6.08			8.16	7.73	7.15
	H1 lead leg	R	strides	23	15	15	15	15	15	15	15	15	16	19.2	178.2				
Hall, Anna (USA) (2001)	time			6.38	10.57	14.81	19.01	23.43	27.99	32.69	37.65	42.68	48.03		54.42	8 / 3			
	reaction time	0.182	interval														12.63	13.68	15.34
			velocity	7.05	4.19	4.24	4.20	4.42	4.56	4.70	4.96	5.03	5.35	6.39	PB		8.31	7.68	6.84
	H1 lead leg	L	strides	21	14	14	14	14	15	15	15	15	17	19.5	173.5				
Woodruff, Gianna (PAN) (1993)	time			6.32	10.39	14.66	19.04	23.51	28.04	32.82	37.81	42.96	48.30		54.59	3 / 4			
	reaction time	0.184	interval														12.72	13.78	15.48
			velocity	7.12	4.07	4.27	4.38	4.47	4.53	4.78	4.99	5.15	5.34	6.29			8.25	7.62	6.78
	H1 lead leg	L	strides	22	15	15	15	15	15	15	16	16	17	19.5	180.5				
Tkachuk, Viktoriya (UKR) (1994)	time			6.24	10.36	14.57	18.83	23.25	27.75	32.60	37.67	42.88	48.33		54.71	7 / 5			
	reaction time	0.167	interval														12.59	13.77	15.73
			velocity	7.21	4.12	4.21	4.26	4.42	4.50	4.85	5.07	5.21	5.45	6.38			8.34	7.63	6.68
	H1 lead leg	L	strides	22	15	15	15	15	15	16	16	17	17	20.2	328.2				
Clayton, Rushell (JAM) (1992)	time			6.38	10.55	14.82	19.13	23.62	28.21	33.05	38.04	43.26	48.53		54.71	5 / 6			
	reaction time	0.133	interval														12.75	13.92	15.48
			velocity	7.05	4.17	4.27	4.31	4.49	4.59	4.84	4.99	5.22	5.27	6.18			8.24	7.54	6.78
	H1 lead leg	L	strides	23	15	14	14	15	15	15	16	16	16	19	178				
Folorunso, Ayomide (ITA) (1996)	time			6.25	10.33	14.61	18.87	23.23	27.69	32.49	37.55	42.91	48.64		55.34	2 / 7			
	reaction time	0.190	interval														12.62	13.62	16.15
			velocity	7.20	4.08	4.18	4.26	4.36	4.46	4.80	5.06	5.36	5.73	6.70			8.32	7.71	6.50
	H1 lead leg	L	strides	23	15	15	15	15	15	16	16	16	17	21.2	184.2				
Ryzhykova, Anna (UKR) (1989)	time			6.43	10.55	14.83	19.21	23.74	28.48	33.45	38.49	43.79	49.38		55.99	1 / 8			
	reaction time	0.155	interval														12.78	14.24	15.93
			velocity	7.00	4.12	4.28	4.38	4.53	4.74	4.97	5.04	5.30	5.59	6.61			8.22	7.37	6.59
	H1 lead leg	R	strides	22	14	14	14	14	14	15	15	16	16	20	130				



Source: Omega Timing (Fri 2 Jun 2023 20:10) - diamond league race analysis
<https://www.omegatiming.com/File/000203050101050101FFFFFFFFFFFF4D.pdf>
Video: <https://www.youtube.com/watch?v=Cw6iko0XnE>

