

2021 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

2021 Season Hurdles Report

Men's 110m Hurdles

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Top 10 Times	33
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2021 Season Hurdles Report

Men's 400m Hurdles

Top 10 Times	62
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Women's 400m Hurdles

Top 10 Times	87
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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
- 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

2021 Top 10 Times - Men's 110m Hurdles

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 1 - 2020 USA Olympic Trials (Eugene, OR) (TV Analysis)										Vazel (2021) https://twitter.com/pjvazel/status/1409323602432999426?s=21								
date	26-Jun	time	2.49	3.49	4.45	5.40	6.36	7.36	8.35	9.36	10.38	11.42		12.81	5 / 1			
reaction time	0.169	interval	7 steps	1.00	0.96	0.95	0.96	1.00	0.99	1.01	1.02	1.04	1.39	PB		2.91	2.95	3.07
wind	1.8 m/s	velocity	5.51	9.14	9.52	9.62	9.52	9.14	9.23	9.05	8.96	8.79	10.09	8.59		9.42	9.29	8.93
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 - 2020 USA Olympic Trials (Eugene, OR) (TV Analysis)										Henson (2021) - Athlete First: 2021 year end hurdle report								
date	26-Jun	time	2.40	3.37	4.34	5.30	6.27	7.24	8.26	9.27	10.33	11.42		12.96	4 / 1			
reaction time	0.146	interval	7 steps	0.97	0.97	0.96	0.97	0.97	1.02	1.01	1.06	1.09	1.54			2.90	2.96	3.16
wind	0.4 m/s	velocity	5.72	9.42	9.42	9.52	9.42	9.42	8.96	9.05	8.62	8.39	9.10	8.49		9.46	9.26	8.68
Allen, Devon (USA) (1994)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2021 Boris Hanžeković Memorial (Zagreb, CRO) (TV Analysis)										Henson (2021) - Athlete First: 2021 year end hurdle report								
date	14-Sep	time	2.46	3.50	4.50	5.47	6.47	7.47	8.47	9.47	10.50	11.53		12.99	5 / 1			
reaction time	0.126	interval		1.04	1.00	0.97	1.00	1.00	1.00	1.00	1.03	1.03	1.46	PB		3.01	3.00	3.06
wind	0.7 m/s	velocity	5.58	8.79	9.14	9.42	9.14	9.14	9.14	9.14	8.87	8.87	9.60	8.47		9.11	9.14	8.96
McLeod, Omar (JAM) (1994)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2021 Golden Gala Pietro Mennea (Florence, ITA) (TV Analysis)										Henson (2021) - Athlete First: 2021 year end hurdle report								
date	10-Jun	time	2.44	3.50	4.48	5.48	6.48	7.48	8.48	9.50	10.50	11.56		13.01	4 / 1			
reaction time	0.147	interval		1.06	0.98	1.00	1.00	1.00	1.00	1.02	1.00	1.06	1.45			3.04	3.00	3.08
wind	-0.1 m/s	velocity	5.62	8.62	9.33	9.14	9.14	9.14	9.14	8.96	9.14	8.62	9.67	8.46		9.02	9.14	8.90
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
Heat 3 - 2020 Olympic Games (Tokyo, JPN) (TV Analysis)										Henson (2024) - Athlete First: 2021 year end hurdle report								
date	3-Aug	time	2.37	3.37	4.35	5.34	6.31	7.31	8.31	9.34	10.41	11.47		13.02	9 / 1			
reaction time	0.127	interval	7 steps	1.00	0.98	0.99	0.97	1.00	1.00	1.03	1.07	1.06	1.55			2.97	2.97	3.16
wind	-0.1 m/s	velocity	5.79	9.14	9.33	9.23	9.42	9.14	9.14	8.87	8.54	8.62	9.05	8.45		9.23	9.23	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 - 2021 Meeting de Paris (Paris, FRA) (TV Analysis)										Henson (2021) - Athlete First: 2021 year end hurdle report								
date	28-Aug	time	2.46	3.48	4.48	5.48	6.46	7.46	8.44	9.46	10.50	11.54		13.03	6 / 1			
reaction time	0.138	interval	7 steps	1.02	1.00	1.00	0.98	1.00	0.98	1.02	1.04	1.04	1.49			3.02	2.96	3.10
wind	0.7 m/s	velocity	5.58	8.96	9.14	9.14	9.33	9.14	9.33	8.96	8.79	8.79	9.41	8.44		9.08	9.26	8.85
McLeod, Omar (JAM) (1994)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Heat 1 - 2021 Jamaican National Championships (Kingston, JAM) (TV Analysis)										Henson (2021) - Athlete First: 2021 year end hurdle report								
date	26-Jun	time	2.47	3.53	4.53	5.56	6.53	7.57	8.57	9.57	10.58	11.59		13.04	4 / 1			
reaction time		interval		1.06	1.00	1.03	0.97	1.04	1.00	1.00	1.01	1.01	1.45			3.09	3.01	3.02
wind	1.3 m/s	velocity	5.55	8.62	9.14	8.87	9.42	8.79	9.14	9.14	9.05	9.05	9.67	8.44		8.87	9.11	9.08
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 - 2020 Olympic Games (Tokyo, JPN) (TV Analysis)										Henson (2021) - Athlete First: 2021 year end hurdle report								
date	5-Aug	time	2.50	3.54	4.56	5.54	6.52	7.50	8.50	9.54	10.56	11.58		13.04	7 / 1			
reaction time	0.130	interval	7 steps	1.04	1.02	0.98	0.98	0.98	1.00	1.04	1.02	1.02	1.46			3.04	2.96	3.08
wind	-0.5 m/s	velocity	5.49	8.79	8.96	9.33	9.33	9.33	9.14	8.79	8.96	8.96	9.60	8.44		9.02	9.26	8.90
Izumiya, Shunsuke (JPN) (2000)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2021 Japanese National Championships (Osaka, JPN)										Okudaira (2021) - https://twitter.com/mimishaca/status/1409407799885447172?s=21								
date	27-Jun	time	2.55	3.57	4.60	5.62	6.64	7.66	8.68	9.68	10.70	11.77		13.06	6 / 1			
reaction time	0.155	interval	7 steps	1.02	1.03	1.02	1.02	1.02	1.02	1.00	1.02	1.07	1.29	NR PB		3.07	3.06	3.09
wind	1.2 m/s	velocity	5.38	8.96	8.87	8.96	8.96	8.96	8.96	9.14	8.96	8.54	10.87	8.42		8.93	8.96	8.87
Allen, Devon (USA) (1994)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2021 Weltklasse (Zürich, SUI) (TV Analysis)										Henson (2021) - Athlete First: 2021 year end hurdle report								
date	9-Sep	time	2.48	3.52	4.52	5.52	6.54	7.56	8.58	9.60	10.60	11.64		13.06	4 / 1			
reaction time	0.115	interval		1.04	1.00	1.00	1.02	1.02	1.02	1.02	1.00	1.04	1.42			3.04	3.06	3.06
wind	0.6 m/s	velocity	5.53	8.79	9.14	9.14	8.96	8.96	8.96	8.96	9.14	8.79	9.87	8.42		9.02	8.96	8.96
Levy, Ronald (JAM) (1992)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2021 Weltklasse (Zürich, SUI) (TV Analysis)										Henson (2021) - Athlete First: 2021 year end hurdle report								
date	9-Sep	time	2.46	3.50	4.54	5.54	6.56	7.58	8.58	9.58	10.62	11.66		13.06	7 / 2			
reaction time	0.128	interval	7 steps	1.04	1.04	1.00	1.02	1.02	1.00	1.00	1.04	1.04	1.40			3.08	3.04	3.08
wind	0.6 m/s	velocity	5.58	8.79	8.79	9.14	8.96	8.96	9.14	9.14	8.79	8.79	10.01	8.42		8.90	9.02	8.90
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 - 2021 Tom Jones Invitational (Gainesville, FL) (TV Analysis)										Henson (2021) - Athlete First: 2021 year end hurdle report								
date	17-Apr	time	2.50	3.52	4.49	5.47	6.45	7.44	8.42	9.47	10.53	11.59		13.07	6 / 1			
reaction time		interval	7 steps	1.02	0.97	0.98	0.98	0.99	0.98	1.05	1.06	1.06	1.48			2.97	2.95	3.17
wind	1.3 m/s	velocity	5.49	8.96	9.42	9.33	9.33	9.23	9.33	8.70	8.62	8.62	9.47	8.42		9.23	9.29	8.65
Allen, Devon (USA) (1994)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2021 Athletissima (Lausanne, SUI) (TV Analysis)										Henson (2021) - Athlete First: 2021 year end hurdle report								
date	26-Aug	time	2.48	3.48	4.52	5.56	6.56	7.56	8.56	9.56	10.56	11.62		13.07	5 / 1			
reaction time	0.140	interval		1.00	1.04	1.04	1.00	1.00	1.00	1.00	1.00	1.06	1.45			3.08	3.00	3.06
wind	2.5 m/s	velocity	5.53	9.14	8.79	8.79	9.14	9.14	9.14	9.14	9.14	8.62	9.67	8.42		8.90	9.14	8.96

2021 Boris Hanžeković Memorial (Zagreb, CRO) (TV Analysis)

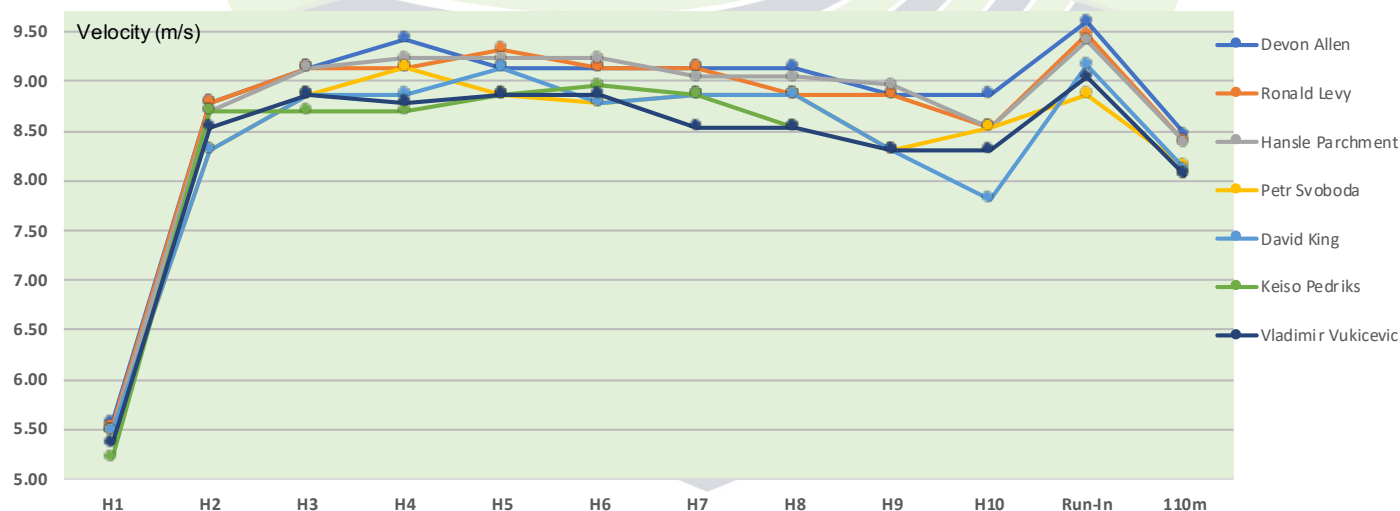
110m Hurdles

Date: 2021.09.14

Wind: 0.7 m/s

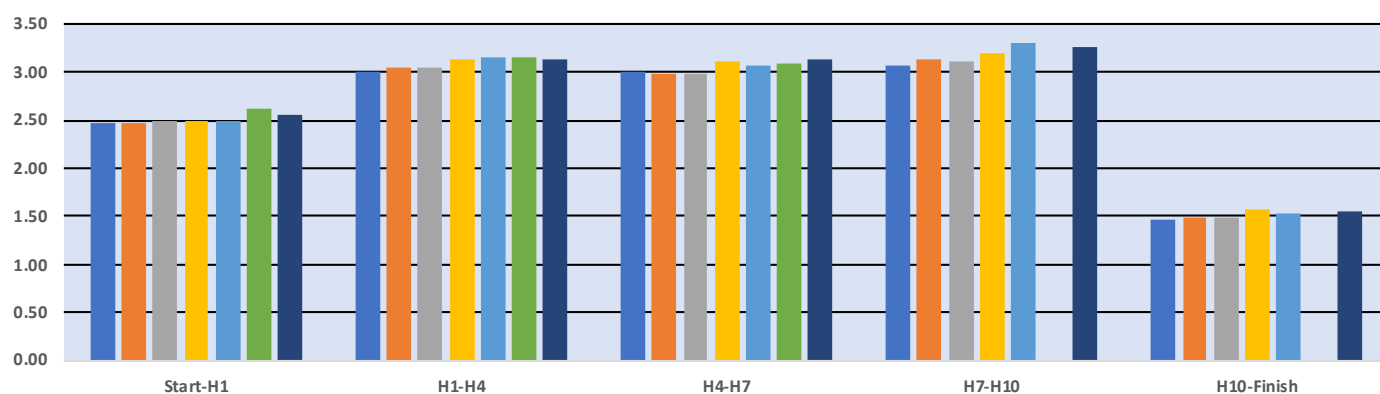
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Allen, Devon (USA) (1994)	time		2.46	3.50	4.50	5.47	6.47	7.47	8.47	9.47	10.50	11.53		12.99	5 / 1			
	reaction time	0.126												PB		3.01	3.00	3.06
	interval			1.04	1.00	0.97	1.00	1.00	1.00	1.00	1.03	1.03	1.46	8.47		9.11	9.14	8.96
Levy, Ronald (JAM) (1992)	time		2.48	3.52	4.52	5.52	6.50	7.50	8.50	9.53	10.56	11.63		13.11	4 / 2			
	reaction time	0.156														3.04	2.98	3.13
	interval		7 steps	1.04	1.00	1.00	0.98	1.00	1.00	1.03	1.03	1.07	1.48	8.39		9.02	9.20	8.76
Parchment, Hansle (JAM) (1990)	time		2.50	3.55	4.55	5.54	6.53	7.52	8.53	9.54	10.56	11.63		13.12	6 / 3			
	reaction time	0.141														3.04	2.99	3.10
	interval		7 steps	1.05	1.00	0.99	0.99	0.99	1.01	1.01	1.02	1.07	1.49	8.38		9.02	9.17	8.85
Svoboda, Petr (CZE) (1984)	time		2.50	3.60	4.63	5.63	6.66	7.70	8.73	9.76	10.86	11.93		13.51	7 / 4			
	reaction time	0.167														3.13	3.10	3.20
	interval			1.10	1.03	1.00	1.03	1.04	1.03	1.03	1.10	1.07	1.58	8.14		8.76	8.85	8.57
King, David (GBR) (1994)	time		2.50	3.60	4.63	5.66	6.66	7.70	8.73	9.76	10.86	12.03		13.56	3 / 5			
	reaction time	0.140														3.16	3.07	3.30
	interval		7 steps	1.10	1.03	1.03	1.00	1.04	1.03	1.03	1.10	1.17	1.53	8.11		8.68	8.93	8.31
Pedriks, Keiso (EST) (1994)	time		2.63	3.68	4.73	5.78	6.81	7.83	8.86	9.93				13.63	8 / 6			
	reaction time	0.182														3.15	3.08	
	interval		7 steps	1.05	1.05	1.05	1.03	1.02	1.03	1.07				PB		8.70	8.90	
Vukicevic, Vladimir (NOR) (1991)	time		2.56	3.63	4.66	5.70	6.73	7.76	8.83	9.90	11.00	12.10		13.65	2 / 7			
	reaction time	0.136														3.14	3.13	3.27
	interval			1.07	1.03	1.04	1.03	1.03	1.07	1.07	1.10	1.10	1.55	8.06		8.73	8.76	8.39
	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=v9hTtUSA-Wc>

2021 Weltklasse (Zürich, SUI) (TV Analysis)

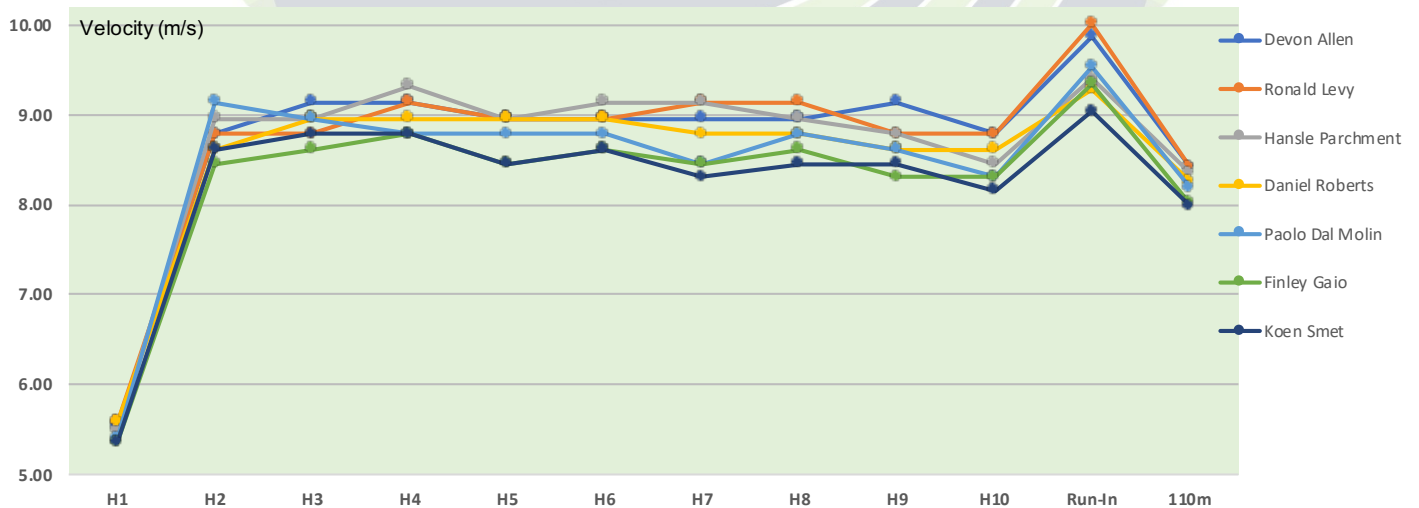
110m Hurdles

Date: 2021.09.09

Wind: 0.6 m/s

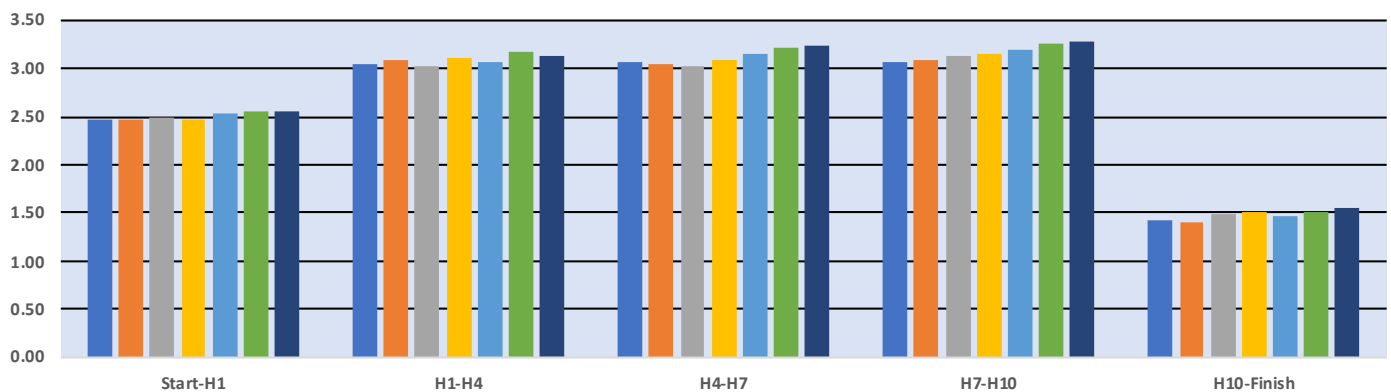
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Allen, Devon (USA) (1994)	time		2.48	3.52	4.52	5.52	6.54	7.56	8.58	9.60	10.60	11.64		13.06	4 / 1			
	reaction time	0.115											1.42			3.04	3.06	3.06
	interval velocity		5.53	8.79	9.14	9.14	8.96	8.96	8.96	8.96	9.14	8.79	9.87	8.42		9.02	8.96	8.96
Levy, Ronald (JAM) (1992)	time		2.46	3.50	4.54	5.54	6.56	7.58	8.58	9.58	10.62	11.66		13.06	7 / 2			
	reaction time	0.128											1.40			3.08	3.04	3.08
	interval velocity		5.58	8.79	8.79	9.14	8.96	8.96	9.14	9.14	8.79	8.79	10.01	8.42		8.90	9.02	8.90
Parchment, Hansle (JAM) (1990)	time		2.50	3.52	4.54	5.52	6.54	7.54	8.54	9.56	10.60	11.68		13.17	5 / 3			
	reaction time	0.132											1.49			3.02	3.02	3.14
	interval velocity		5.49	8.96	8.96	9.33	8.96	9.14	9.14	8.96	8.79	8.46	9.41	8.35		9.08	9.08	8.73
Roberts, Daniel (USA) (1997)	time		2.46	3.52	4.54	5.56	6.58	7.60	8.64	9.68	10.74	11.80		13.31	3 / 4			
	reaction time	0.173											1.51			3.10	3.08	3.16
	interval velocity		5.58	8.62	8.96	8.96	8.96	8.96	8.79	8.79	8.62	8.62	9.28	8.26		8.85	8.90	8.68
Dal Molin, Paolo (ITA) (1987)	time		2.54	3.54	4.56	5.60	6.64	7.68	8.76	9.80	10.86	11.96		13.43	2 / 5			
	reaction time	0.135											1.47			3.06	3.16	3.20
	interval velocity		5.40	9.14	8.96	8.79	8.79	8.79	8.46	8.79	8.62	8.31	9.54	8.19		8.96	8.68	8.57
Gaio, Finley (SUI) (1999)	time		2.56	3.64	4.70	5.74	6.82	7.88	8.96	10.02	11.12	12.22		13.72	8 / 6			
	reaction time	0.135											1.50			3.18	3.22	3.26
	interval velocity		5.36	8.46	8.62	8.79	8.46	8.62	8.46	8.62	8.31	8.31	9.35	8.02		8.62	8.52	8.41
Smet, Koen (NED) (1992)	time		2.56	3.62	4.66	5.70	6.78	7.84	8.94	10.02	11.10	12.22		13.77	1 / 7			
	reaction time	0.132											1.55			3.14	3.24	3.28
	interval velocity		5.36	8.62	8.79	8.79	8.46	8.62	8.31	8.46	8.46	8.16	9.05	7.99		8.73	8.46	8.36



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 25fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=f-Bnl2iZogM>