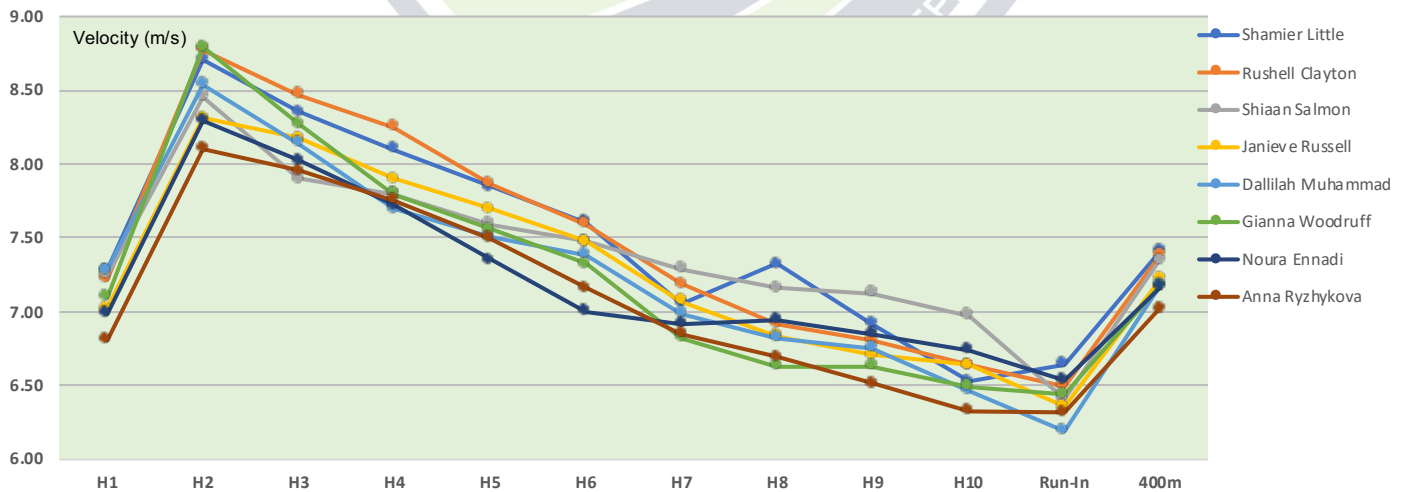
2023 Meeting International Mohammed VI d'Athlétisme (Rabat, MAR)