2021 Meeting de Paris (Paris, FRA) (TV Analysis)

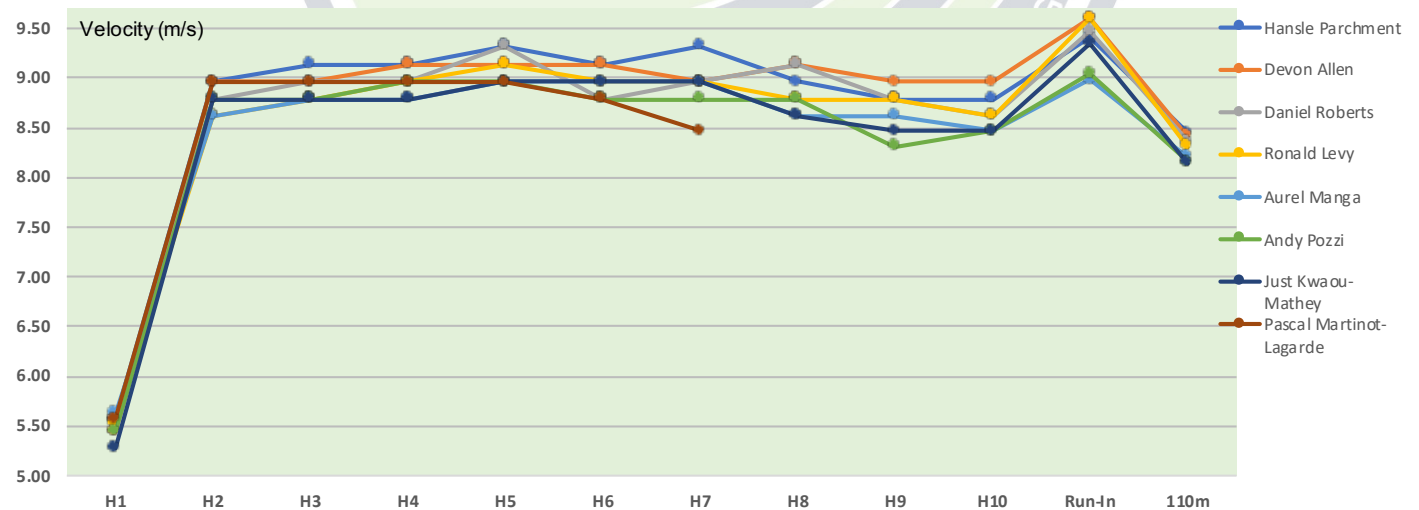
110m Hurdles

Date: 2021.08.28

Wind: 0.7 m/s

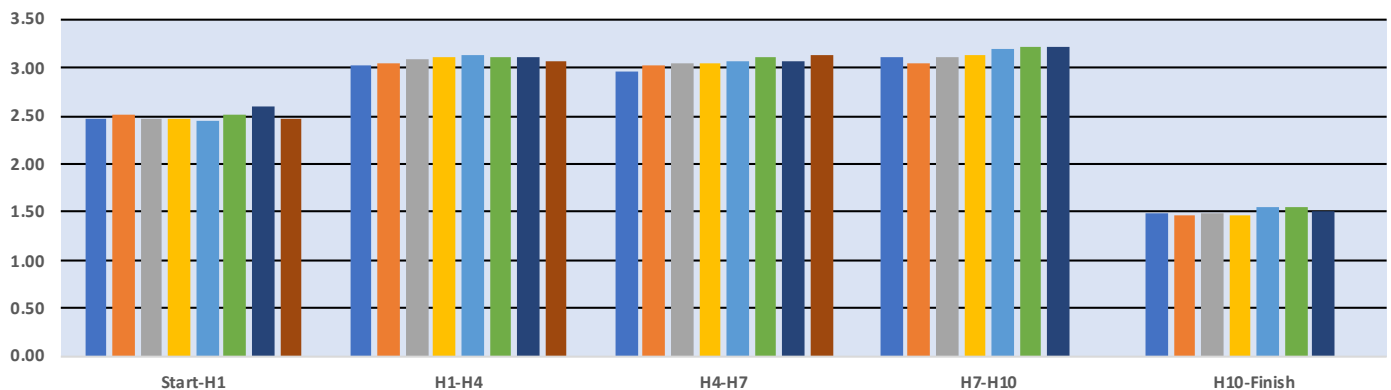
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Parchment, Hansle (JAM) (1990)	time		2.46	3.48	4.48	5.48	6.46	7.46	8.44	9.46	10.50	11.54		13.03	6 / 1			
	reaction time	0.138											1.49			3.02	2.96	3.10
	interval		7 steps	1.02	1.00	1.00	0.98	1.00	0.98	1.02	1.04	1.04	1.49			9.08	9.26	8.85
Allen, Devon (USA) (1994)	time		2.52	3.54	4.56	5.56	6.56	7.56	8.58	9.58	10.60	11.62		13.08	5 / 2			
	reaction time	0.141											1.46			3.04	3.02	3.04
	interval		7 steps	1.02	1.02	1.00	1.00	1.00	1.02	1.00	1.02	1.02	1.46			9.02	9.08	9.02
Roberts, Daniel (USA) (1997)	time		2.46	3.50	4.52	5.54	6.52	7.56	8.58	9.58	10.62	11.68		13.16	2 / 3			
	reaction time	0.169											1.48			3.08	3.04	3.10
	interval		7 steps	1.04	1.02	1.02	0.98	1.04	1.02	1.00	1.04	1.06	1.48			8.90	9.02	8.85
Levy, Ronald (JAM) (1992)	time		2.48	3.54	4.58	5.60	6.60	7.62	8.64	9.68	10.72	11.78		13.24	4 / 4			
	reaction time	0.144											1.46			3.12	3.04	3.14
	interval		7 steps	1.06	1.04	1.02	1.00	1.02	1.02	1.04	1.04	1.06	1.46			8.79	9.02	8.73
Manga, Aurel (FRA) (1992)	time		2.44	3.50	4.54	5.58	6.60	7.62	8.64	9.70	10.76	11.84		13.40	7 / 5			
	reaction time	0.154											1.56			3.14	3.06	3.20
	interval		7 steps	1.06	1.04	1.04	1.02	1.02	1.02	1.06	1.06	1.08	1.56			8.73	8.96	8.57
Pozzi, Andy (GBR) (1992)	time		2.52	3.56	4.60	5.62	6.64	7.68	8.72	9.76	10.86	11.94		13.49	8 / 6			
	reaction time	0.126											1.55			3.10	3.10	3.22
	interval		7 steps	1.04	1.04	1.02	1.02	1.04	1.04	1.04	1.10	1.08	1.55			8.85	8.85	8.52
Kwaou-Mathey, Just (FRA) (1999)	time		2.60	3.64	4.68	5.72	6.74	7.76	8.78	9.84	10.92	12.00		13.50	1 / 7			
	reaction time	0.161											1.50			3.12	3.06	3.22
	interval		7 steps	1.04	1.04	1.04	1.02	1.02	1.02	1.06	1.08	1.08	1.50			8.79	8.96	8.52
Martino-Lagarde, Pascal (FRA) (1991)	time		2.46	3.48	4.50	5.52	6.54	7.58	8.66						3 / --			
	reaction time	0.150														3.06	3.14	
	interval		7 steps	1.02	1.02	1.02	1.02	1.04	1.08							8.96	8.73	
	velocity		5.58	8.96	8.96	8.96	8.96	8.96	8.96	8.62	8.46	8.46	9.35	8.15				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 25fps
 Timing From: First Movement
 Source: https://www.youtube.com/watch?v=1Q-OmB5Kl_m4

2021 Athletissima (Lausanne, SUI) (TV Analysis)

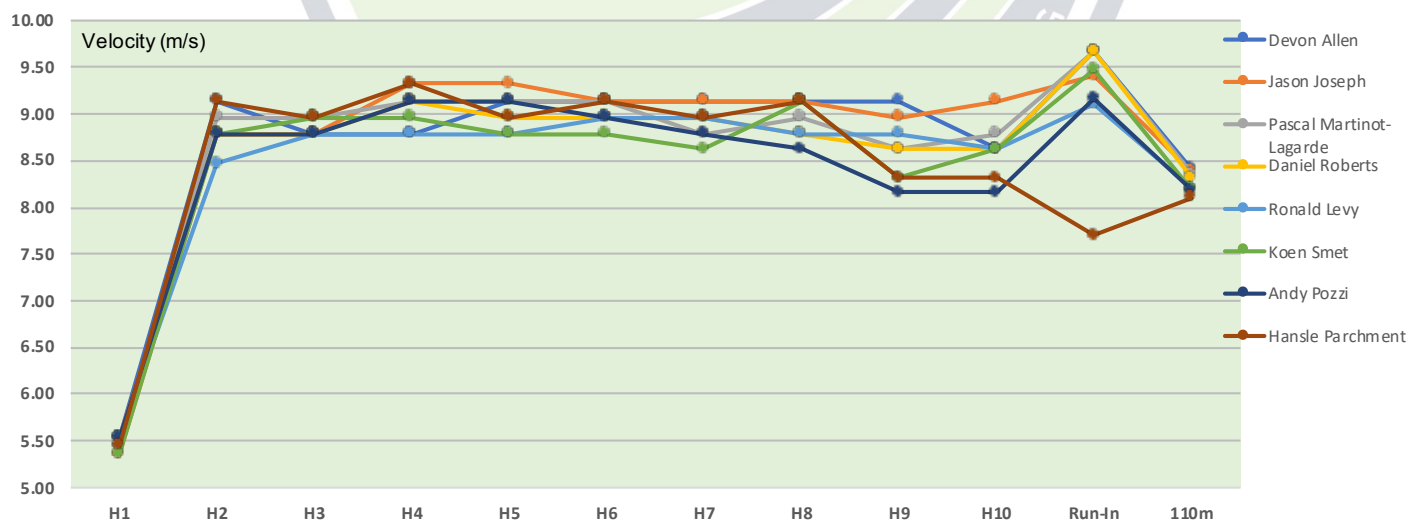
110m Hurdles

Date: 2021.08.26

Wind: 2.5 m/s

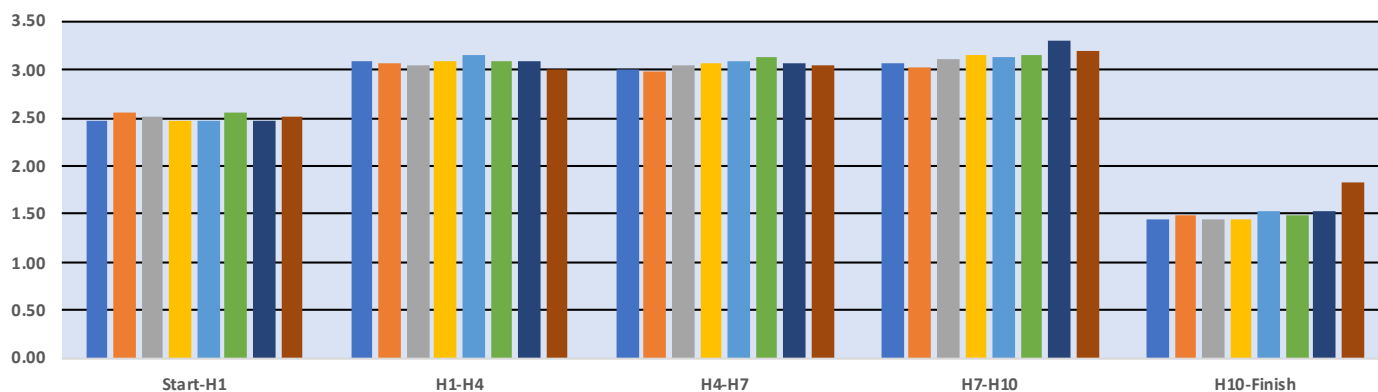
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Allen, Devon (USA) (1994)	time		2.48	3.48	4.52	5.56	6.56	7.56	8.56	9.56	10.56	11.62		13.07	5 / 1			
	reaction time	0.140											1.45			3.08	3.00	3.06
	interval			1.00	1.04	1.04	1.00	1.00	1.00	1.00	1.00	1.06	1.45			8.90	9.14	8.96
Joseph, Jason (SUI) (1998)	time		2.56	3.60	4.64	5.62	6.60	7.60	8.60	9.60	10.62	11.62		13.11	3 / 2			
	reaction time	0.149											1.49			3.06	2.98	3.02
	interval		7 steps	1.04	1.04	0.98	0.98	1.00	1.00	1.00	1.02	1.00	1.49			8.96	9.20	9.08
Martinot-Lagarde, Pascal (FRA) (1991)	time		2.52	3.54	4.56	5.56	6.56	7.56	8.60	9.62	10.68	11.72		13.17	2 / 3			
	reaction time	0.149											1.45			3.04	3.04	3.12
	interval		7 steps	1.02	1.02	1.00	1.00	1.00	1.04	1.02	1.06	1.04	1.45			9.02	9.02	8.79
Roberts, Daniel (USA) (1997)	time		2.48	3.52	4.56	5.56	6.58	7.60	8.62	9.66	10.72	11.78		13.23	7 / 4			
	reaction time	0.178											1.45			3.08	3.06	3.16
	interval			1.04	1.04	1.00	1.02	1.02	1.02	1.04	1.06	1.06	1.45			8.90	8.96	8.68
Levy, Ronald (JAM) (1992)	time		2.48	3.56	4.60	5.64	6.68	7.70	8.72	9.76	10.80	11.86		13.40	4 / 5			
	reaction time	0.113											1.54			3.16	3.08	3.14
	interval		7 steps	1.08	1.04	1.04	1.04	1.02	1.02	1.04	1.04	1.06	1.54			8.68	8.90	8.73
Smet, Koen (NED) (1992)	time		2.56	3.60	4.62	5.64	6.68	7.72	8.78	9.78	10.88	11.94		13.42	1 / 6			
	reaction time	0.144											1.48			3.08	3.14	3.16
	interval			1.04	1.02	1.02	1.04	1.04	1.06	1.00	1.10	1.06	1.48			8.90	8.73	8.68
Pozzi, Andy (GBR) (1992)	time		2.48	3.52	4.56	5.56	6.56	7.58	8.62	9.68	10.80	11.92		13.45	8 / 7			
	reaction time	0.149											1.53			3.08	3.06	3.30
	interval		7 steps	1.04	1.04	1.00	1.00	1.02	1.04	1.06	1.12	1.12	1.53			8.90	8.96	8.31
Parchment, Hansle (JAM) (1990)	time		2.52	3.52	4.54	5.52	6.54	7.54	8.56	9.56	10.66	11.76		13.58	6 / 8			
	reaction time	0.133											1.82			3.00	3.04	3.20
	interval		7 steps	1.00	1.02	0.98	1.02	1.00	1.02	1.00	1.10	1.10	1.82			9.14	9.02	8.57
	velocity		5.53	8.79	8.79	9.14	8.96	8.96	8.96	8.79	8.62	8.31	8.31	7.70				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 25fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=QGOvkoiEs8U>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

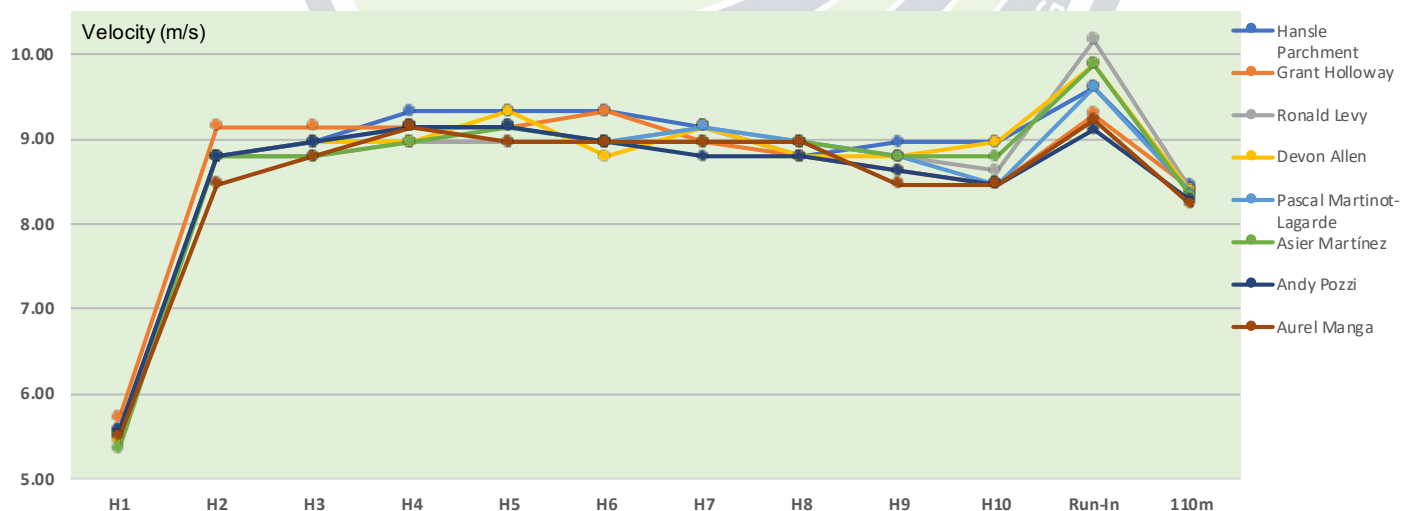
110m Hurdles

Date: 2021.08.05

Wind: -0.5 m/s

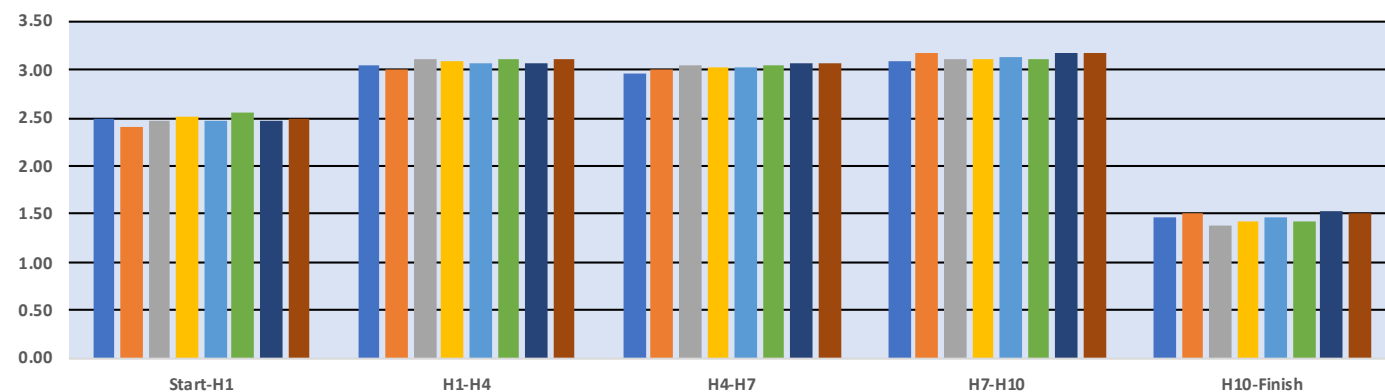
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Parchment, Hansle (JAM) (1990)	time		2.50	3.54	4.56	5.54	6.52	7.50	8.50	9.54	10.56	11.58		13.04	7 / 1	3.04	2.96	3.08
	reaction time	0.130																
	interval		7 steps	1.04	1.02	0.98	0.98	0.98	1.00	1.04	1.02	1.02	1.46					
	velocity		5.49	8.79	8.96	9.33	9.33	9.33	9.14	8.79	8.96	8.96	9.60	8.44		9.02	9.26	8.90
Holloway, Grant (USA) (1997)	time		2.40	3.40	4.40	5.40	6.40	7.38	8.40	9.44	10.50	11.58		13.09	4 / 2	3.00	3.00	3.18
	reaction time	0.136																
	interval		7 steps	1.00	1.00	1.00	1.00	0.98	1.02	1.04	1.06	1.08	1.51					
	velocity		5.72	9.14	9.14	9.14	9.14	9.33	8.96	8.79	8.62	8.46	9.28	8.40		9.14	9.14	8.62
Levy, Ronald (JAM) (1992)	time		2.46	3.50	4.54	5.56	6.58	7.60	8.60	9.62	10.66	11.72		13.10	5 / 3	3.10	3.04	3.12
	reaction time	0.146																
	interval		7 steps	1.04	1.04	1.02	1.02	1.02	1.00	1.02	1.04	1.06	1.38					
	velocity		5.58	8.79	8.79	8.96	8.96	8.96	9.14	8.96	8.79	8.62	10.16	8.40		8.85	9.02	8.79
Allen, Devon (USA) (1994)	time		2.52	3.56	4.58	5.60	6.58	7.62	8.62	9.66	10.70	11.72		13.14	6 / 4	3.08	3.02	3.10
	reaction time	0.133																
	interval			1.04	1.02	1.02	0.98	1.04	1.00	1.04	1.04	1.02	1.42					
	velocity		5.44	8.79	8.96	8.96	9.33	8.79	9.14	8.79	8.79	8.96	9.87	8.37		8.90	9.08	8.85
Martinot-Lagarde, Pascal (FRA) (1991)	time		2.48	3.52	4.54	5.54	6.54	7.56	8.56	9.58	10.62	11.70		13.16	8 / 5	3.06	3.02	3.14
	reaction time	0.120																
	interval		7 steps	1.04	1.02	1.00	1.00	1.02	1.00	1.02	1.04	1.08	1.46					
	velocity		5.53	8.79	8.96	9.14	9.14	8.96	9.14	8.96	8.79	8.46	9.60	8.36		8.96	9.08	8.73
Martínez, Asier (ESP) (2000)	time		2.56	3.60	4.64	5.66	6.66	7.68	8.70	9.72	10.76	11.80		13.22	2 / 6	3.10	3.04	3.10
	reaction time	0.155																
	interval		7 steps	1.04	1.04	1.02	1.00	1.02	1.02	1.02	1.04	1.04	1.42	PB				
	velocity		5.36	8.79	8.79	8.96	9.14	8.96	8.96	8.79	8.79	8.79	9.87	8.32		8.85	9.02	8.85
Pozzi, Andy (GBR) (1992)	time		2.46	3.50	4.52	5.52	6.52	7.54	8.58	9.62	10.68	11.76		13.30	3 / 7	3.06	3.06	3.18
	reaction time	0.140																
	interval		7 steps	1.04	1.02	1.00	1.00	1.02	1.04	1.04	1.06	1.08	1.54					
	velocity		5.58	8.79	8.96	9.14	9.14	8.96	8.79	8.79	8.62	8.46	9.10	8.27		8.96	8.96	8.62
Manga, Aurel (FRA) (1992)	time		2.50	3.58	4.62	5.62	6.64	7.66	8.68	9.70	10.78	11.86		13.38	9 / 8	3.12	3.06	3.18
	reaction time	0.151																
	interval		7 steps	1.08	1.04	1.00	1.02	1.02	1.02	1.02	1.08	1.08	1.52					
	velocity		5.49	8.46	8.79	9.14	8.96	8.96	8.96	8.96	8.46	8.46	9.22	8.22		8.79	8.96	8.62



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=QG0vkojEs8U>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

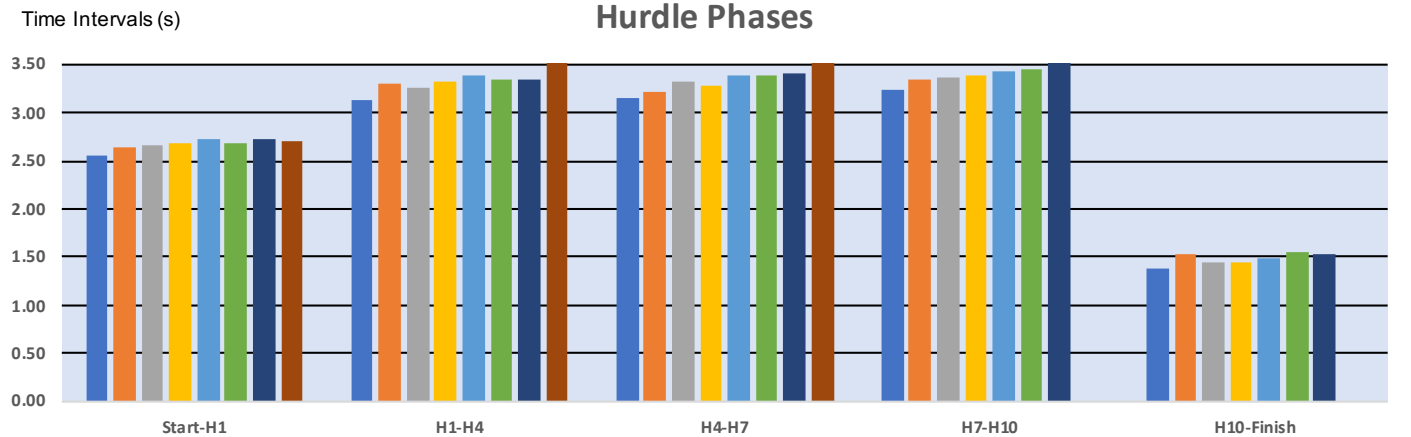
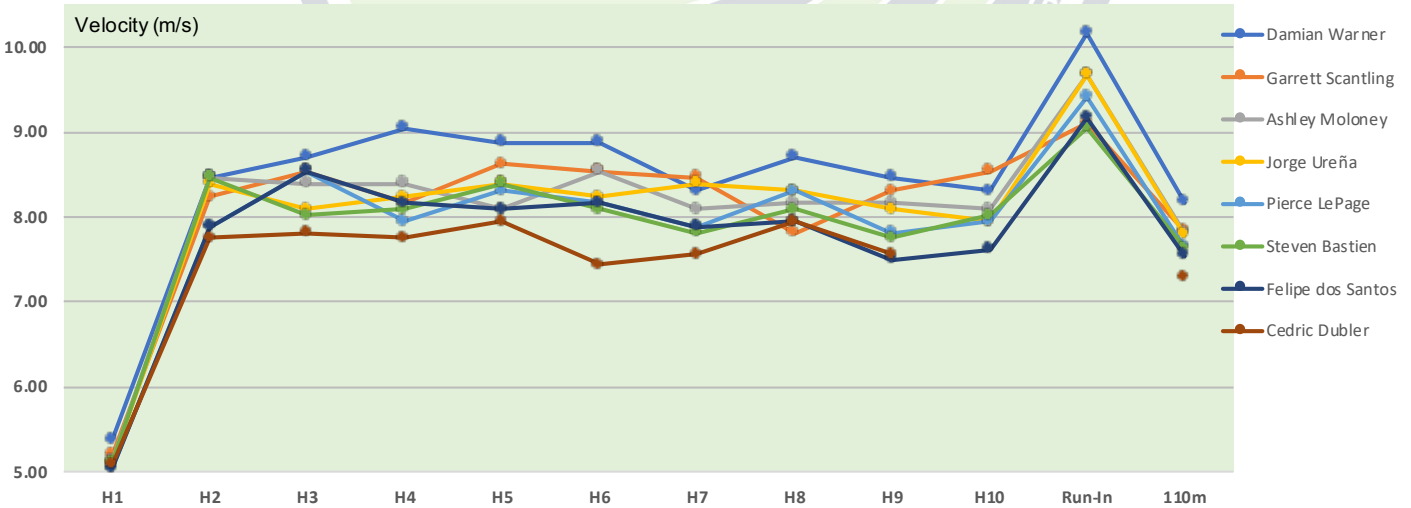
110m Hurdles

Date: 2021.08.05

Wind: -1.0 m/s

Decathlon - Heat 3

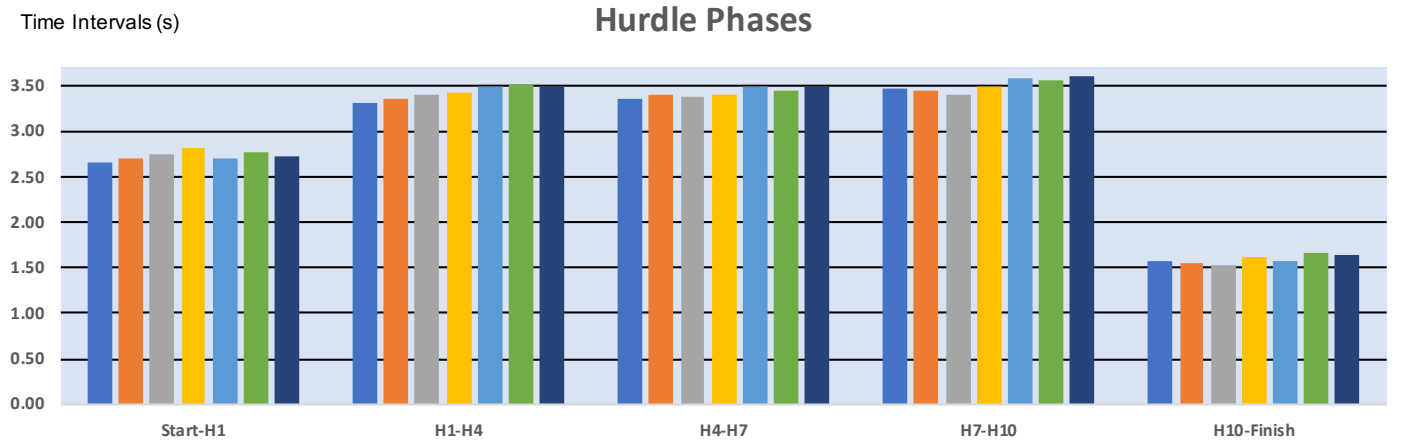
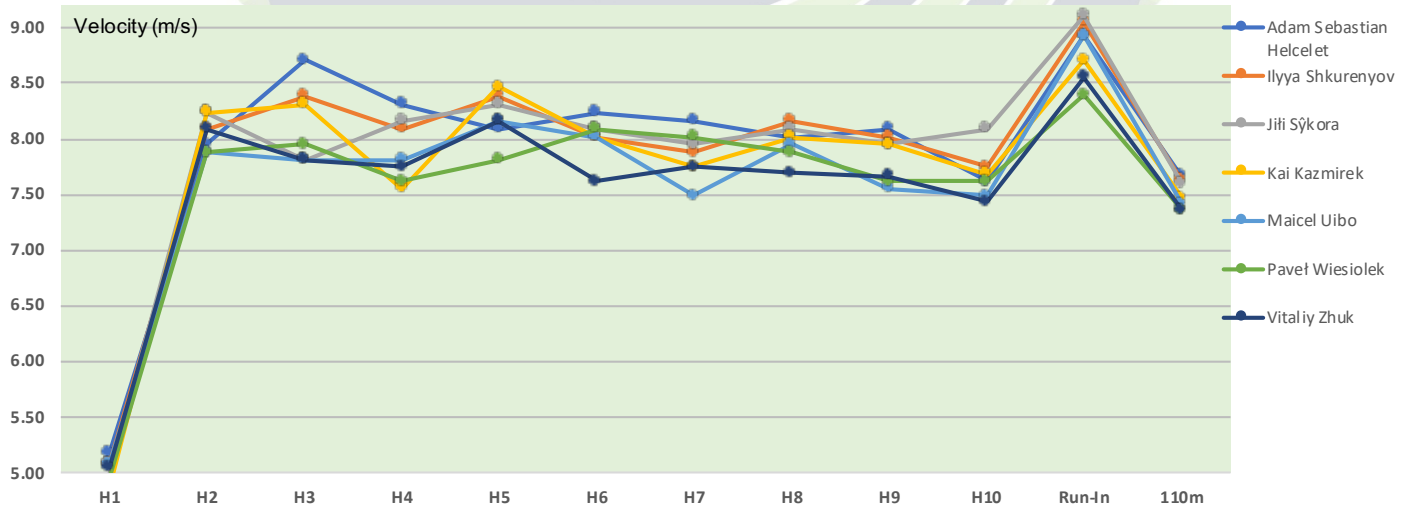
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Warner, Damian (CAN) (1989)	time		2.55	3.63	4.68	5.69	6.72	7.75	8.85	9.90	10.98	12.08		13.46	7 / 1	3.14	3.16	3.23
	reaction time	0.148												ODB				
	interval velocity		7 steps	1.08	1.05	1.01	1.03	1.03	1.10	1.05	1.08	1.10	1.38	8.17				
Scantling, Garrett (USA) (1993)	time		2.64	3.75	4.82	5.94	7.00	8.07	9.15	10.32	11.42	12.49		14.03	6 / 2	3.30	3.21	3.34
	reaction time	0.162											1.54	7.84				
	interval velocity		7 steps	1.11	1.07	1.12	1.06	1.07	1.08	1.17	1.10	1.07	9.10	7.84				
Moloney, Ashley (AUS) (2000)	time		2.67	3.75	4.84	5.93	7.06	8.13	9.26	10.38	11.50	12.63		14.08	3 / 3	3.26	3.33	3.37
	reaction time	0.143											1.45	PB				
	interval velocity		7 steps	1.08	1.09	1.09	1.13	1.07	1.13	1.12	1.12	1.13	9.67	7.81				
Ureña, Jorge (ESP) (1993)	time		2.68	3.77	4.90	6.01	7.10	8.21	9.30	10.40	11.53	12.68		14.13	9 / 4	3.33	3.29	3.38
	reaction time	0.132											1.45	9.67				
	interval velocity		7 steps	1.09	1.13	1.11	1.09	1.11	1.09	1.10	1.13	1.15	9.67	7.78				
LePage, Pierce (CAN) (1996)	time		2.72	3.88	4.95	6.10	7.20	8.32	9.48	10.58	11.75	12.90		14.39	5 / 5	3.38	3.38	3.42
	reaction time	0.168											1.49	7.64				
	interval velocity		7 steps	1.16	1.07	1.15	1.10	1.12	1.16	1.10	1.17	1.15	9.41	7.64				
Bastien, Steven (USA) (1994)	time		2.68	3.76	4.90	6.03	7.12	8.25	9.42	10.55	11.73	12.87		14.42	2 / 6	3.35	3.39	3.45
	reaction time	0.148											1.55	7.63				
	interval velocity		7 steps	1.08	1.14	1.13	1.09	1.13	1.17	1.13	1.18	1.14	9.05	7.63				
dos Santos, Felipe (BRA) (1994)	time		2.72	3.88	4.95	6.07	7.20	8.32	9.48	10.63	11.85	13.05		14.58	8 / 7	3.35	3.41	3.57
	reaction time	0.172											1.53	7.54				
	interval velocity		7 steps	1.16	1.07	1.12	1.13	1.12	1.16	1.15	1.22	1.20	9.16	7.54				
Dubler, Cedric (AUS) (1995)	time		2.70	3.88	5.05	6.23	7.38	8.61	9.82	10.97	12.18		15.10	4 / 8	3.53	3.59		
	reaction time	0.129																7.28
	interval velocity		7 steps	1.18	1.17	1.18	1.15	1.23	1.21	1.15	1.21							7.28



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-13-morning-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

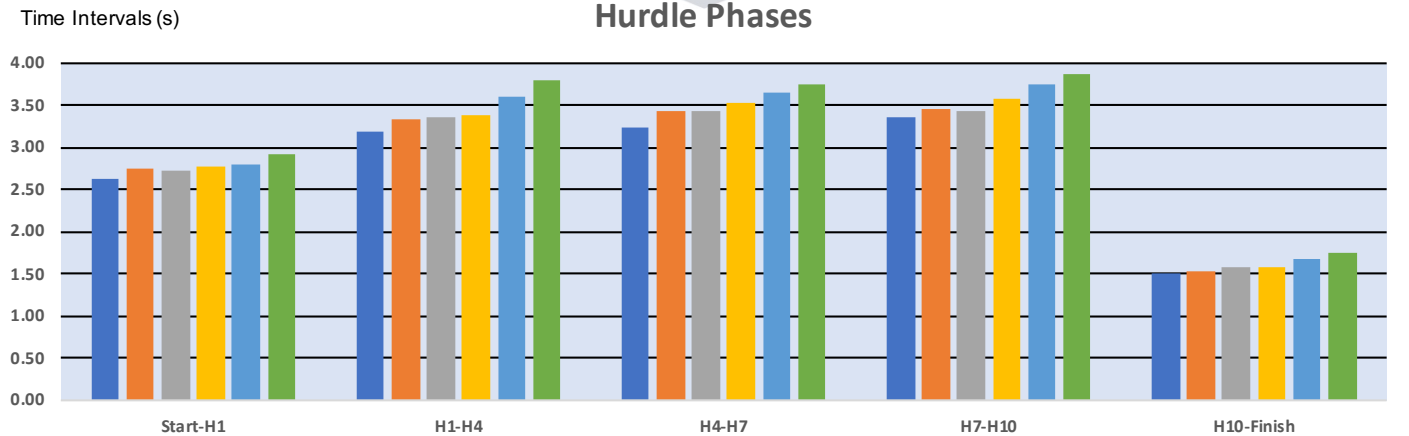
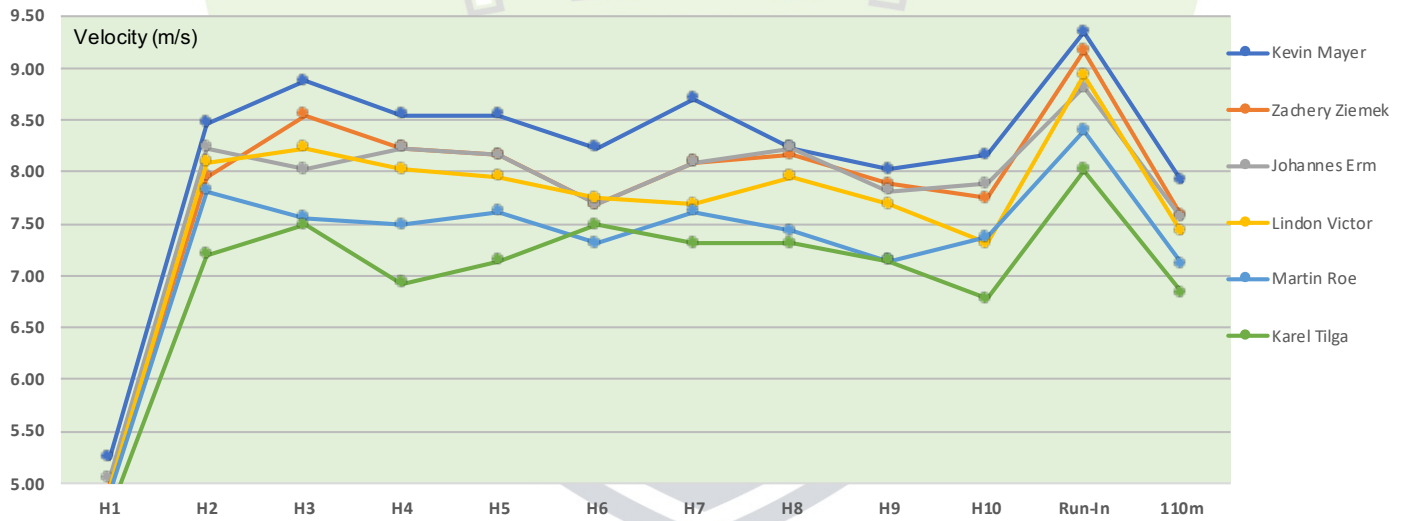
110m Hurdles														Decathlon - Heat 2									
Date: 2021.08.05 Wind: 0.0 m/s																							
				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10				
Helcelet, Adam Sebastian (CZE) (1991)				time	2.65	3.80	4.85	5.95	7.08	8.19	9.31	10.45	11.58	12.78		14.35	4 / 1						
reaction time				0.140	interval	7 steps	1.15	1.05	1.10	1.13	1.11	1.12	1.14	1.13	1.20	1.57		3.30	3.36	3.47			
					velocity		5.18	7.95	8.70	8.31	8.09	8.23	8.16	8.02	8.09	7.62	8.93	8.31	8.16	7.90			
Shkurenkov, Ilya (RUS) (1991)				time	2.70	3.83	4.92	6.05	7.14	8.28	9.44	10.56	11.70	12.88		14.43	2 / 2						
reaction time				0.174	interval	7 steps	1.13	1.09	1.13	1.09	1.14	1.16	1.12	1.14	1.18	1.55		3.35	3.39	3.44			
					velocity		5.08	8.09	8.39	8.09	8.39	8.02	7.88	8.16	8.02	7.75	9.05	8.19	8.09	7.97			
Sýkora, Jiří (CZE) (1995)				time	2.75	3.86	5.03	6.15	7.25	8.38	9.53	10.66	11.81	12.94		14.48	8 / 3						
reaction time				0.160	interval		1.11	1.17	1.12	1.10	1.13	1.15	1.13	1.15	1.13	1.54		3.40	3.38	3.41			
					velocity		4.99	8.23	7.81	8.16	8.31	8.09	7.95	8.09	8.09	9.10	7.60	8.06	8.11	8.04			
Kazmirek, Kai (GER) (1991)				time	2.82	3.93	5.03	6.24	7.32	8.46	9.64	10.78	11.93	13.12		14.73	9 / 4						
reaction time				0.136	interval		1.11	1.10	1.21	1.08	1.14	1.18	1.14	1.15	1.19	1.61		3.42	3.40	3.48			
					velocity		4.87	8.23	8.31	7.55	8.46	8.02	7.75	8.02	7.95	7.68	8.71	8.02	8.06	7.88			
Uibo, Maicel (EST) (1992)				time	2.70	3.86	5.03	6.20	7.32	8.46	9.68	10.83	12.04	13.26		14.83	5 / 5						
reaction time				0.162	interval	7 steps	1.16	1.17	1.17	1.12	1.14	1.22	1.15	1.21	1.22	1.57		3.50	3.48	3.58			
					velocity		5.08	7.88	7.81	7.81	8.16	8.02	7.49	7.95	7.55	7.49	8.93	7.83	7.88	7.66			
Wiesiolek, Paweł (POL) (1991)				time	2.77	3.93	5.08	6.28	7.45	8.58	9.72	10.88	12.08	13.28		14.95	6 / 6						
reaction time				0.154	interval	7 steps	1.16	1.15	1.20	1.17	1.13	1.14	1.16	1.20	1.20	1.67		3.51	3.44	3.56			
					velocity		4.95	7.88	7.95	7.62	7.81	8.09	8.02	7.88	7.62	7.62	8.40	7.81	7.97	7.70			
Zhuk, Vitaliy (BLR) (1996)				time	2.72	3.85	5.02	6.20	7.32	8.52	9.70	10.89	12.08	13.31		14.95	3 / 7						
reaction time				0.146	interval	7 steps	1.13	1.17	1.18	1.12	1.20	1.18	1.19	1.19	1.23	1.64		3.48	3.50	3.61			
					velocity		5.04	8.09	7.81	7.75	8.16	7.62	7.75	7.69	7.67	7.43	8.55	7.88	7.83	7.60			



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field/day-13-morning-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

110m Hurdles		Date: 2021.08.05		Wind: 0.1 m/s		Decathlon - Heat 1											
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Mayer, Kevin (FRA) (1992)	time	2.62	3.70	4.73	5.80	6.87	7.98	9.03	10.14	11.28	12.40		13.90	3 / 1			
	reaction time	0.137													3.18	3.23	3.37
	interval	7 steps	1.08	1.03	1.07	1.07	1.11	1.05	1.11	1.14	1.12	1.50			8.62	8.49	8.14
Ziemek, Zachery (USA) (1993)	time	2.75	3.90	4.97	6.08	7.20	8.39	9.52	10.64	11.80	12.98		14.51	6 / 2			
	reaction time	0.181													3.33	3.44	3.46
	interval	7 steps	1.15	1.07	1.11	1.12	1.19	1.13	1.12	1.16	1.18	1.53			8.23	7.97	7.92
Erm, Johannes (EST) (1998)	time	2.72	3.83	4.97	6.08	7.20	8.39	9.52	10.63	11.80	12.96		14.55	4 / 3			
	reaction time	0.155													3.36	3.44	3.44
	interval	7 steps	1.11	1.14	1.11	1.12	1.19	1.13	1.11	1.17	1.16	1.59			8.16	7.97	7.97
Victor, Lndon (GRN) (1993)	time	2.77	3.90	5.01	6.15	7.30	8.48	9.67	10.82	12.01	13.26		14.83	5 / 4			
	reaction time	0.174													3.38	3.52	3.59
	interval	7 steps	1.13	1.11	1.14	1.15	1.18	1.19	1.15	1.19	1.25	1.57			8.11	7.79	7.64
Roe, Martin (NOR) (1992)	time	2.80	3.97	5.18	6.40	7.60	8.85	10.05	11.28	12.56	13.80		15.47	8 / 5			
	reaction time	0.144													3.60	3.65	3.75
	interval	7 steps	1.17	1.21	1.22	1.20	1.25	1.20	1.23	1.28	1.24	1.67			7.62	7.51	7.31
Tilga, Karel (EST) (1998)	time	2.91	4.18	5.40	6.72	8.00	9.22	10.47	11.72	13.00	14.35		16.10	7 / 6			
	reaction time	0.187													3.81	3.75	3.88
	interval	7 steps	1.27	1.22	1.32	1.28	1.22	1.25	1.25	1.28	1.35	1.75			7.20	7.31	7.07
	velocity																



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-13-morning-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

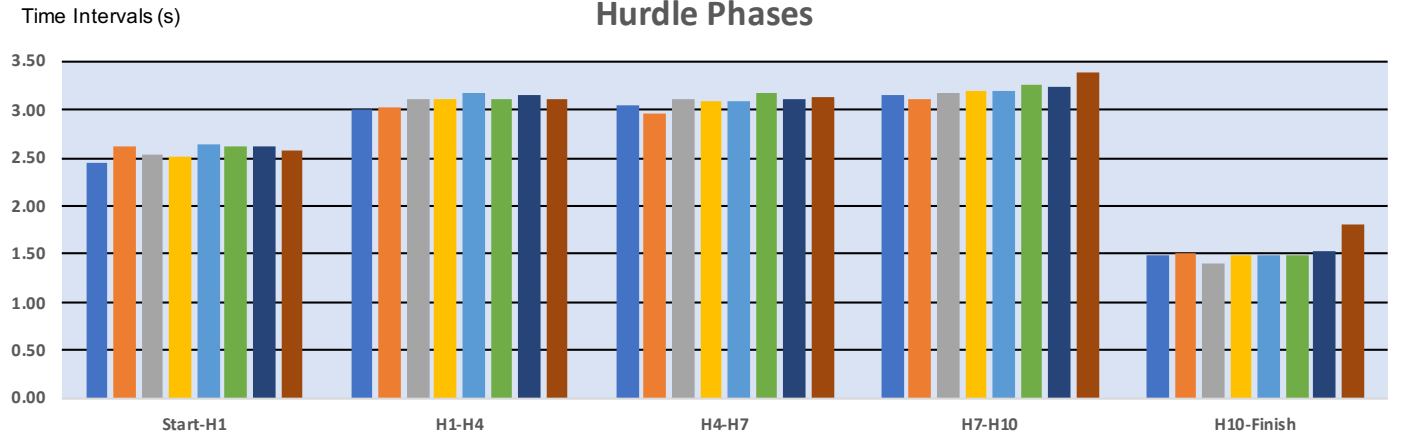
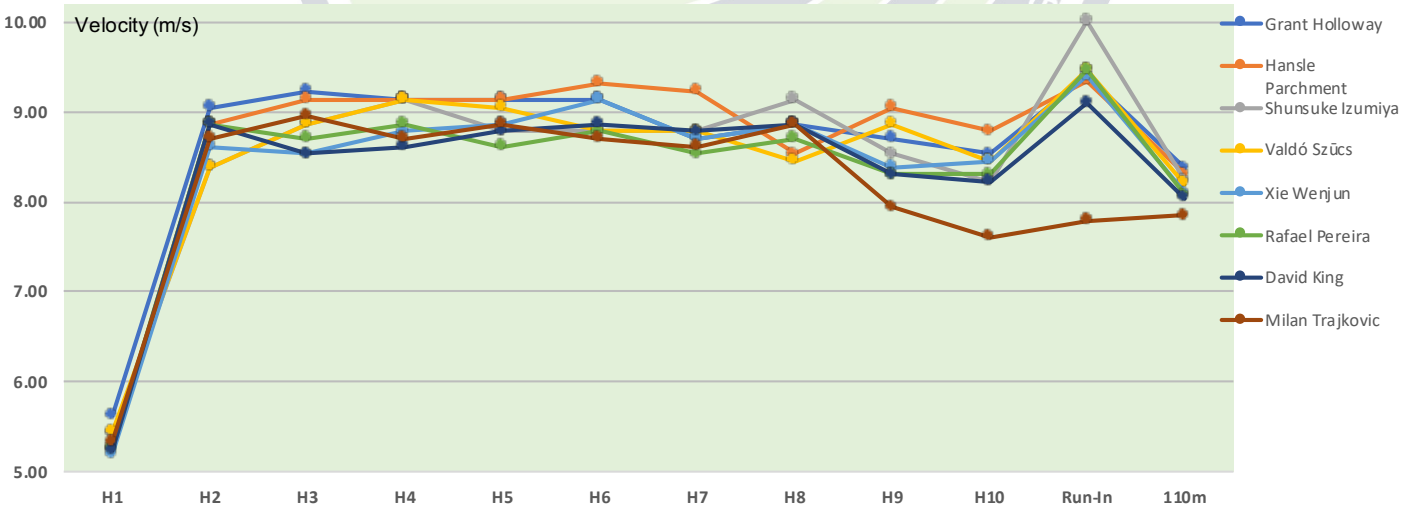
110m Hurdles