Women's 400m Hurdles

Date 2023.05.28

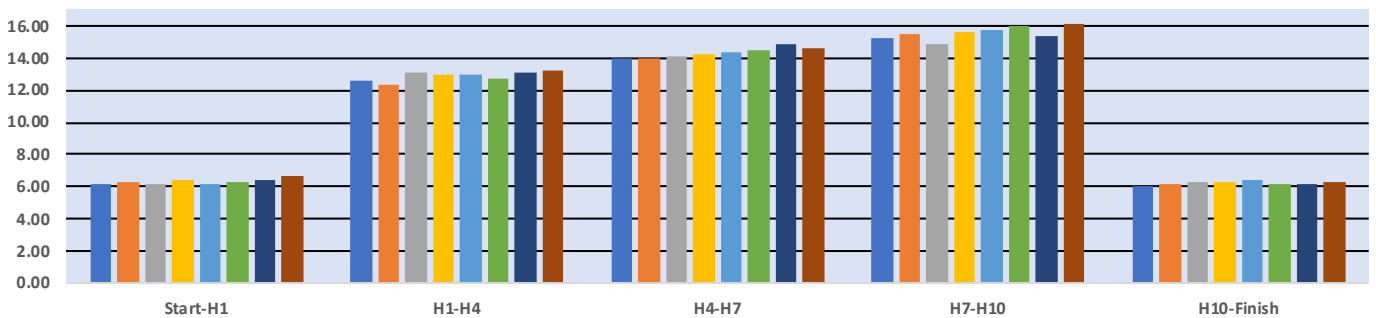
FINAL

				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Little, Shamier (USA) (1995)	time			6.18	10.20	14.39	18.71	23.17	27.77	32.73	37.51	42.57	47.93		53.95	4 / 1			
	reaction time	0.183	interval		4.02	4.19	4.32	4.46	4.60	4.96	4.78	5.06	5.36	6.02			12.53	14.02	15.20
	velocity			7.28	8.71	8.35	8.10	7.85	7.61	7.06	7.32	6.92	6.53	6.64	7.41		8.38	7.49	6.91
	H1 lead leg	R	strides	23	15	15	15	15	15	15	15	15	16	19.5	178.5				
Clayton, Rushell (JAM) (1992)	time			6.23	10.22	14.35	18.59	23.04	27.65	32.52	37.58	42.72	47.99		54.15	5 / 2			
	reaction time	0.142	interval		3.99	4.13	4.24	4.45	4.61	4.87	5.06	5.14	5.27	6.16			12.36	13.93	15.47
	velocity			7.22	8.77	8.47	8.25	7.87	7.59	7.19	6.92	6.81	6.64	6.49	7.39		8.50	7.54	6.79
	H1 lead leg	L	strides	23	15	15	15	15	15	16	16	16	16	19.2	181.2				
Salmon, Shiaan (JAM) (1999)	time			6.21	10.35	14.78	19.27	23.88	28.56	33.36	38.25	43.16	48.18		54.42	3 / 3			
	reaction time	0.178	interval		4.14	4.43	4.49	4.61	4.68	4.80	4.89	4.91	5.02	6.24			13.06	14.09	14.82
	velocity			7.25	8.45	7.90	7.80	7.59	7.48	7.29	7.16	7.13	6.97	6.41	7.35		8.04	7.45	7.09
	H1 lead leg	R	strides	21	15	15	14	15	15	16	16	16	16	19.7	178.7				
Russell, Janieve (JAM) (1993)	time			6.41	10.62	14.90	19.33	23.88	28.56	33.51	38.63	43.85	49.12		55.41	7 / 4			
	reaction time	0.160	interval		4.21	4.28	4.43	4.55	4.68	4.95	5.12	5.22	5.27	6.29			12.92	14.18	15.61
	velocity			7.02	8.31	8.18	7.90	7.69	7.48	7.07	6.84	6.70	6.64	6.36	7.22		8.13	7.40	6.73
	H1 lead leg	L	strides	23	15	15	15	15	16	16			17	20	152				
Muhammad, Dalilah (USA) (1990)	time			6.18	10.28	14.58	19.13	23.79	28.53	33.54	38.67	43.85	49.26		55.72	6 / 5			
	reaction time	0.17	interval		4.10	4.30	4.55	4.66	4.74	5.01	5.13	5.18	5.41	6.46			12.95	14.41	15.72
	velocity			7.28	8.54	8.14	7.69	7.51	7.38	6.99	6.82	6.76	6.47	6.19	7.18		8.11	7.29	6.68
	H1 lead leg	R	strides	22	14	14	15	15	15	15			16	20	146				
Woodruff, Gianna (PAN) (1993)	time			6.34	10.32	14.55	19.04	23.67	28.45	33.58	38.86	44.14	49.53		55.74	2 / 6			
	reaction time	0.201	interval		3.98	4.23	4.49	4.63	4.78	5.13	5.28	5.28	5.39	6.21			12.70	14.54	15.95
	velocity			7.10	8.79	8.27	7.80	7.56	7.32	6.82	6.63	6.63	6.49	6.44	7.18		8.27	7.22	6.58
	H1 lead leg	R	strides	22	14		15	15	15	16			16	19	132				
Ennadi, Noura (MAR) (1999)	time			6.44	10.66	15.02	19.55	24.31	29.31	34.37	39.41	44.52	49.71		55.83	1 / 7			
	reaction time	0.183	interval		4.22	4.36	4.53	4.76	5.00	5.06	5.04	5.11	5.19	6.12	PB		13.11	14.82	15.34
	velocity			6.99	8.29	8.03	7.73	7.35	7.00	6.92	6.94	6.85	6.74	6.54	7.16		8.01	7.09	6.84
	H1 lead leg	R	strides	23	15		15	15	17			17	17	20	139				
Ryzhykova, Anna (UKR) (1989)	time			6.61	10.93	15.33	19.84	24.51	29.40	34.51	39.74	45.11	50.64		56.97	8 / 8			
	reaction time	0.268	interval		4.32	4.40	4.51	4.67	4.89	5.11	5.23	5.37	5.53	6.33			13.23	14.67	16.13
	velocity			6.81	8.10	7.95	7.76	7.49	7.16	6.85	6.69	6.52	6.33	6.32	7.02		7.94	7.16	6.51
	H1 lead leg	R	strides	22	14	14	14	14	15	15			16	19	159				



Time Intervals (s)

Hurdle Phases



Source: Omega Timing (Sun 28 May 2023 19:08) - diamond league race analysis

<https://www.omegatiming.com/File/000203040101050101FFFFFFFF4D.pdf>Video: <https://www.youtube.com/watch?v=WczG-q8l6bQ>