Date: 2021.08.04

Wind: -0.1 m/s

Semi-Final 3

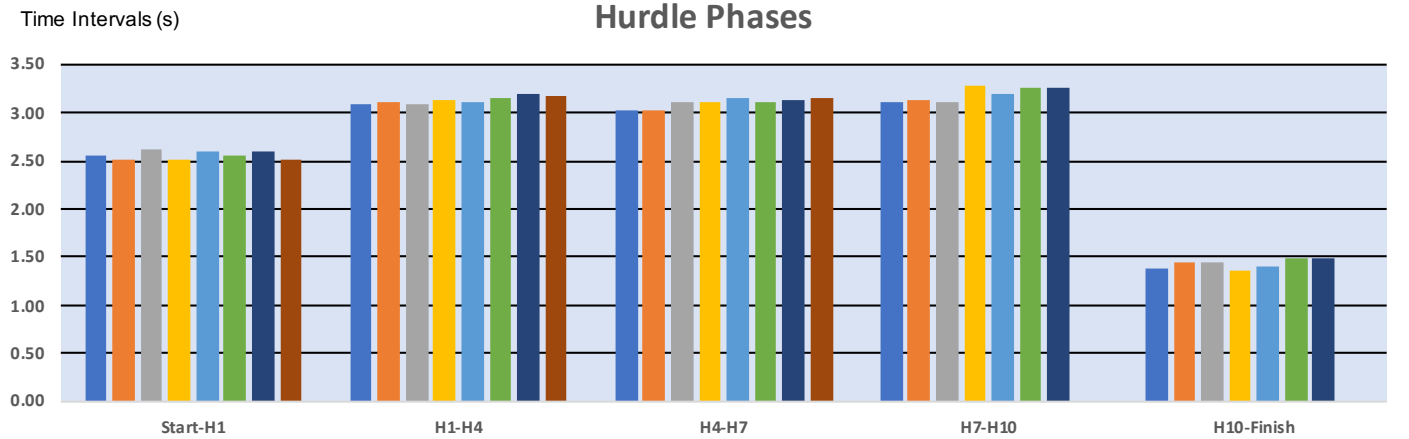
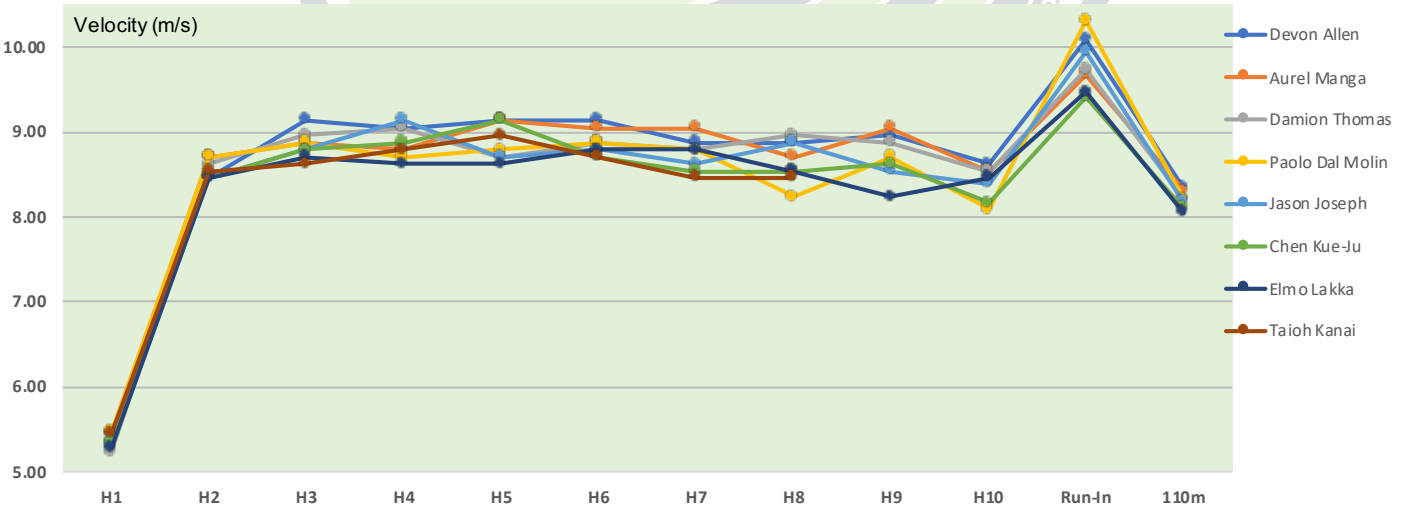
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Holloway, Grant (USA) (1997)	time		2.44	3.45	4.44	5.44	6.44	7.44	8.49	9.52	10.57	11.64		13.13	4 / 1			
	reaction time	0.130											1.49			3.00	3.05	3.15
	interval velocity		7 steps	1.01	0.99	1.00	1.00	1.00	1.05	1.03	1.05	1.07	9.41	8.38		9.14	8.99	8.70
Parchment, Hansle (JAM) (1990)	time		2.61	3.64	4.64	5.64	6.64	7.62	8.61	9.68	10.69	11.73		13.23	6 / 2			
	reaction time	0.145											1.50			3.03	2.97	3.12
	interval velocity		7 steps	1.03	1.00	1.00	1.00	0.98	0.99	1.07	1.01	1.04	9.35	8.31		9.05	9.23	8.79
Izumiya, Shunsuke (JPN) (2000)	time		2.53	3.62	4.65	5.65	6.69	7.73	8.77	9.77	10.84	11.95		13.35	7 / 3			
	reaction time	0.141											1.40			3.12	3.12	3.18
	interval velocity		7 steps	1.09	1.03	1.00	1.04	1.04	1.00	1.07	1.11	1.11	10.01	8.24		8.79	8.79	8.62
Szűcs, Valdó (HUN) (1995)	time		2.52	3.61	4.64	5.64	6.65	7.69	8.73	9.81	10.84	11.92		13.40	9 / 4			
	reaction time	0.140											1.48			3.12	3.09	3.19
	interval velocity		7 steps	1.09	1.03	1.00	1.01	1.04	1.08	1.03	1.08	1.08	9.47	8.21		8.79	8.87	8.60
Xie Wenjun (CHN) (1990)	time		2.64	3.70	4.77	5.81	6.84	7.84	8.89	9.92	11.01	12.09		13.58	8 / 5			
	reaction time	0.154											1.49			3.17	3.08	3.20
	interval velocity			1.06	1.07	1.04	1.03	1.00	1.05	1.03	1.09	1.08	9.41	8.10		8.65	8.90	8.57
Pereira, Rafael (BRA) (1997)	time		2.61	3.64	4.69	5.72	6.78	7.82	8.89	9.94	11.04	12.14		13.62	5 / 6			
	reaction time	0.154											1.48			3.11	3.17	3.25
	interval velocity			1.03	1.05	1.03	1.06	1.04	1.07	1.05	1.10	1.10	9.47	8.08		8.82	8.65	8.44
King, David (GBR) (1994)	time		2.62	3.65	4.72	5.78	6.82	7.85	8.89	9.92	11.02	12.13		13.67	2 / 7			
	reaction time	0.141											1.54			3.16	3.11	3.24
	interval velocity		7 steps	1.03	1.07	1.06	1.04	1.03	1.04	1.03	1.10	1.11	9.10	8.05		8.68	8.82	8.46
Trajkovic, Milan (CYP) (1992)	time		2.57	3.62	4.64	5.69	6.72	7.77	8.83	9.86	11.01	12.21		14.01	3 / 8			
	reaction time	0.147											1.80			3.12	3.14	3.38
	interval velocity		7 steps	1.05	1.02	1.05	1.03	1.05	1.06	1.03	1.15	1.20	7.79	7.85		8.79	8.73	8.11



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-12-morning-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

110m Hurdles			Date: 2021.08.04		Wind: 0.1 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		
Allen, Devon (USA) (1994)	time		2.56	3.64	4.64	5.65	6.65	7.65	8.68	9.71	10.73	11.79		13.18	5 / 1					
	reaction time	0.121															3.09	3.03	3.11	
	interval		1.08	1.00	1.01	1.00	1.00	1.03	1.03	1.02	1.06	1.39					8.87	9.05	8.82	
Manga, Aurel (FRA) (1992)	time		2.52	3.57	4.60	5.64	6.64	7.65	8.66	9.71	10.72	11.79		13.24	6 / 2					
	reaction time	0.151															3.12	3.02	3.13	
	interval		1.05	1.03	1.04	1.00	1.01	1.01	1.05	1.01	1.07	1.45					8.79	9.08	8.76	
Thomas, Damion (JAM) (1999)	time		2.62	3.68	4.70	5.71	6.76	7.79	8.83	9.85	10.88	11.95		13.39	8 / 3					
	reaction time	0.135															3.09	3.12	3.12	
	interval		1.06	1.02	1.01	1.05	1.03	1.04	1.02	1.03	1.07	1.44					8.87	8.79	8.79	
Dal Molin, Paolo (ITA) (1987)	time		2.51	3.56	4.59	5.64	6.68	7.71	8.75	9.86	10.91	12.04		13.40	9 / 4					
	reaction time	0.133															3.13	3.11	3.29	
	interval		1.05	1.03	1.05	1.04	1.03	1.04	1.11	1.05	1.13	1.36					8.76	8.82	8.33	
Joseph, Jason (SUI) (1998)	time		2.59	3.67	4.71	5.71	6.76	7.80	8.86	9.89	10.96	12.05		13.46	4 / 5					
	reaction time	0.135															3.12	3.15	3.19	
	interval		1.08	1.04	1.00	1.05	1.04	1.06	1.03	1.07	1.09	1.41					8.79	8.70	8.60	
Chen Kue-Ju (TPE) (1993)	time		2.56	3.64	4.68	5.71	6.71	7.76	8.83	9.90	10.96	12.08		13.57	2 / 6					
	reaction time	0.146															3.15	3.12	3.25	
	interval		1.08	1.04	1.03	1.00	1.05	1.07	1.07	1.06	1.12	1.49					8.70	8.79	8.44	
Lakka, Elmo (FIN) (1993)	time		2.60	3.68	4.73	5.79	6.85	7.89	8.93	10.00	11.11	12.19		13.67	3 / 7					
	reaction time	0.139															3.19	3.14	3.26	
	interval		1.08	1.05	1.06	1.06	1.04	1.04	1.07	1.11	1.08	1.48					8.60	8.73	8.41	
Kanai, Taioh (JPN) (1995)	time		2.52	3.59	4.65	5.69	6.71	7.76	8.84	9.92				26.11	7 / 8					
	reaction time	0.127															3.17	3.15		
	interval		1.07	1.06	1.04	1.02	1.05	1.08	1.08								8.65	8.70		



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-12-morning-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

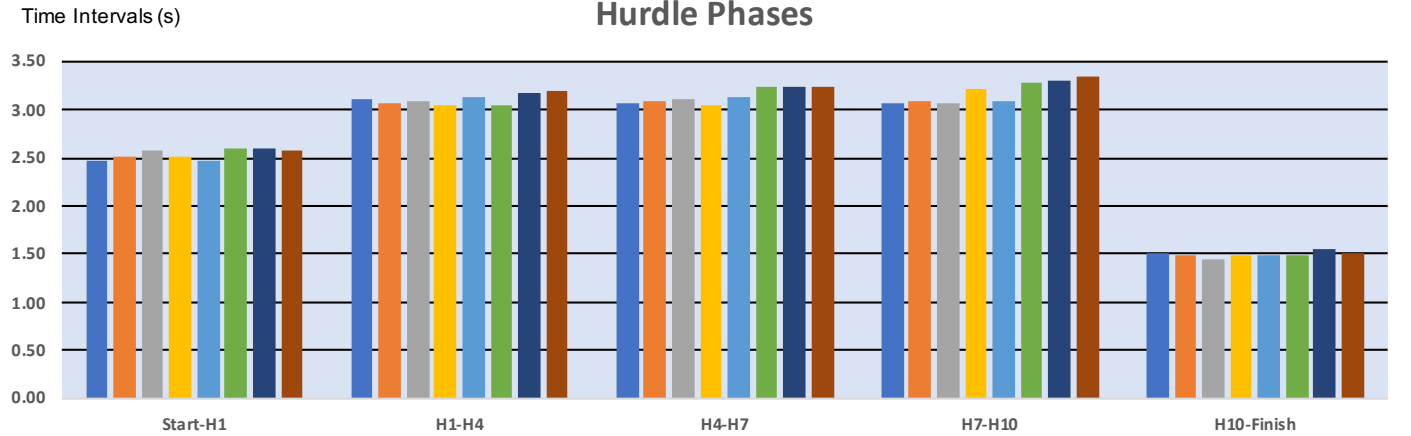
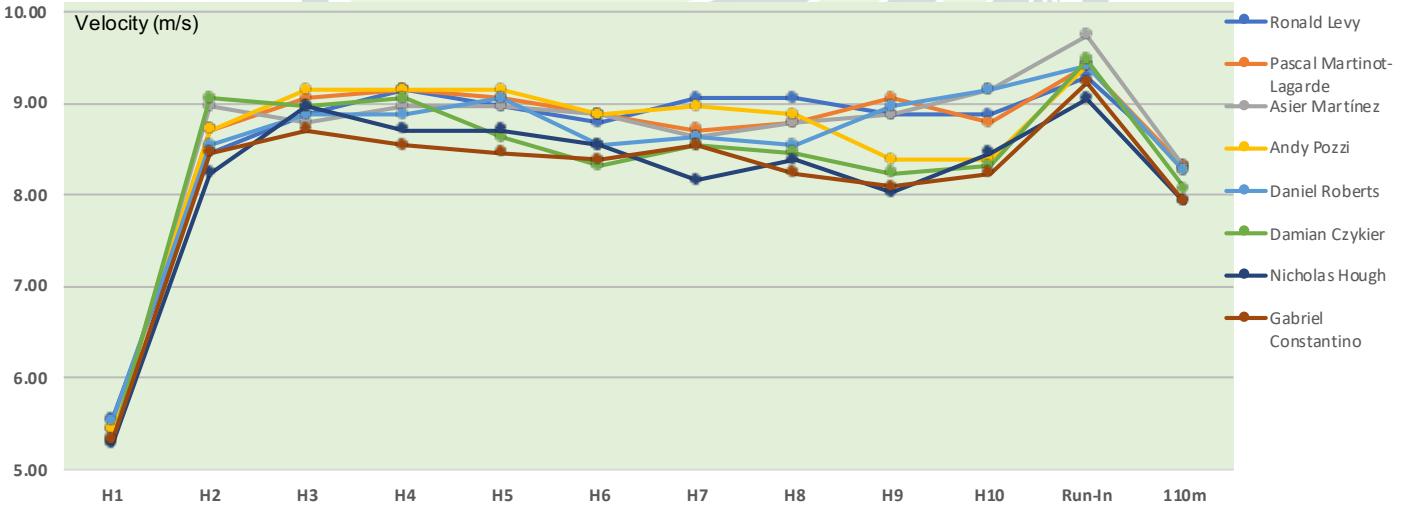
110m Hurdles

Date: 2021.08.04

Wind: 0.3 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
Levy, Ronald (JAM) (1992)	time		2.47	3.55	4.58	5.58	6.60	7.64	8.65	9.66	10.69	11.72		13.23	7 / 1			
	reaction time	0.154														3.11	3.07	3.07
	interval		7 steps	1.08	1.03	1.00	1.02	1.04	1.01	1.01	1.03	1.03	1.51			8.82	8.93	8.93
	velocity		5.55	8.46	8.87	9.14	8.96	8.79	9.05	9.05	8.87	8.87	9.28	8.31				
Martinot-Lagarde, Pascal (FRA) (1991)	time		2.52	3.57	4.58	5.58	6.59	7.62	8.67	9.71	10.72	11.76		13.25	4 / 2			
	reaction time	0.155														3.06	3.09	3.09
	interval		7 steps	1.05	1.01	1.00	1.01	1.03	1.05	1.04	1.01	1.04	1.49			8.96	8.87	8.87
	velocity		5.44	8.70	9.05	9.14	9.05	8.87	8.70	8.79	9.05	8.79	9.41	8.30				
Martinez, Asier (ESP) (2000)	time		2.57	3.59	4.63	5.65	6.67	7.70	8.76	9.80	10.83	11.83		13.27	6 / 3			
	reaction time	0.150														3.08	3.11	3.07
	interval		7 steps	1.02	1.04	1.02	1.02	1.03	1.06	1.04	1.03	1.00	1.44	PB		8.90	8.82	8.93
	velocity		5.34	8.96	8.79	8.96	8.96	8.87	8.62	8.79	8.87	9.14	9.74	8.29				
Pozzi, Andy (GBR) (1992)	time		2.52	3.57	4.57	5.57	6.57	7.60	8.62	9.65	10.74	11.83		13.32	8 / 4			
	reaction time	0.148														3.05	3.05	3.21
	interval		7 steps	1.05	1.00	1.00	1.00	1.03	1.02	1.03	1.09	1.09	1.49			8.99	8.99	8.54
	velocity		5.44	8.70	9.14	9.14	9.14	8.87	8.96	8.87	8.39	8.39	9.41	8.26				
Roberts, Daniel (USA) (1997)	time		2.48	3.55	4.58	5.61	6.62	7.69	8.75	9.82	10.84	11.84		13.33	5 / 5			
	reaction time	0.195														3.13	3.14	3.09
	interval			1.07	1.03	1.03	1.01	1.07	1.06	1.07	1.02	1.00	1.49			8.76	8.73	8.87
	velocity		5.53	8.54	8.87	8.87	9.05	8.54	8.62	8.54	8.96	9.14	9.41	8.25				
Czykier, Damian (POL) (1992)	time		2.59	3.60	4.62	5.63	6.69	7.79	8.86	9.94	11.05	12.15		13.63	2 / 6			
	reaction time	0.152														3.04	3.23	3.29
	interval		7 steps	1.01	1.02	1.01	1.06	1.10	1.07	1.08	1.11	1.10	1.48			9.02	8.49	8.33
	velocity		5.30	9.05	8.96	9.05	8.62	8.31	8.54	8.46	8.23	8.31	9.47	8.07				
Hough, Nicholas (AUS) (1993)	time		2.60	3.71	4.73	5.78	6.83	7.90	9.02	10.11	11.25	12.33		13.88	9 / 7			
	reaction time	0.163														3.18	3.24	3.31
	interval		7 steps	1.11	1.02	1.05	1.05	1.07	1.12	1.09	1.14	1.08	1.55			8.62	8.46	8.28
	velocity		5.28	8.23	8.96	8.70	8.70	8.54	8.16	8.39	8.02	8.46	9.05	7.93				
Constantino, Gabriel (BRA) (1995)	time		2.58	3.66	4.71	5.78	6.86	7.95	9.02	10.13	11.26	12.37		13.89	3 / 8			
	reaction time	0.159														3.20	3.24	3.35
	interval		7 steps	1.08	1.05	1.07	1.08	1.09	1.07	1.11	1.13	1.11	1.52			8.57	8.46	8.19
	velocity		5.32	8.46	8.70	8.54	8.46	8.39	8.54	8.23	8.09	8.23	9.22	7.92				



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-12-morning-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

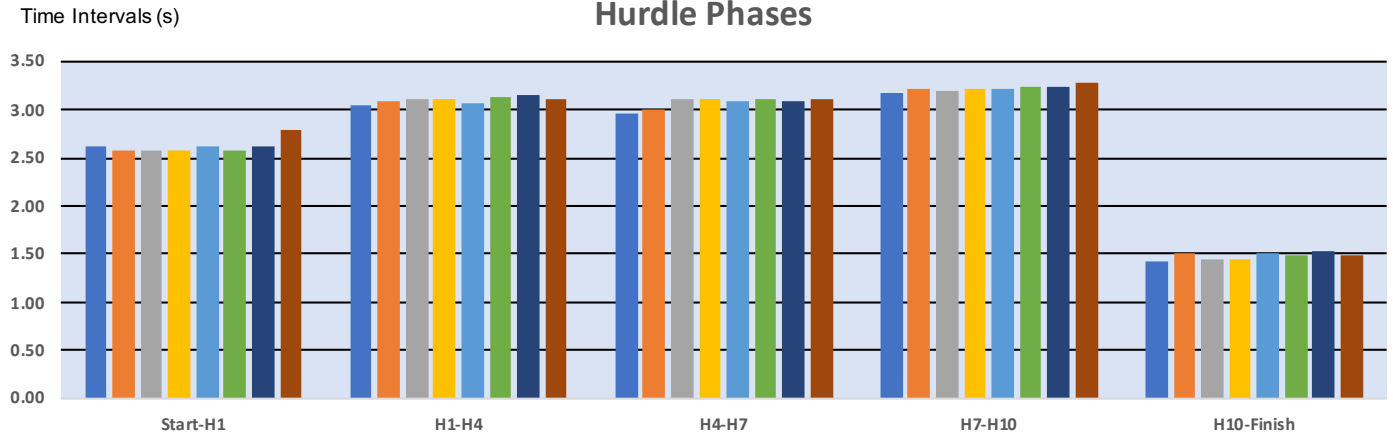
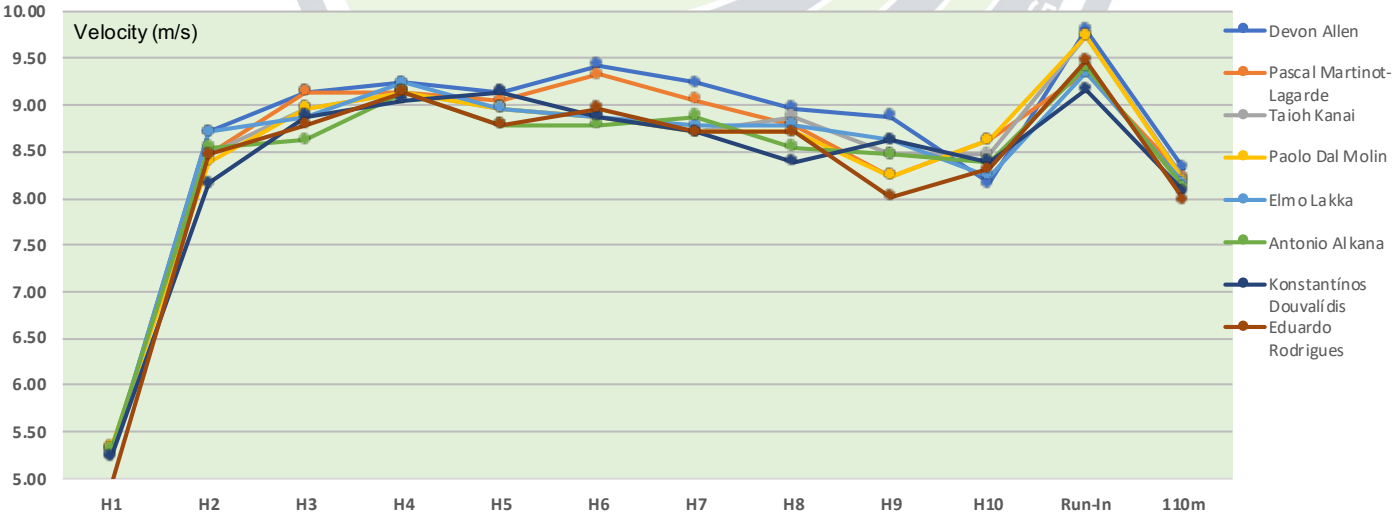
110m Hurdles

Date: 2021.08.03

Wind: -0.1 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
Allen, Devon (USA) (1994)	time	2.61	3.66	4.66	5.65	6.65	7.62	8.61	9.63	10.66	11.78		13.21	5 / 1			
	reaction time	0.146													3.04	2.96	3.17
	interval velocity		5.26	8.70	9.14	9.23	9.14	9.42	9.23	8.96	8.87	8.16	9.80		9.02	9.26	8.65
Martinot-Lagarde, Pascal (FRA) (1991)	time	2.58	3.66	4.66	5.66	6.67	7.65	8.66	9.70	10.81	11.87		13.37	3 / 2			
	reaction time	0.155													3.08	3.00	3.21
	interval velocity		7 steps 5.32	1.08 8.46	1.00 9.14	1.00 9.14	1.01 9.05	0.98 9.33	1.01 9.05	1.04 8.79	1.11 8.23	1.06 8.62	1.50 9.35		8.90	9.14	8.54
Kanai, Taioh (JPN) (1995)	time	2.58	3.66	4.68	5.68	6.70	7.73	8.78	9.81	10.89	11.97		13.41	7 / 3			
	reaction time	0.148													3.10	3.10	3.19
	interval velocity		7 steps 5.32	1.08 8.46	1.02 8.96	1.00 9.14	1.02 8.96	1.03 8.87	1.05 8.70	1.03 8.87	1.08 8.46	1.08 8.46	1.44 9.74		8.85	8.85	8.60
Dal Molin, Paolo (ITA) (1987)	time	2.57	3.66	4.68	5.68	6.70	7.73	8.78	9.83	10.94	12.00		13.44	8 / 4			
	reaction time	0.151													3.11	3.10	3.22
	interval velocity		7 steps 5.34	1.09 8.39	1.02 8.96	1.00 9.14	1.02 8.96	1.03 8.87	1.05 8.70	1.05 8.70	1.11 8.23	1.06 8.62	1.44 9.74		8.82	8.85	8.52
Lakka, Elmo (FIN) (1993)	time	2.61	3.66	4.69	5.68	6.70	7.73	8.77	9.81	10.87	11.98		13.48	6 / 5			
	reaction time	0.145													3.07	3.09	3.21
	interval velocity		7 steps 5.26	1.05 8.70	1.03 8.87	1.03 9.23	1.02 8.96	1.03 8.87	1.04 8.79	1.04 8.79	1.06 8.62	1.11 8.23	1.50 9.35		8.93	8.87	8.54
Alkana, Antonio (RSA) (1990)	time	2.58	3.65	4.71	5.71	6.75	7.79	8.82	9.89	10.97	12.06		13.55	4 / 6			
	reaction time	0.118													3.13	3.11	3.24
	interval velocity		5.32	1.07 8.54	1.06 8.62	1.00 9.14	1.04 8.79	1.04 8.79	1.03 8.87	1.07 8.54	1.08 8.46	1.09 8.39	1.49 9.41		8.76	8.82	8.46
Douvalidis, Konstantinos (GRE) (198)	time	2.62	3.74	4.77	5.78	6.78	7.81	8.86	9.95	11.01	12.10		13.63	2 / 7			
	reaction time	0.128													3.16	3.08	3.24
	interval velocity		7 steps 5.24	1.12 8.16	1.03 8.87	1.01 9.05	1.00 9.14	1.03 8.87	1.05 8.70	1.09 8.39	1.06 8.62	1.09 8.39	1.53 9.16		8.68	8.90	8.46
Rodrigues, Eduardo (BRA) (1995)	time	2.78	3.86	4.90	5.90	6.94	7.96	9.01	10.06	11.20	12.30		13.78	9 / 8			
	reaction time	0.163													3.12	3.11	3.29
	interval velocity		4.94	1.08 8.46	1.04 8.79	1.00 9.14	1.04 8.79	1.02 8.96	1.05 8.70	1.05 8.70	1.14 8.02	1.10 8.31	1.48 9.47		8.79	8.82	8.33



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-11-evening-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

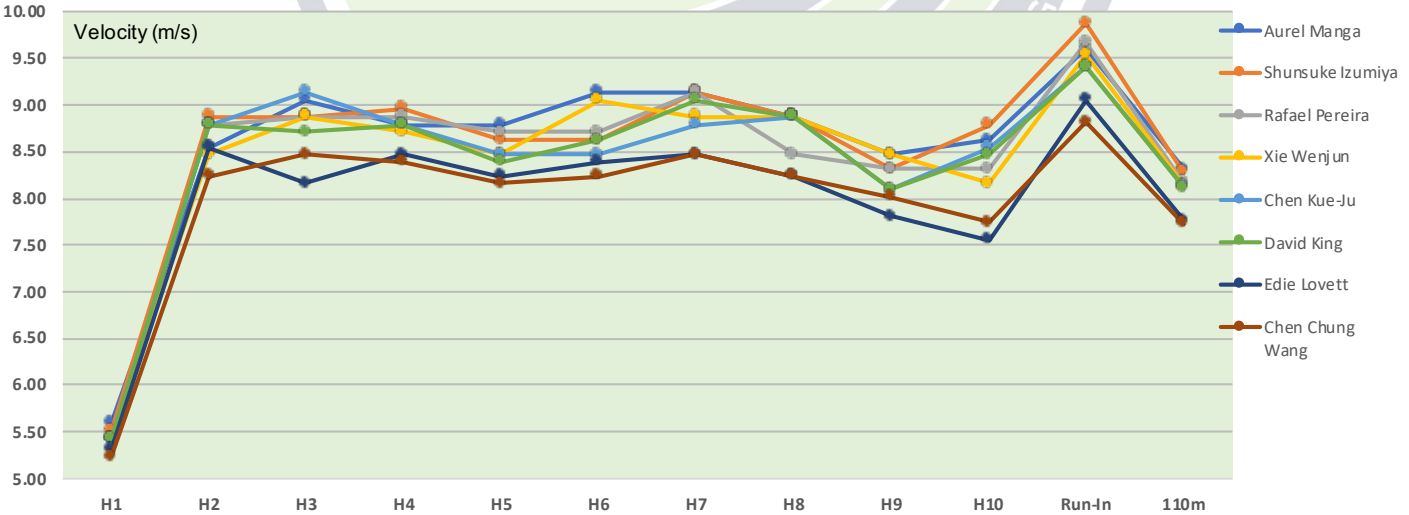
110m Hurdles

Date: 2021.08.03

Wind: -0.2 m/s

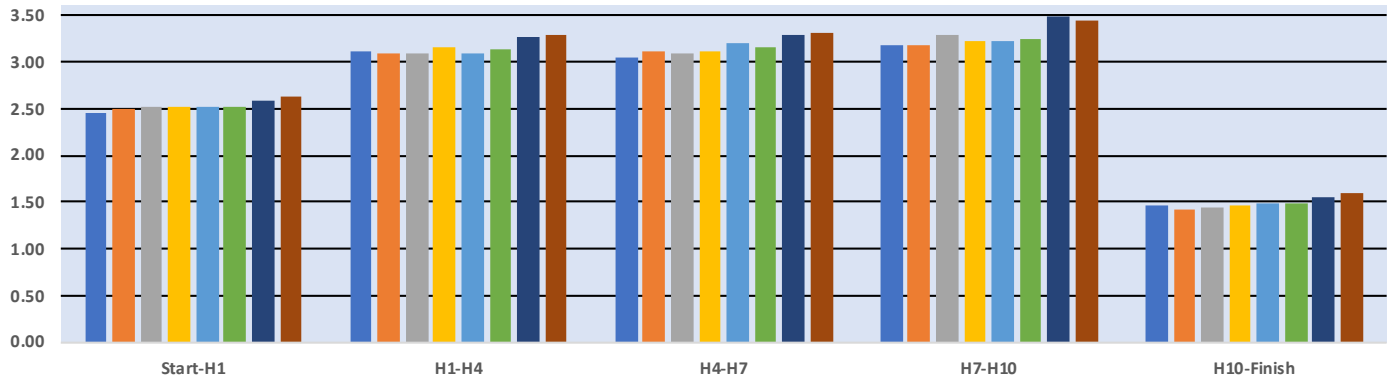
Heat 4

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Manga, Aurel (FRA) (1992)	time		2.45	3.52	4.53	5.57	6.61	7.61	8.61	9.64	10.72	11.78		13.24	8 / 1	3.12	3.04	3.17
	reaction time	0.154																
	interval		7 steps	1.07	1.01	1.04	1.04	1.00	1.00	1.03	1.08	1.06	1.46	=PB				
Izumiya, Shunsuke (JPN) (2000)	time		2.49	3.52	4.55	5.57	6.63	7.69	8.69	9.72	10.82	11.86		13.28	6 / 2	3.08	3.12	3.17
	reaction time	0.122											1.42					
	interval		7 steps	1.03	1.03	1.02	1.06	1.06	1.00	1.03	1.10	1.04	1.42					
Pereira, Rafael (BRA) (1997)	time		2.53	3.57	4.60	5.63	6.68	7.73	8.73	9.81	10.91	12.01		13.46	4 / 3	3.10	3.10	3.28
	reaction time	0.145											1.45					
	interval			1.04	1.03	1.03	1.05	1.05	1.00	1.08	1.10	1.10	1.45					
Xie Wenjun (CHN) (1990)	time		2.53	3.61	4.64	5.69	6.77	7.78	8.81	9.84	10.92	12.04		13.51	2 / 4	3.16	3.12	3.23
	reaction time	0.147											1.47					
	interval			1.08	1.03	1.05	1.08	1.01	1.03	1.03	1.08	1.12	1.47					
Chen Kue-Ju (TPE) (1993)	time		2.53	3.57	4.57	5.61	6.69	7.77	8.81	9.84	10.97	12.04		13.53	3 / 5	3.08	3.20	3.23
	reaction time	0.161											1.49					
	interval		7 steps	1.04	1.00	1.04	1.08	1.08	1.04	1.03	1.13	1.07	1.49					
King, David (GBR) (1994)	time		2.53	3.57	4.62	5.66	6.75	7.81	8.82	9.85	10.98	12.06		13.55	1 / 6	3.13	3.16	3.24
	reaction time	0.111											1.49					
	interval		7 steps	1.04	1.05	1.04	1.09	1.06	1.01	1.03	1.13	1.08	1.49					
Lovett, Eddie (ISV) (1992)	time		2.58	3.65	4.77	5.85	6.96	8.05	9.13	10.24	11.41	12.62		14.17	9 / 7	3.27	3.28	3.49
	reaction time	0.132											1.55					
	interval			1.07	1.12	1.08	1.11	1.09	1.08	1.11	1.17	1.21	1.55					
Chan Chung Wang (NKG) (1991)	time		2.62	3.73	4.81	5.90	7.02	8.13	9.21	10.32	11.46	12.64		14.23	7 / 8	3.28	3.31	3.43
	reaction time	0.149											1.59					
	interval		7 steps	1.11	1.08	1.09	1.12	1.11	1.08	1.11	1.14	1.18	1.59					
	velocity		5.24	8.23	8.46	8.39	8.16	8.23	8.46	8.23	8.02	7.75	8.82	7.73		8.36	8.28	7.99



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-11-evening-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

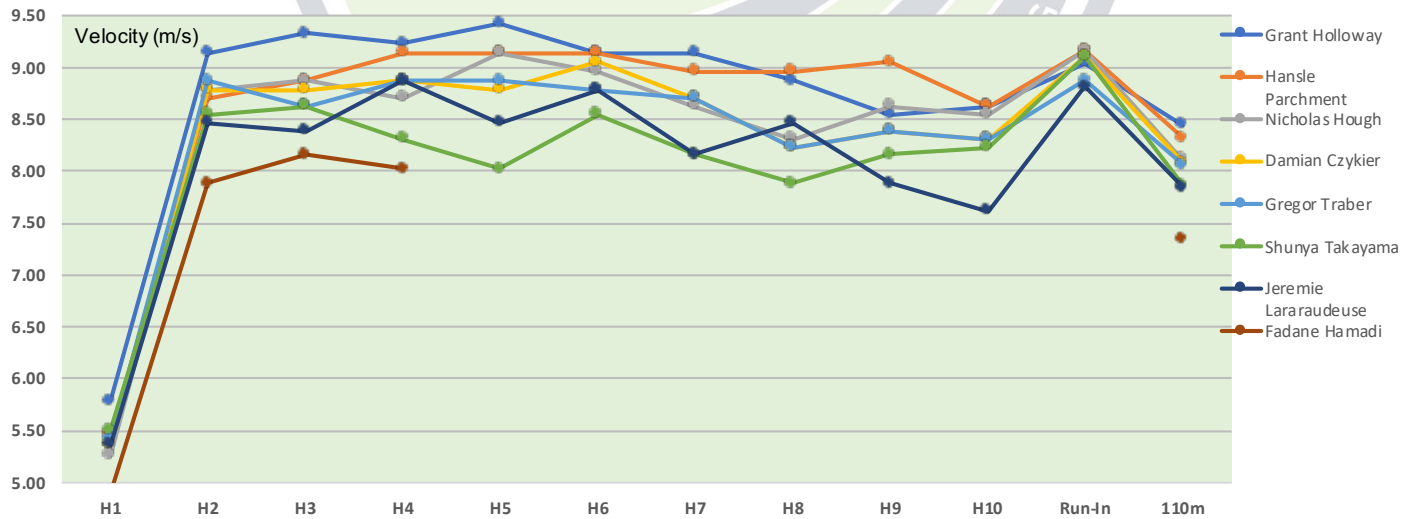
110m Hurdles

Date: 2021.08.03

Wind: -0.1 m/s

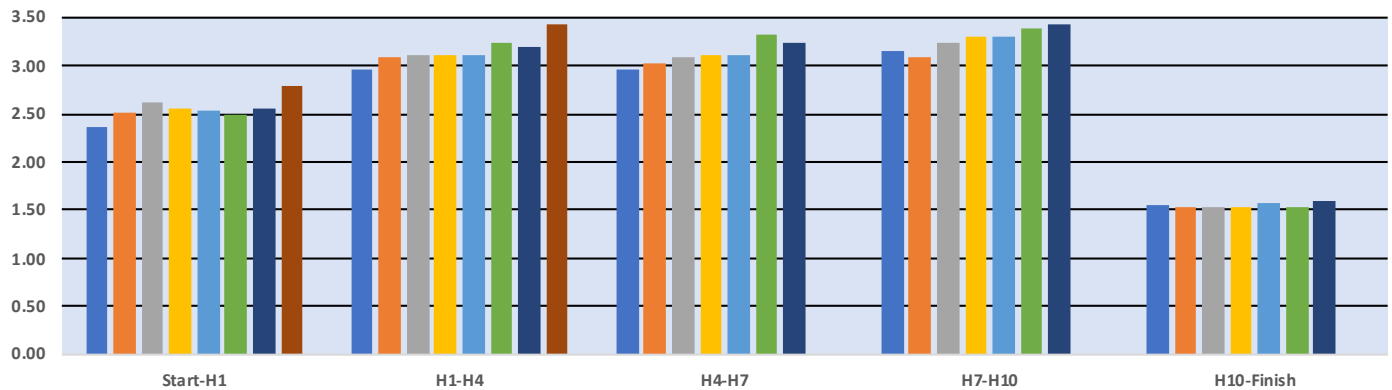
Heat 3

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Holloway, Grant (USA) (1997)	time	2.37	3.37	4.35	5.34	6.31	7.31	8.31	9.34	10.41	11.47		13.02	9 / 1			
	reaction time	0.127													2.97	2.97	3.16
	interval velocity	7 steps	1.00	0.98	0.99	0.97	1.00	1.00	1.03	1.07	1.06	1.55			9.23	9.23	8.68
Parchment, Hansle (JAM) (1990)	time	2.51	3.56	4.59	5.59	6.59	7.59	8.61	9.63	10.64	11.70		13.23	7 / 2			
	reaction time	0.155													3.08	3.02	3.09
	interval velocity	7 steps	1.05	1.03	1.00	1.00	1.00	1.02	1.02	1.01	1.06	1.53			8.90	9.08	8.87
Hough, Nicholas (AUS) (1993)	time	2.61	3.65	4.68	5.73	6.73	7.75	8.81	9.91	10.97	12.04		13.57	3 / 3			
	reaction time	0.162													3.12	3.08	3.23
	interval velocity	7 steps	1.04	1.03	1.05	1.00	1.02	1.06	1.10	1.06	1.07	1.53			8.79	8.90	8.49
Czykier, Damian (POL) (1992)	time	2.56	3.60	4.64	5.67	6.71	7.72	8.77	9.88	10.97	12.07		13.61	5 / 4			
	reaction time	0.141													3.11	3.10	3.30
	interval velocity	7 steps	1.04	1.04	1.03	1.04	1.01	1.05	1.11	1.09	1.10	1.54			8.82	8.85	8.31
Traber, Gregor (GER) (1992)	time	2.53	3.56	4.62	5.65	6.68	7.72	8.77	9.88	10.97	12.07		13.65	4 / 5			
	reaction time	0.136													3.12	3.12	3.30
	interval velocity	7 steps	1.03	1.06	1.03	1.03	1.04	1.05	1.11	1.09	1.10	1.58			8.79	8.79	8.31
Takayama, Shunya (JPN) (1994)	time	2.49	3.56	4.62	5.72	6.86	7.93	9.05	10.21	11.33	12.44		13.98	2 / 6			
	reaction time	0.153													3.23	3.33	3.39
	interval velocity		1.07	1.06	1.10	1.14	1.07	1.12	1.16	1.12	1.11	1.54			8.49	8.23	8.09
Lararaudeuse, Jeremie (MRI) (2001)	time	2.56	3.64	4.73	5.76	6.84	7.88	9.00	10.08	11.24	12.44		14.03	1 / 7			
	reaction time	0.132													3.20	3.24	3.44
	interval velocity		1.08	1.09	1.03	1.08	1.04	1.12	1.08	1.16	1.20	1.59			8.57	8.46	7.97
Hamadi, Fadane (COM) (1992)	time	2.80	3.96	5.08	6.22								14.99	8 / 8			
	reaction time	0.189													3.42		
	interval velocity		1.16	1.12	1.14										8.02		



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field/day-11-evening-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

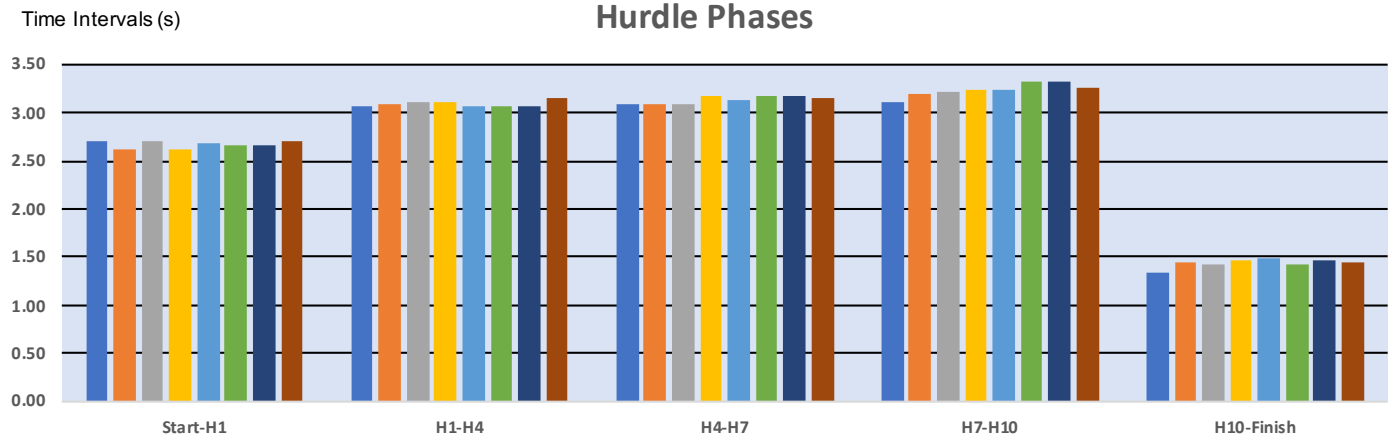
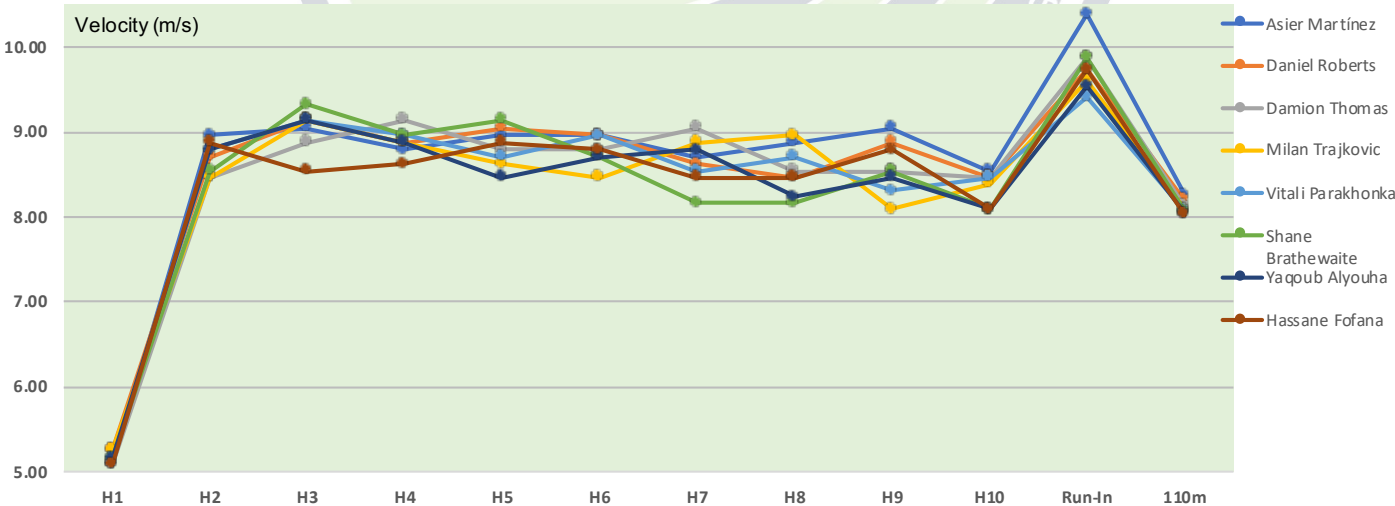
110m Hurdles

Date: 2021.08.03

Wind: -0.1 m/s

Heat 2

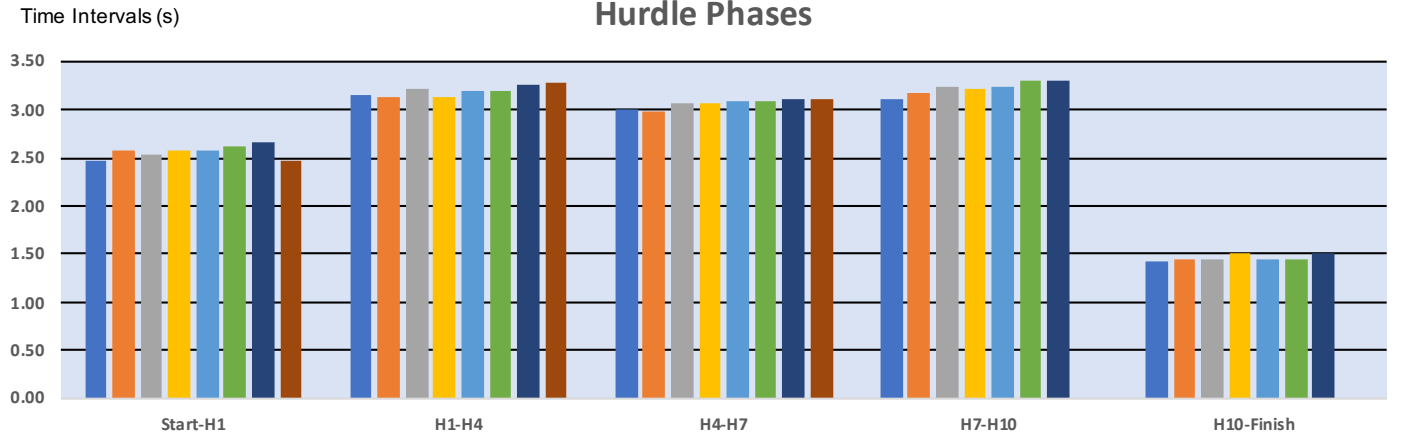
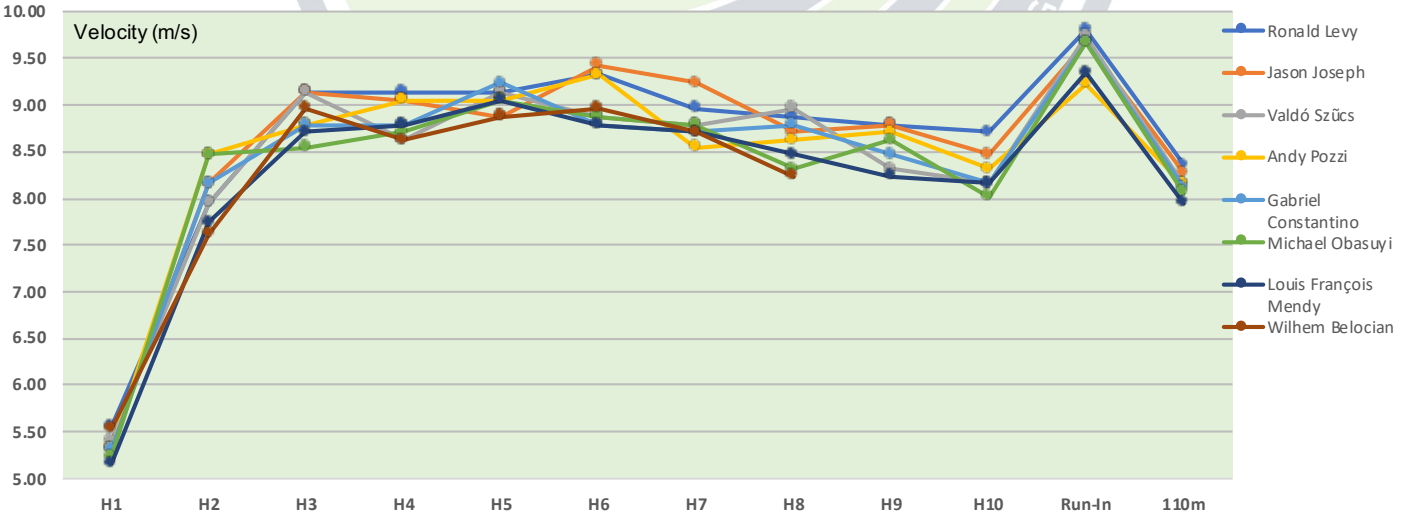
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Martínez, Asier (ESP) (2000)	time		2.70	3.72	4.73	5.77	6.79	7.81	8.86	9.89	10.90	11.97		13.32	7 / 1			
	reaction time	0.146											1.35			3.07	3.09	3.11
	interval		7 steps	1.02	1.01	1.04	1.02	1.02	1.05	1.03	1.01	1.07	1.35			8.93	8.87	8.82
Roberts, Daniel (USA) (1997)	time		2.61	3.66	4.66	5.69	6.70	7.72	8.78	9.86	10.89	11.97		13.41	5 / 2			
	reaction time	0.188											1.44			3.08	3.09	3.19
	interval		5.26	1.05	1.00	1.03	1.01	1.02	1.06	1.08	1.03	1.08	1.44			8.90	8.87	8.60
Thomas, Damion (JAM) (1999)	time		2.70	3.78	4.81	5.81	6.85	7.89	8.90	9.97	11.04	12.12		13.54	8 / 3			
	reaction time	0.142											1.42			3.11	3.09	3.22
	interval		7 steps	1.08	1.03	1.00	1.04	1.04	1.01	1.07	1.07	1.08	1.42			8.82	8.87	8.52
Trajkovic, Milan (CYP) (1992)	time		2.61	3.69	4.69	5.72	6.78	7.86	8.89	9.91	11.04	12.13		13.59	2 / 4			
	reaction time	0.117											1.46			3.11	3.17	3.24
	interval		7 steps	1.08	1.00	1.03	1.06	1.08	1.03	1.02	1.13	1.09	1.46			8.82	8.65	8.46
Parakhonka, Vitali (BLR) (1993)	time		2.69	3.73	4.73	5.75	6.80	7.82	8.89	9.94	11.04	12.12		13.61	9 / 5			
	reaction time	0.133											1.49			3.06	3.14	3.23
	interval		5.10	1.04	1.00	1.02	1.05	1.02	1.07	1.05	1.10	1.08	1.49			8.96	8.73	8.49
Brathewaite, Shane (BAR) (1990)	time		2.66	3.73	4.71	5.73	6.73	7.78	8.90	10.02	11.09	12.22		13.64	4 / 6			
	reaction time	0.151											1.42			3.07	3.17	3.32
	interval		7 steps	1.07	0.98	1.02	1.00	1.05	1.12	1.12	1.07	1.13	1.42			8.93	8.65	8.26
Alyouha, Yaqoub (KUW) (1993)	time		2.66	3.70	4.70	5.73	6.81	7.86	8.90	10.01	11.09	12.22		13.69	3 / 7			
	reaction time	0.117											1.47			3.07	3.17	3.32
	interval		5.16	1.04	1.00	1.03	1.08	1.05	1.04	1.11	1.08	1.13	1.47			8.93	8.65	8.26
Fofana, Hassane (ITA) (1992)	time		2.70	3.73	4.80	5.86	6.89	7.93	9.01	10.09	11.13	12.26		13.70	6 / 8			
	reaction time	0.161											1.44			3.16	3.15	3.25
	interval		5.08	1.03	1.07	1.06	1.03	1.04	1.08	1.08	1.04	1.13	1.44			8.68	8.70	8.44
	velocity																	
			5.08	8.87	8.54	8.62	8.87	8.79	8.46	8.46	8.79	8.09	9.74	8.03				



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-11-evening-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

110m Hurdles		Date: 2021.08.03		Wind: 0.0 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	
Levy, Ronald (JAM) (1992)	time		2.47	3.62	4.62	5.62	6.62	7.60	8.62	9.65	10.69	11.74		13.17	4 / 1	3.15	3.00	3.12	
	reaction time	0.129																	
	interval		7 steps	1.15	1.00	1.00	1.00	0.98	1.02	1.03	1.04	1.05	1.43						
	velocity		5.55	7.95	9.14	9.14	9.14	9.33	8.96	8.87	8.79	8.70	9.80	8.35		8.70	9.14	8.79	
	Joseph, Jason (SUI) (1998)	time		2.57	3.69	4.69	5.70	6.73	7.70	8.69	9.74	10.78	11.86		13.31	6 / 2	3.13	2.99	3.17
		reaction time	0.143																
interval			7 steps	1.12	1.00	1.01	1.03	0.97	0.99	1.05	1.04	1.08	1.45						
	velocity		5.34	8.16	9.14	9.05	8.87	9.42	9.23	8.70	8.79	8.46	9.67	8.26		8.76	9.17	8.65	
	Szűcs, Valdó (HUN) (1995)	time		2.54	3.69	4.69	5.75	6.75	7.78	8.82	9.84	10.94	12.06		13.50	9 / 3	3.21	3.07	3.24
		reaction time	0.137																
interval			7 steps	1.15	1.00	1.06	1.00	1.03	1.04	1.02	1.10	1.12	1.44						
	velocity		5.40	7.95	9.14	8.62	9.14	8.87	8.79	8.96	8.31	8.16	9.74	8.15		8.54	8.93	8.46	
	Pozzi, Andy (GBR) (1992)	time		2.58	3.66	4.70	5.71	6.72	7.70	8.77	9.83	10.88	11.98		13.50	2 / 4	3.13	3.06	3.21
		reaction time	0.135																
interval			7 steps	1.08	1.04	1.01	1.01	0.98	1.07	1.06	1.05	1.10	1.52						
	velocity		5.32	8.46	8.79	9.05	9.05	9.33	8.54	8.62	8.70	8.31	9.22	8.15		8.76	8.96	8.54	
	Constantino, Gabriel (BRA) (1995)	time		2.58	3.70	4.74	5.78	6.77	7.81	8.86	9.90	10.98	12.10		13.55	5 / 5	3.20	3.08	3.24
		reaction time	0.154																
interval			7 steps	1.12	1.04	1.04	0.99	1.04	1.05	1.04	1.08	1.12	1.45						
	velocity		5.32	8.16	8.79	8.79	9.23	8.79	8.70	8.79	8.46	8.16	9.67	8.12		8.57	8.90	8.46	
	Obasuyi, Michael (BEL) (1999)	time		2.62	3.70	4.77	5.82	6.83	7.86	8.90	10.00	11.06	12.20		13.65	8 / 6	3.20	3.08	3.30
		reaction time	0.141																
interval			7 steps	1.08	1.07	1.05	1.01	1.03	1.04	1.10	1.06	1.14	1.45						
	velocity		5.24	8.46	8.54	8.70	9.05	8.87	8.79	8.31	8.62	8.02	9.67	8.06		8.57	8.90	8.31	
	Mendy, Louis François (SEN) (1999)	time		2.66	3.84	4.89	5.93	6.94	7.98	9.03	10.11	11.22	12.34		13.84	7 / 7	3.27	3.10	3.31
		reaction time	0.169																
interval				1.18	1.05	1.04	1.01	1.04	1.05	1.08	1.11	1.12	1.50						
	velocity		5.16	7.75	8.70	8.79	9.05	8.79	8.70	8.46	8.23	8.16	9.35	7.95		8.39	8.85	8.28	
	Belocian, Wilhem (FRA) (1995)	time		2.48	3.68	4.70	5.76	6.79	7.81	8.86	9.97				3 / --	3.28	3.10		
		reaction time	0.135																
interval				1.20	1.02	1.06	1.03	1.02	1.05	1.11									
	velocity		5.53	7.62	8.96	8.62	8.87	8.96	8.70	8.23				DQ		8.36	8.85		



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field/day-11-evening-session-athletics-tokyo-2020-replays>

2021 Müller British Grand Prix (Gateshead, GBR) (TV Analysis)

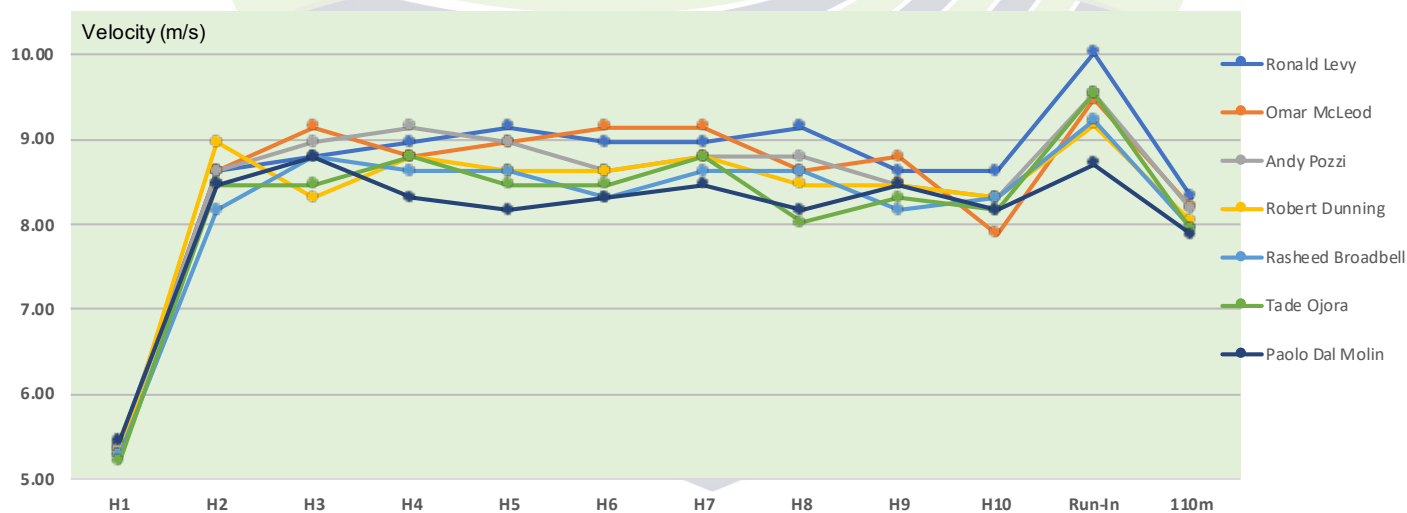
110m Hurdles

Date: 2021.07.13

Wind: 0.8 m/s

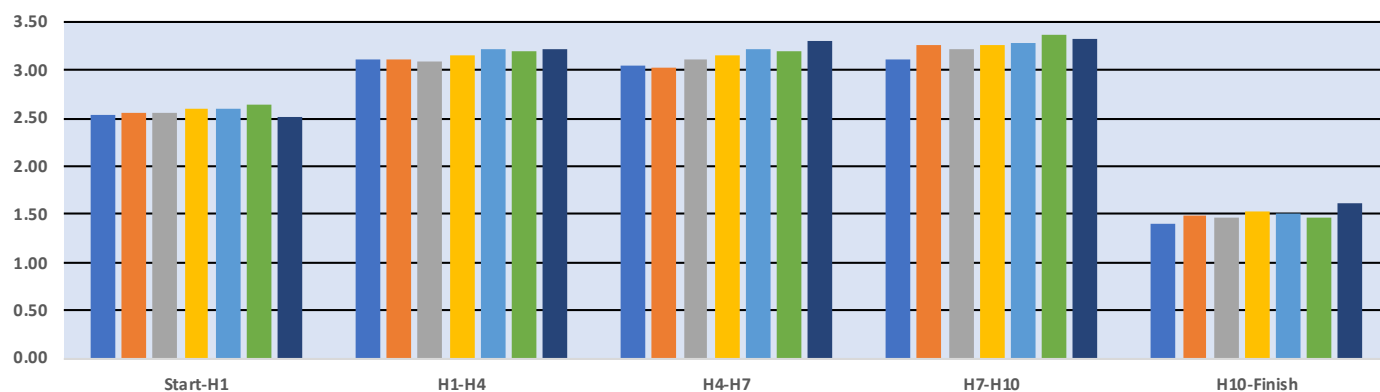
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Levy, Ronald (JAM) (1992)	time		2.54	3.60	4.64	5.66	6.66	7.68	8.70	9.70	10.76	11.82		13.22	4 / 1			
	reaction time	0.150														3.12	3.04	3.12
	interval		7 steps	1.06	1.04	1.02	1.00	1.02	1.02	1.00	1.06	1.06	1.40			8.79	9.02	8.79
McLeod, Omar (JAM) (1994)	time		2.56	3.62	4.62	5.66	6.68	7.68	8.68	9.74	10.78	11.94		13.42	5 / 2			
	reaction time	0.140														3.10	3.02	3.26
	interval			1.06	1.00	1.04	1.02	1.00	1.00	1.06	1.04	1.16	1.48			8.85	9.08	8.41
Pozzi, Andy (GBR) (1992)	time		2.56	3.62	4.64	5.64	6.66	7.72	8.76	9.80	10.88	11.98		13.45	3 / 3			
	reaction time	0.114														3.08	3.12	3.22
	interval		7 steps	1.06	1.02	1.00	1.02	1.06	1.04	1.04	1.08	1.10	1.47			8.90	8.79	8.52
Dunning, Robert (USA) (1997)	time		2.60	3.62	4.72	5.76	6.82	7.88	8.92	10.00	11.08	12.18		13.71	6 / 4			
	reaction time	0.130														3.16	3.16	3.26
	interval		7 steps	1.02	1.10	1.04	1.06	1.06	1.04	1.08	1.08	1.10	1.53			8.68	8.68	8.41
Broadbell, Rasheed (JAM) (2000)	time		2.60	3.72	4.76	5.82	6.88	7.98	9.04	10.10	11.22	12.32		13.84	2 / 5			
	reaction time	0.165														3.22	3.22	3.28
	interval		7 steps	1.12	1.04	1.06	1.06	1.10	1.06	1.06	1.12	1.10	1.52			8.52	8.52	8.36
Ojora, Tade (GBR) (1999)	time		2.64	3.72	4.80	5.84	6.92	8.00	9.04	10.18	11.28	12.40		13.87	7 / 6			
	reaction time	0.151														3.20	3.20	3.36
	interval			1.08	1.08	1.04	1.08	1.08	1.04	1.14	1.10	1.12	1.47			8.57	8.57	8.16
Dal Molin, Paolo (ITA) (1987)	time		2.52	3.60	4.64	5.74	6.86	7.96	9.04	10.16	11.24	12.36		13.97	8 / 7			
	reaction time	0.150														3.22	3.30	3.32
	interval		7 steps	1.08	1.04	1.10	1.12	1.10	1.08	1.12	1.08	1.12	1.61			8.52	8.31	8.26
	velocity		5.44	8.46	8.79	8.31	8.16	8.31	8.46	8.16	8.46	8.16	8.71	7.87				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1078 @ 30fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=6T0k5f5eoPw>

2021 István Gyulai Memorial (Székesfehérvár, HUN) (TV Analysis)

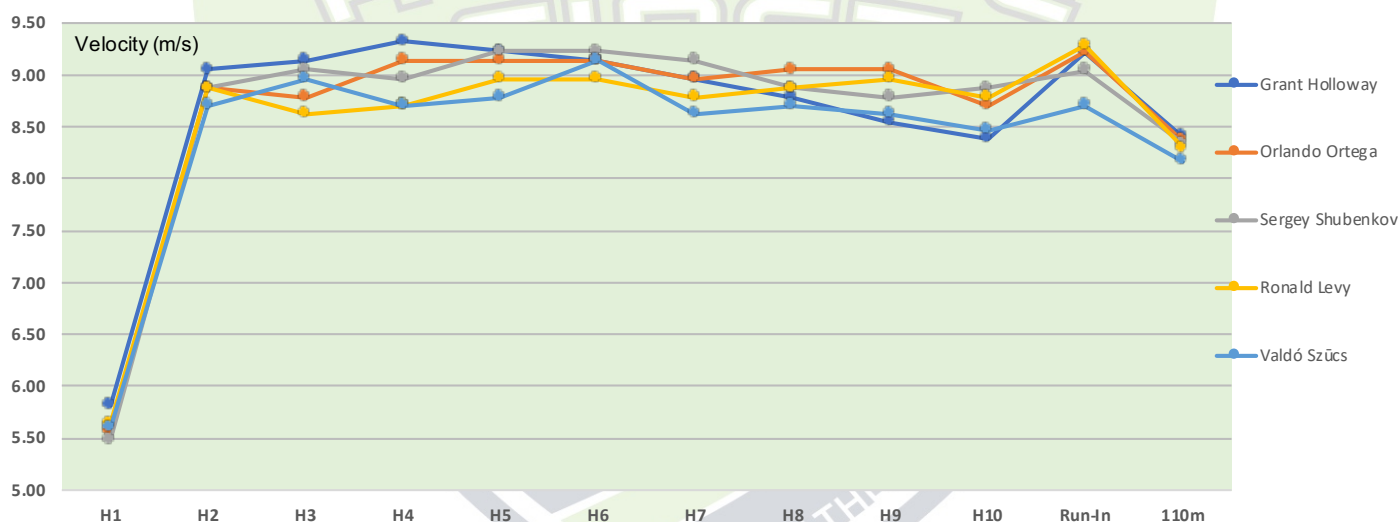
110m Hurdles

Date: 2021.07.06

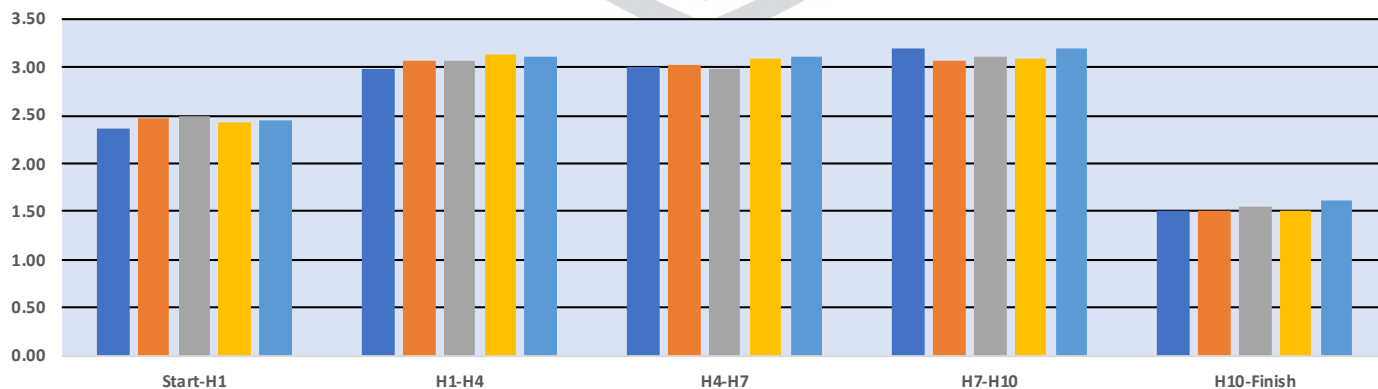
Wind: -0.1 m/s

FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Holloway, Grant (USA) (1997)	time		2.36	3.37	4.37	5.35	6.34	7.34	8.36	9.40	10.47	11.56		13.08	4 / 1			
	reaction time	0.145														2.99	3.01	3.20
	interval		7 steps	1.01	1.00	0.98	0.99	1.00	1.02	1.04	1.07	1.09	1.52			9.17	9.11	8.57
Ortega, Orlando (ESP) (1991)	time		2.47	3.50	4.54	5.54	6.54	7.54	8.56	9.57	10.58	11.63		13.15	5 / 2			
	reaction time	0.134														3.07	3.02	3.07
	interval		7 steps	1.03	1.04	1.00	1.00	1.00	1.02	1.01	1.01	1.05	1.52			8.93	9.08	8.93
Shubenkov, Sergey (ANA) (1990)	time		2.50	3.53	4.54	5.56	6.55	7.54	8.54	9.57	10.61	11.64		13.19	6 / 3			
	reaction time	0.150														3.06	2.98	3.10
	interval		7 steps	1.03	1.01	1.02	0.99	0.99	1.00	1.03	1.04	1.03	1.55			8.96	9.20	8.85
Levy, Ronald (JAM) (1992)	time		2.43	3.46	4.52	5.57	6.59	7.61	8.65	9.68	10.70	11.74		13.25	3 / 4			
	reaction time	0.140														3.14	3.08	3.09
	interval		7 steps	1.03	1.06	1.05	1.02	1.02	1.04	1.03	1.02	1.04	1.51			8.73	8.90	8.87
Szűcs, Valdó (HUN) (1995)	time		2.45	3.50	4.52	5.57	6.61	7.61	8.67	9.72	10.78	11.86		13.47	2 / 5			
	reaction time	0.147														3.12	3.10	3.19
	interval		7 steps	1.05	1.02	1.05	1.04	1.00	1.06	1.05	1.06	1.08	1.61			8.79	8.85	8.60
	velocity		5.81	9.05	9.14	9.33	9.23	9.14	8.96	8.79	8.54	8.39	9.22	8.41				
			5.55	8.87	8.79	9.14	9.14	9.14	8.96	9.05	9.05	8.70	9.22	8.37				



Time Intervals (s)



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1078 @ 60fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=xR6lqcrGpql>

2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

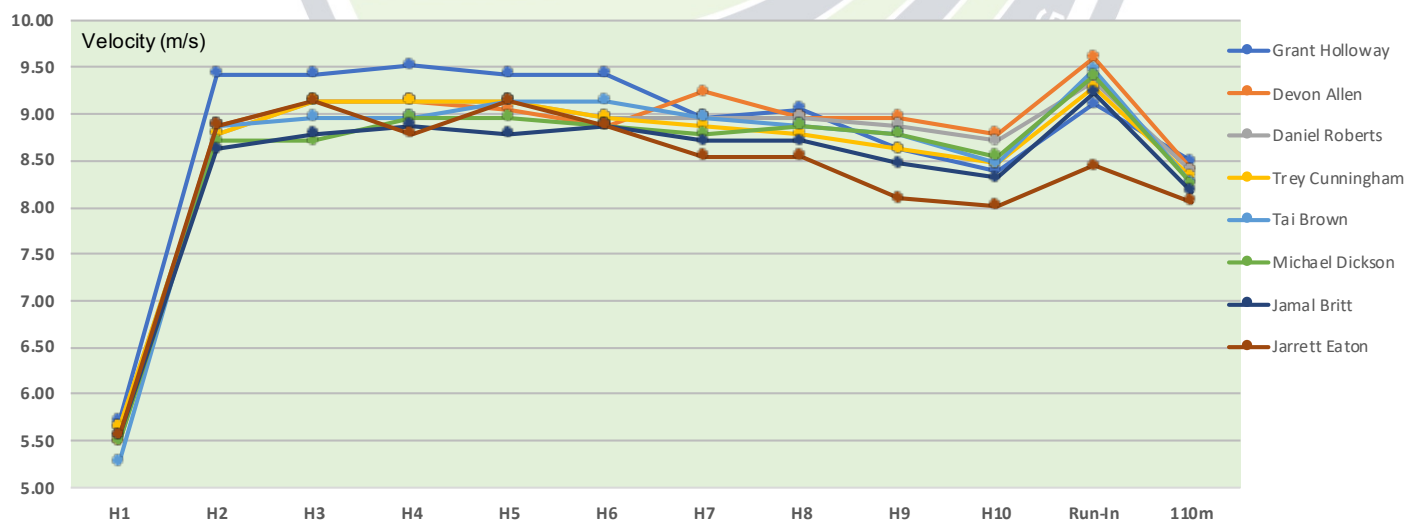
110m Hurdles

Date: 2021.06.26

Wind: 0.4 m/s

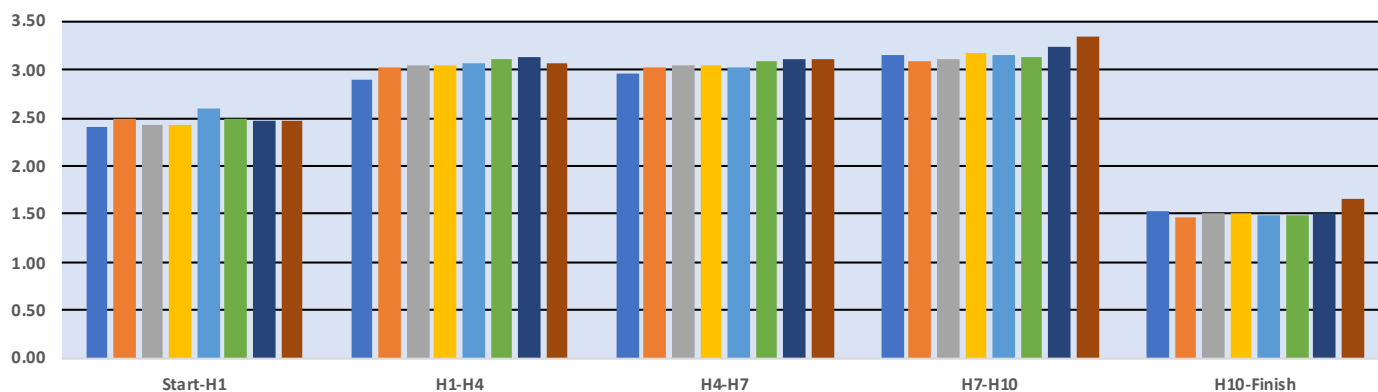
FINAL

			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		2.40	3.37	4.34	5.30	6.27	7.24	8.26	9.27	10.33	11.42		12.96	4 / 1			
	reaction time	0.146											1.54			2.90	2.96	3.16
	interval		7 steps	0.97	0.97	0.96	0.97	0.97	1.02	1.01	1.06	1.09	9.10	8.49		9.46	9.26	8.68
Allen, Devon (USA) (1994)	time		2.50	3.53	4.53	5.53	6.54	7.57	8.56	9.58	10.60	11.64		13.10	5 / 2			
	reaction time	0.152											1.46			3.03	3.03	3.08
	interval			1.03	1.00	1.00	1.01	1.03	0.99	1.02	1.02	1.04	9.60	8.40		9.05	9.05	8.90
Roberts, Daniel (USA) (1998)	time		2.43	3.47	4.47	5.47	6.47	7.49	8.51	9.53	10.56	11.61		13.11	6 / 3			
	reaction time	0.201											1.50			3.04	3.04	3.10
	interval			1.04	1.00	1.00	1.00	1.02	1.02	1.02	1.03	1.05	9.35	8.39		9.02	9.02	8.85
Cunningham, Trey (USA) (1998)	time		2.43	3.47	4.47	5.47	6.47	7.49	8.52	9.56	10.62	11.70		13.21	3 / 4			
	reaction time	0.165											1.51			3.04	3.05	3.18
	interval		7 steps	1.04	1.00	1.00	1.00	1.02	1.03	1.04	1.06	1.08	9.28	8.33		9.02	8.99	8.62
Brown, Tai (USA) (2000)	time		2.60	3.63	4.65	5.67	6.67	7.67	8.69	9.72	10.76	11.84		13.32	8 / 5			
	reaction time	0.174											1.48			3.07	3.02	3.15
	interval			1.03	1.02	1.02	1.00	1.00	1.02	1.03	1.04	1.08	9.47	8.26		8.93	9.08	8.70
Dickson, Michael (USA) (1997)	time		2.50	3.55	4.60	5.62	6.64	7.67	8.71	9.74	10.78	11.85		13.34	2 / 6			
	reaction time	0.201											1.49			3.12	3.09	3.14
	interval		7 steps	1.05	1.05	1.02	1.02	1.03	1.04	1.03	1.04	1.07	9.41	8.25		8.79	8.87	8.73
Britt, Jamal (USA) (1998)	time		2.47	3.53	4.57	5.60	6.64	7.67	8.72	9.77	10.85	11.95		13.47	7 / 7			
	reaction time	0.158											1.52			3.13	3.12	3.23
	interval		7 steps	1.06	1.04	1.03	1.04	1.03	1.05	1.05	1.08	1.10	9.22	8.17		8.76	8.79	8.49
Eaton, Jarrett (USA) (1989)	time		2.47	3.50	4.50	5.54	6.54	7.57	8.64	9.71	10.84	11.98		13.64	1 / 8			
	reaction time	0.137											1.66			3.07	3.10	3.34
	interval		7 steps	1.03	1.00	1.04	1.00	1.03	1.07	1.07	1.13	1.14	9.45	8.06		8.93	8.85	8.21
	velocity		5.55	8.87	9.14	8.79	9.14	8.87	8.54	8.54	8.09	8.02	8.45	8.06				



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=2sin2Dbspu8>

2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

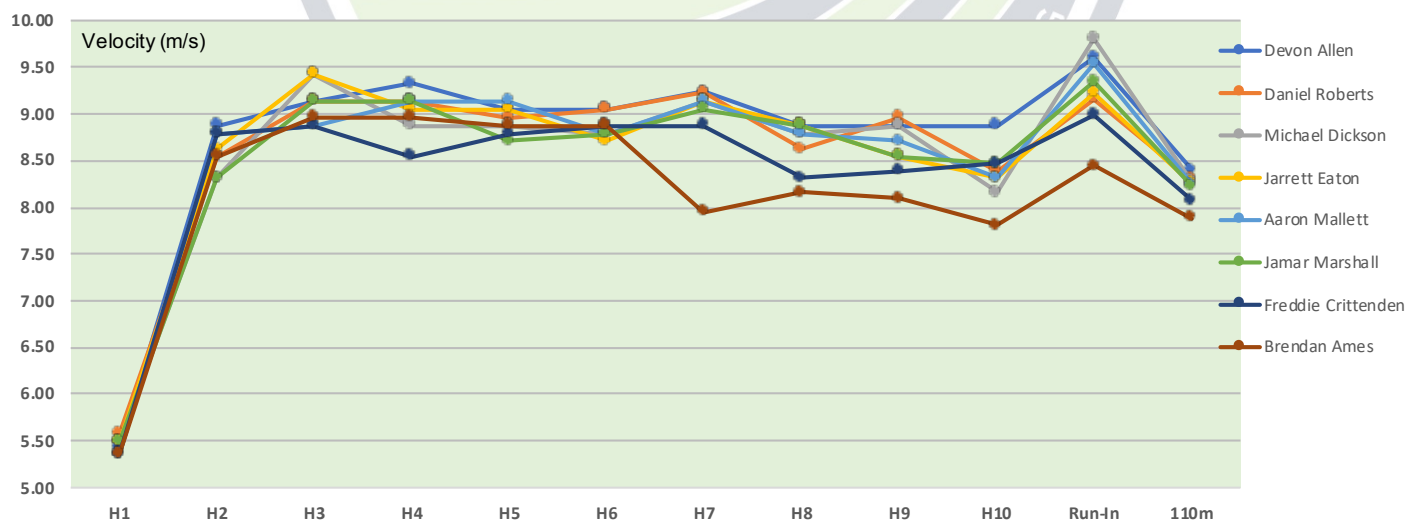
110m Hurdles

Date: 2021.06.26

Wind: 1.2 m/s

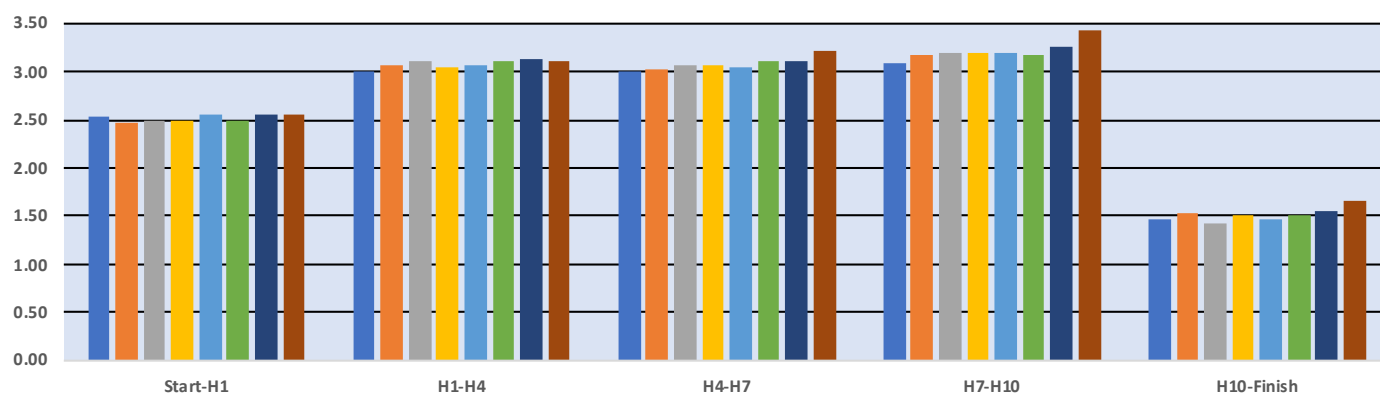
Semi-Final 2

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Allen, Devon (USA) (1994)	time		2.53	3.56	4.56	5.54	6.55	7.56	8.55	9.58	10.61	11.64		13.10	5 / 1			
	reaction time	0.124														3.01	3.01	3.09
	interval			1.03	1.00	0.98	1.01	1.01	0.99	1.03	1.03	1.03	1.46			9.11	9.11	8.87
Roberts, Daniel (USA) (1998)	time		2.46	3.53	4.53	5.53	6.55	7.56	8.55	9.61	10.63	11.72		13.25	4 / 2			
	reaction time	0.179														3.07	3.02	3.17
	interval			1.07	1.00	1.00	1.02	1.01	0.99	1.06	1.02	1.09	1.53			8.93	9.08	8.65
Dickson, Michael (USA) (1997)	time		2.50	3.60	4.57	5.60	6.63	7.67	8.67	9.71	10.74	11.86		13.29	6 / 3			
	reaction time	0.173														3.10	3.07	3.19
	interval			1.10	0.97	1.03	1.03	1.04	1.00	1.04	1.03	1.12	1.43			8.85	8.93	8.60
Eaton, Jarrett (USA) (1989)	time		2.50	3.56	4.53	5.54	6.55	7.60	8.60	9.63	10.70	11.80		13.32	3 / 4			
	reaction time	0.157														3.04	3.06	3.20
	interval			1.06	0.97	1.01	1.01	1.05	1.00	1.03	1.07	1.10	1.52			9.02	8.96	8.57
Mallett, Aaron (USA) (1994)	time		2.56	3.60	4.63	5.63	6.63	7.67	8.67	9.71	10.76	11.86		13.33	7 / 5			
	reaction time	0.198														3.07	3.04	3.19
	interval			1.04	1.03	1.00	1.00	1.04	1.00	1.04	1.05	1.10	1.47			8.93	9.02	8.60
Marshall, Jamar (USA) (2001)	time		2.50	3.60	4.60	5.60	6.65	7.69	8.70	9.73	10.80	11.88		13.38	1 / 6			
	reaction time	0.137														3.10	3.10	3.18
	interval			1.10	1.00	1.00	1.05	1.04	1.01	1.03	1.07	1.08	1.50			8.85	8.85	8.62
Crittenden, Freddie (USA) (1994)	time		2.56	3.60	4.63	5.70	6.74	7.77	8.80	9.90	10.99	12.07		13.63	2 / 6			
	reaction time	0.175														3.14	3.10	3.27
	interval			1.04	1.03	1.07	1.04	1.03	1.03	1.10	1.09	1.08	1.56			8.73	8.85	8.39
Ames, Brendan (USA) (1988)	time		2.56	3.63	4.65	5.67	6.70	7.73	8.88	10.00	11.13	12.30		13.96	8 / 7			
	reaction time	0.208														3.11	3.21	3.42
	interval			1.07	1.02	1.02	1.03	1.03	1.15	1.12	1.13	1.17	1.66			8.82	8.54	8.02
	velocity		5.49	8.31	9.42	8.87	8.87	8.79	9.14	8.79	8.87	8.16	8.09	7.81				



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=ALtrPk_oJed0

2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

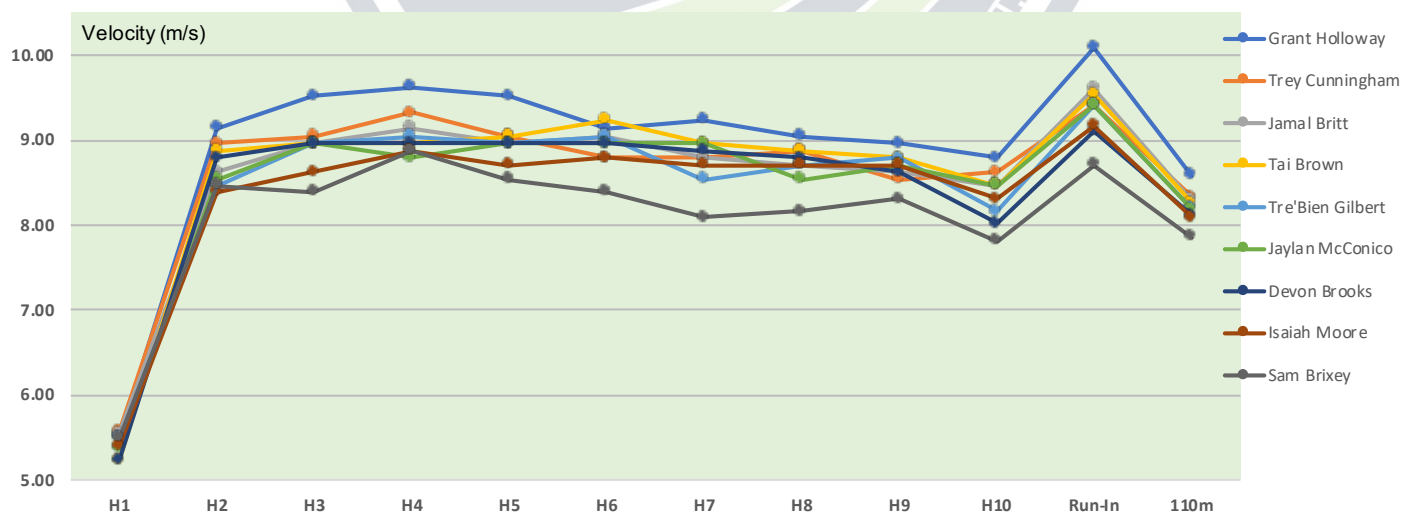
110m Hurdles

Date: 2021.06.26

Wind: 1.8 m/s

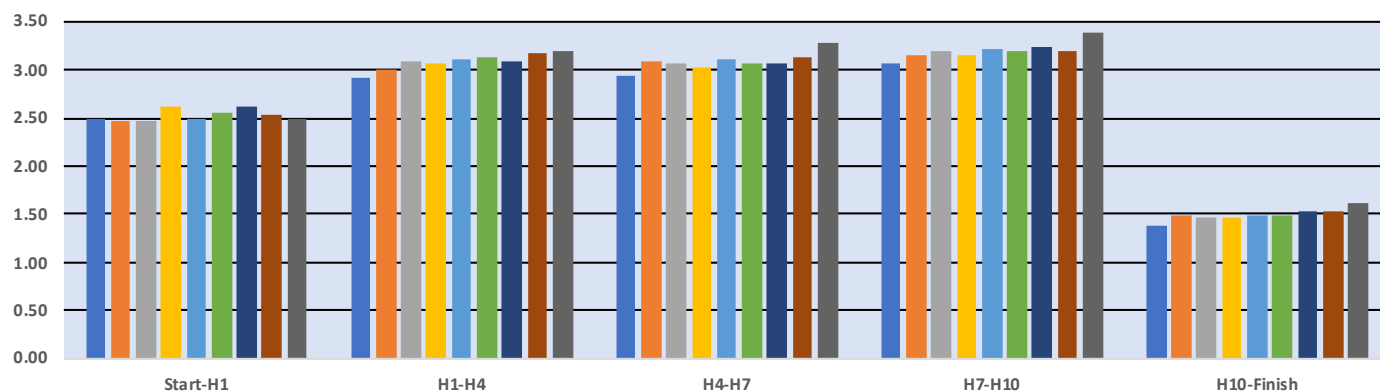
Semi-Final 1

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Holloway, Grant (USA) (1997)	time		2.49	3.49	4.45	5.40	6.36	7.36	8.35	9.36	10.38	11.42	12.81		5 / 1			
	reaction time	0.169														2.91	2.95	3.07
	interval		7 steps	1.00	0.96	0.95	0.96	1.00	0.99	1.01	1.02	1.04	1.39	PB		9.42	9.29	8.93
Cunningham, Trey (USA) (1998)	time		2.46	3.48	4.49	5.47	6.48	7.52	8.56	9.59	10.66	11.72	13.21		6 / 2			
	reaction time	0.163														3.01	3.09	3.16
	interval		7 steps	1.02	1.01	0.98	1.01	1.04	1.03	1.07	1.06	1.06	1.49	PB		9.11	8.87	8.68
Britt, Jamal (USA) (1998)	time		2.47	3.53	4.55	5.55	6.57	7.58	8.62	9.67	10.73	11.81	13.27		3 / 3			
	reaction time	0.147														3.08	3.07	3.19
	interval		7 steps	1.06	1.02	1.00	1.02	1.01	1.04	1.05	1.06	1.08	1.46	PB		8.90	8.93	8.60
Brown, Tai (USA) (2000)	time		2.62	3.65	4.67	5.69	6.70	7.69	8.71	9.74	10.78	11.86	13.33		2 / 4			
	reaction time	0.173														3.07	3.02	3.15
	interval		7 steps	1.03	1.02	1.02	1.01	0.99	1.02	1.03	1.04	1.08	1.47	PB		8.93	9.08	8.70
Gilbert, Tre'Bien (USA) (1999)	time		2.50	3.58	4.60	5.61	6.63	7.64	8.71	9.76	10.80	11.92	13.41		8 / 5			
	reaction time	0.191														3.11	3.10	3.21
	interval		7 steps	1.08	1.02	1.01	1.02	1.01	1.07	1.05	1.04	1.12	1.49	PB		8.82	8.85	8.54
McConico, Jaylan (USA) (1998)	time		2.55	3.62	4.64	5.68	6.70	7.72	8.74	9.81	10.86	11.94	13.43		4 / 6			
	reaction time	0.209														3.13	3.06	3.20
	interval		7 steps	1.07	1.02	1.04	1.02	1.02	1.02	1.07	1.05	1.08	1.49			8.76	8.96	8.57
Brooks, Devon (USA) (1998)	time		2.62	3.66	4.68	5.70	6.72	7.74	8.77	9.81	10.87	12.01	13.55		1 / 7			
	reaction time	0.264														3.08	3.07	3.24
	interval		7 steps	1.04	1.02	1.02	1.02	1.02	1.03	1.04	1.06	1.14	1.54			8.90	8.93	8.46
Moore, Isaiah (USA) (1996)	time		2.54	3.63	4.69	5.72	6.77	7.81	8.86	9.91	10.96	12.06	13.59		7 / 8			
	reaction time	0.147														3.18	3.14	3.20
	interval		7 steps	1.09	1.06	1.03	1.05	1.04	1.05	1.05	1.05	1.10	1.53			8.62	8.73	8.57
Brixey, Sam (USA) (1998)	time		2.50	3.58	4.67	5.70	6.77	7.86	8.99	10.11	11.21	12.38	13.99		9 / 9			
	reaction time	0.148														3.20	3.29	3.39
	interval		7 steps	1.08	1.09	1.03	1.07	1.09	1.13	1.12	1.10	1.17	1.61			8.57	8.33	8.09
	velocity		5.49	8.46	8.39	8.87	8.54	8.39	8.09	8.16	8.31	7.81	8.71	7.86				



Time Intervals (s)

Hurdle Phases



1st Place - Grant Holloway

Source: Vazel, P.J. (2021.06.27). Retrieved from <https://twitter.com/pjvazel/status/1409323602432999426?s=21>

2nd-9th Place

Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.youtube.com/watch?v=RMldL1bWGA>

2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

110m Hurdles

Date: 2021.06.25

Wind: 0.5 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
Allen, Devon (USA) (1994)	time	2.50	3.53	4.56	5.63	6.63	7.63	8.66	9.73	10.73	11.76		13.26	3 / 1			
	reaction time	0.139										1.50			3.13	3.03	3.10
	interval		1.03	1.03	1.07	1.00	1.00	1.03	1.07	1.00	1.03	9.35	8.30		8.76	9.05	8.85
Dickson, Michael (USA) (1997)	time	2.53	3.57	4.60	5.66	6.66	7.66	8.70	9.73	10.73	11.78		13.26	2 / 2			
	reaction time	0.208										1.48			3.13	3.04	3.08
	interval		1.04	1.03	1.06	1.00	1.00	1.04	1.03	1.00	1.05	9.47	8.30		8.76	9.02	8.90
	velocity	5.49	8.87	8.87	8.54	9.14	9.14	8.87	8.54	9.14	8.87						
	velocity																
	velocity																

Date: 2021.06.25

Wind: 1.5 m/s

Heat 2

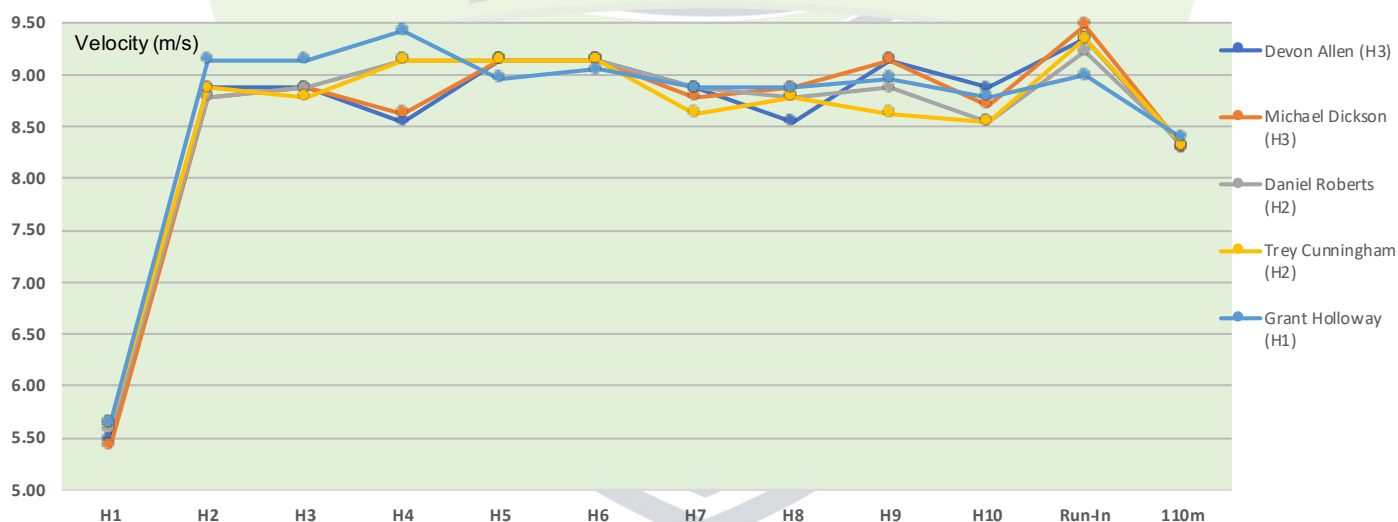
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Roberts, Daniel (USA) (1998)	time	2.46	3.50	4.53	5.53	6.53	7.53	8.56	9.60	10.63	11.70		13.22	1 / 1			
	reaction time	0.182										1.52			3.07	3.03	3.14
	interval		1.04	1.03	1.00	1.00	1.00	1.03	1.04	1.03	1.07	9.22	8.32		8.93	9.05	8.73
Cunningham, Trey (USA) (1998)	time	2.43	3.46	4.50	5.50	6.50	7.50	8.56	9.60	10.66	11.73		13.23	3 / 2			
	reaction time	0.162													3.07	3.06	3.17
	interval		1.03	1.04	1.00	1.00	1.00	1.06	1.04	1.06	1.07	1.50			8.93	8.96	8.65
	velocity	5.65	8.87	8.79	9.14	9.14	9.14	8.62	8.79	8.62	8.54	9.35	8.31				
	velocity																
	velocity																

Date: 2021.06.25

Wind: 0.7 m/s

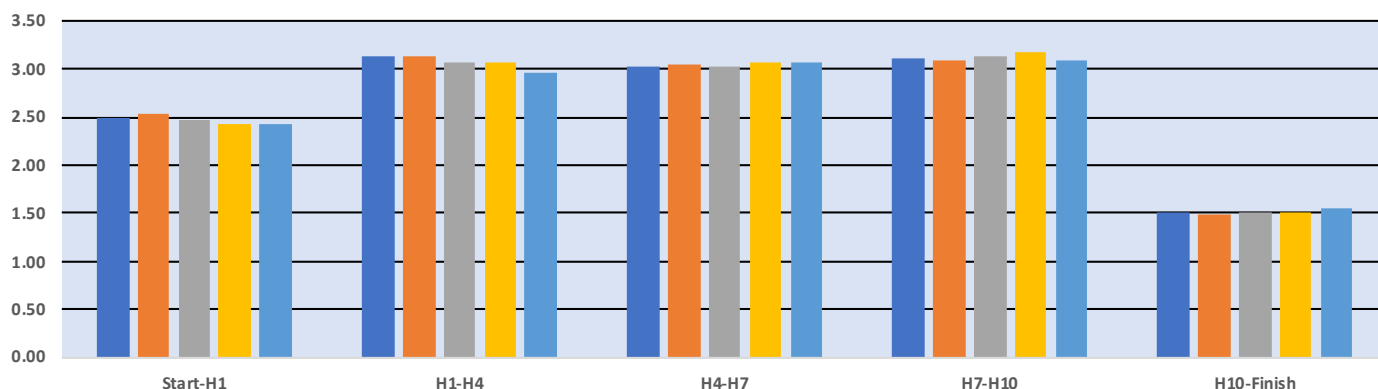
Heat 1

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Holloway, Grant (USA) (1997)	time	2.43	3.43	4.43	5.40	6.42	7.43	8.46	9.49	10.51	11.55		13.11	4 / 1			
	reaction time	0.175										1.56			2.97	3.06	3.09
	interval		1.00	1.00	0.97	1.02	1.01	1.03	1.03	1.02	1.04	9.99	8.39		9.23	8.96	8.87
	velocity	5.65	9.14	9.14	9.42	8.96	9.05	8.87	8.87	8.96	8.79						
	velocity																
	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=ObAFK8AeHsk&t=95s>

Biomechanical Analysis

2021 Jamaican National Championships (Kingston, JAM) (TV Analysis)

110m Hurdles

Date: 2021.06.26

Wind: 1.3 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
McLeod, Omar (JAM) (1994)	time	2.47	3.53	4.53	5.56	6.53	7.57	8.57	9.57	10.58	11.59		13.04	4 / 1			
	reaction time											1.45			3.09	3.01	3.02
	interval		1.06	1.00	1.03	0.97	1.04	1.00	1.00	1.01	1.01	1.45			8.87	9.11	9.08
Levy, Ronald (JAM) (1992)	time	2.53	3.53	4.56	5.56	6.53	7.53	8.53	9.53	10.56	11.60		13.08	5 / 2			
	reaction time											1.48			3.03	2.97	3.07
	interval	7 steps	1.00	1.03	1.00	0.97	1.00	1.00	1.00	1.03	1.04	1.48			9.05	9.23	8.93
	velocity	5.55	8.62	9.14	8.87	9.42	8.79	9.14	9.14	9.05	9.05	9.67	8.44				
	velocity	5.42	9.14	8.87	9.14	9.42	9.14	9.14	9.14	8.87	8.79	9.47	8.41				

2021 Fanny Blankers Koen Games (Hengelo, NED) (TV Analysis)

Date: 2021.06.06

Wind: 1.7 m/s

FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
McLeod, Omar (JAM) (1994)	time	2.37	3.43	4.48	5.50	6.47	7.47	8.54	9.56	10.58	11.66		13.08	5 / 1			
	reaction time											1.42			3.13	3.04	3.12
	interval		1.06	1.05	1.02	0.97	1.00	1.07	1.02	1.02	1.08	1.42			8.76	9.02	8.79
Allen, Devon (USA) (1994)	time	2.47	3.54	4.54	5.60	6.64	7.67	8.73	9.74	10.77	11.86		13.32	4 / 2			
	reaction time											1.46			3.13	3.13	3.13
	interval		1.07	1.00	1.06	1.04	1.03	1.06	1.01	1.03	1.09	1.46			8.76	8.76	8.76
Belocian, Wilhem (FRA) (1995)	time	2.47	3.54	4.54	5.57	6.60	7.62	8.64	9.67	10.74	11.84		13.34	6 / 3			
	reaction time											1.50			3.10	3.07	3.20
	interval		1.07	1.00	1.03	1.03	1.02	1.02	1.03	1.07	1.10	1.50			8.85	8.93	8.57
	velocity	5.55	8.54	9.14	8.87	8.87	8.96	8.96	8.87	8.54	8.31	9.35	8.25				
	velocity	5.55	8.54	9.14	8.87	8.87	8.96	8.96	8.87	8.54	8.31	9.35	8.25				

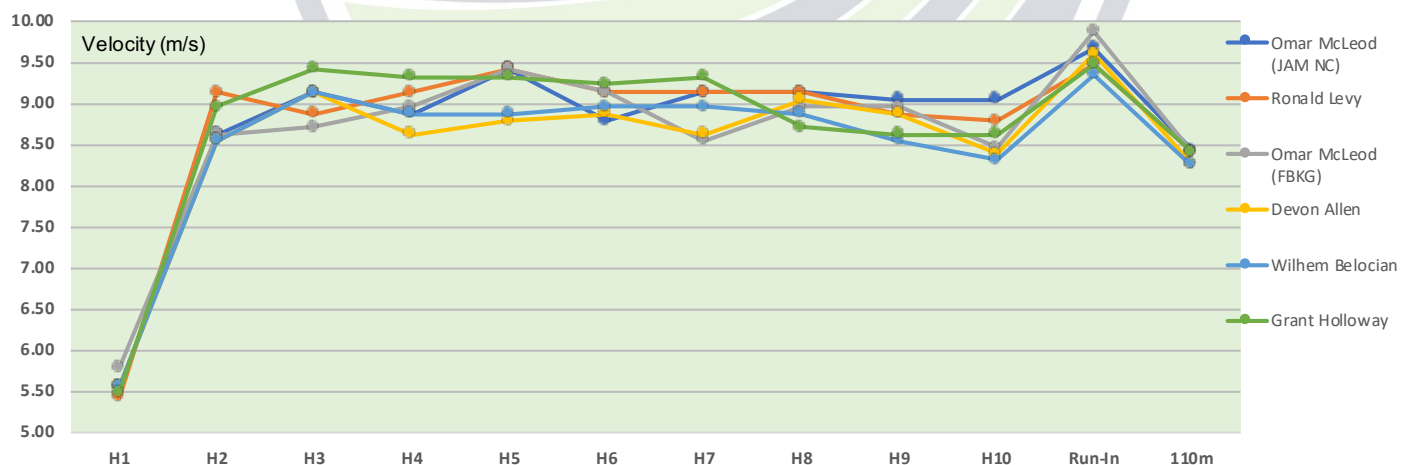
2021 Tom Jones Invitational (Gainesville, FL) (TV Analysis)

Date: 2021.04.17

Wind: 1.3 m/s

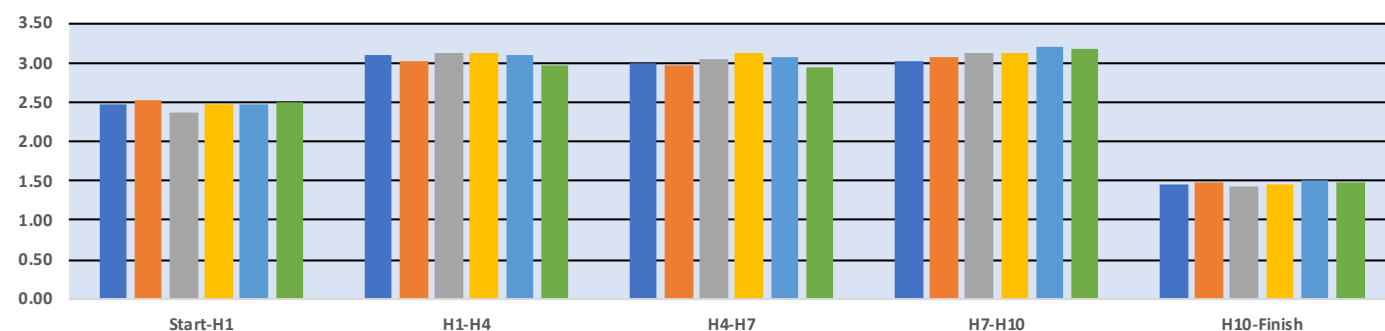
FINAL

		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	2.50	3.52	4.49	5.47	6.45	7.44	8.42	9.47	10.53	11.59		13.07	6 / 1			
	reaction time											1.48			2.97	2.95	3.17
	interval	7 steps	1.02	0.97	0.98	0.98	0.99	0.98	1.05	1.06	1.06	1.48			9.23	9.29	8.65
	velocity	5.49	8.96	9.42	9.33	9.33	9.23	9.33	8.70	8.62	8.62	9.47	8.42				



Time Intervals (s)

Hurdle Phases



Jamaican National Championships

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=i5M1Zoz12Vs>

Tom Jones Invitational

Evaluated with: ObjectusVideo

Quality & Frame Rate: 608 x 1080 @ 60fps

Timing From: Gun Flash

Source: https://www.youtube.com/watch?v=N-welm9Q_ZQ

Fanny Blankers Koen Games

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 60fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=dkI9wp8nyAQ>

2021 NCAA Championships (Eugene, OR) (TV Analysis)

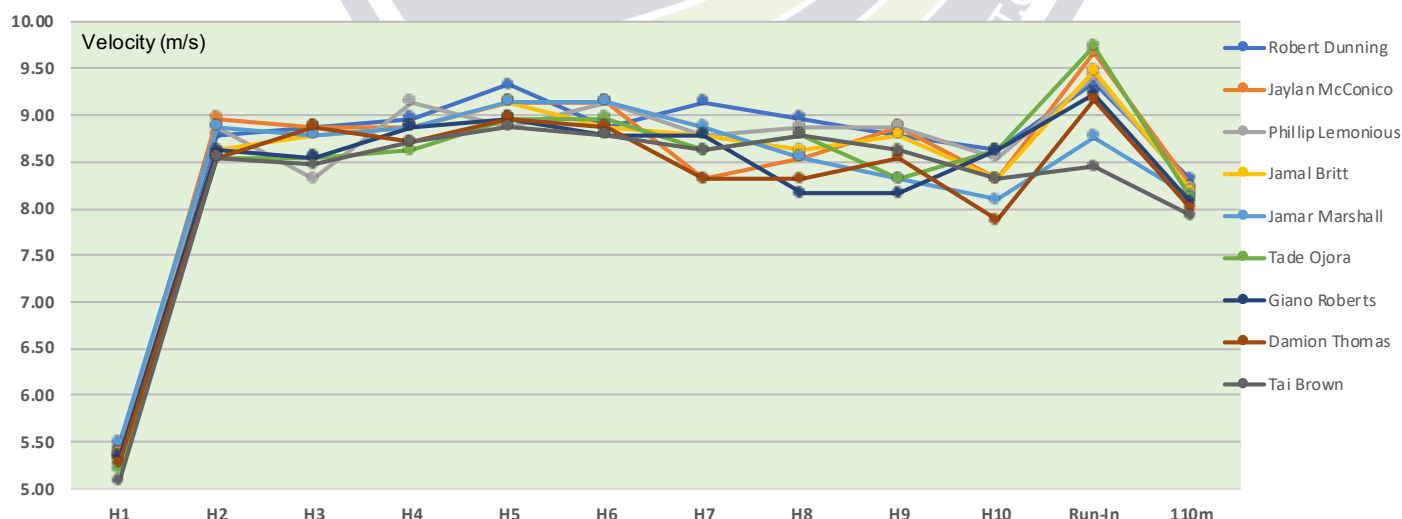
100m Hurdles

Date: 2021.06.11

Wind: -0.6 m/s

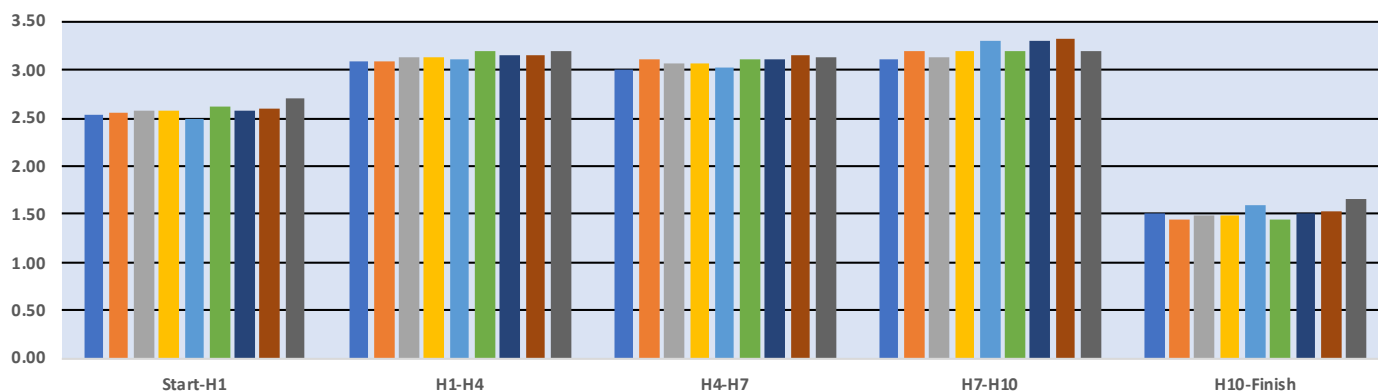
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Dunning, Robert (USA) (1997)	time	2.53	3.57	4.60	5.62	6.60	7.63	8.63	9.65	10.69	11.75		13.25	2 / 1			
	reaction time	0.161													3.09	3.01	3.12
	interval	7 steps	1.04	1.03	1.02	0.98	1.03	1.00	1.02	1.04	1.06	1.50			8.87	9.11	8.79
McConico, Jaylan (USA) (1998)	time	2.55	3.57	4.60	5.63	6.63	7.63	8.73	9.80	10.83	11.93		13.38	4 / 2			
	reaction time	0.194													3.08	3.10	3.20
	interval	velocity	5.38	8.96	8.87	8.87	9.14	9.14	8.31	8.54	8.87	8.31	9.67		8.90	8.85	8.57
Lemonious, Phillip (JAM) (1998)	time	2.57	3.60	4.70	5.70	6.73	7.73	8.77	9.80	10.83	11.90		13.39	5 / 3			
	reaction time	0.150													3.13	3.07	3.13
	interval	7 steps	1.03	1.10	1.00	1.03	1.00	1.04	1.03	1.03	1.07	1.49	PB		8.76	8.93	8.76
Britt, Jamal (USA) (1998)	time	2.57	3.63	4.67	5.70	6.70	7.73	8.77	9.83	10.87	11.97		13.45	8 / 4			
	reaction time	0.203													3.13	3.07	3.20
	interval	7 steps	1.06	1.04	1.03	1.00	1.03	1.04	1.06	1.04	1.10	1.48	PB		8.76	8.93	8.57
Marshall, Jamar (USA) (2001)	time	2.50	3.53	4.57	5.60	6.60	7.60	8.63	9.70	10.80	11.93		13.53	7 / 5			
	reaction time	0.161													3.10	3.03	3.30
	interval	7 steps	1.03	1.04	1.03	1.00	1.00	1.03	1.07	1.10	1.13	1.60			8.85	9.05	8.31
Ojora, Tade (GBR) (1999)	time	2.63	3.70	4.77	5.83	6.85	7.87	8.93	9.97	11.07	12.13		13.57	9 / 6			
	reaction time	0.224													3.20	3.10	3.20
	interval	velocity	5.22	8.54	8.54	8.62	8.96	8.96	8.62	8.79	8.31	8.62	9.74		8.57	8.85	8.57
Roberts, Giano (USA) (2000)	time	2.57	3.63	4.70	5.73	6.75	7.79	8.83	9.95	11.07	12.13		13.65	3 / 7			
	reaction time	0.152													3.16	3.10	3.30
	interval	velocity	5.34	8.62	8.54	8.87	8.96	8.79	8.79	8.16	8.16	8.62	9.22		8.68	8.85	8.31
Thomas, Damion (JAM) (1999)	time	2.60	3.67	4.70	5.75	6.77	7.80	8.90	10.00	11.07	12.23		13.76	6 / 8			
	reaction time	0.200													3.15	3.15	3.33
	interval	7 steps	1.07	1.03	1.05	1.02	1.03	1.10	1.10	1.07	1.16	1.53			8.70	8.70	8.23
Brown, Tai (USA) (2000)	time	2.70	3.77	4.85	5.90	6.93	7.97	9.03	10.07	11.13	12.23		13.89	1 / 9			
	reaction time	0.161													3.20	3.13	3.20
	interval	velocity	5.08	8.54	8.46	8.70	8.87	8.79	8.62	8.79	8.62	8.31	8.45		8.57	8.76	8.57



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 25fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=bODE6lNm4g>

2021 Golden Gala Pietro Mennea (Florence, ITA) (TV Analysis)

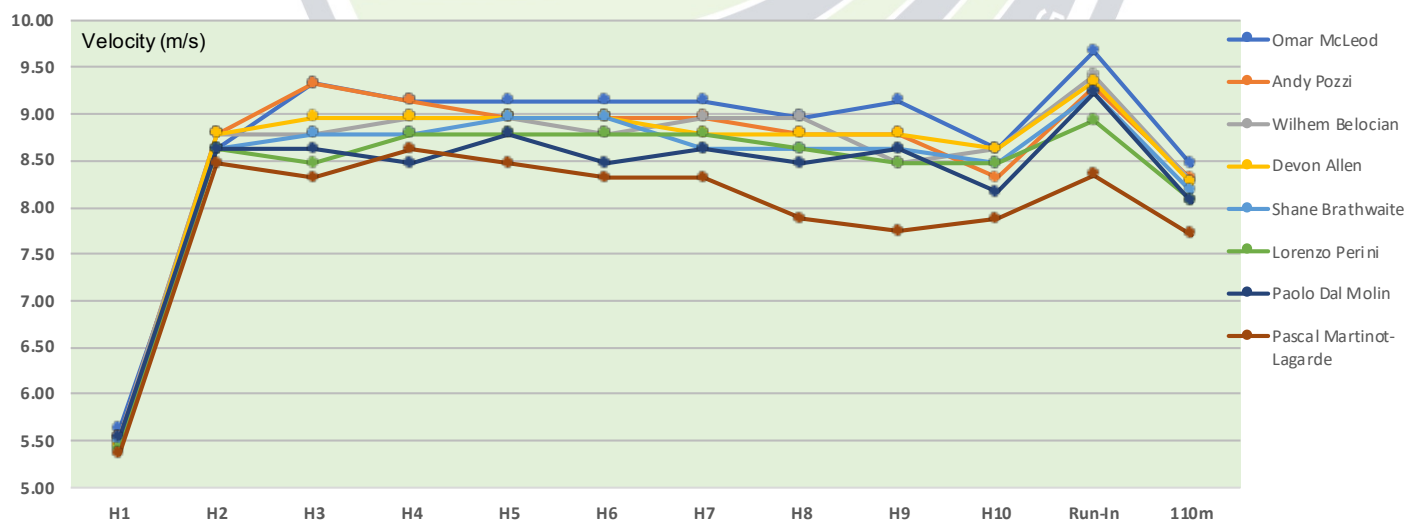
110m Hurdles

Date: 2021.06.10

Wind: -0.1 m/s

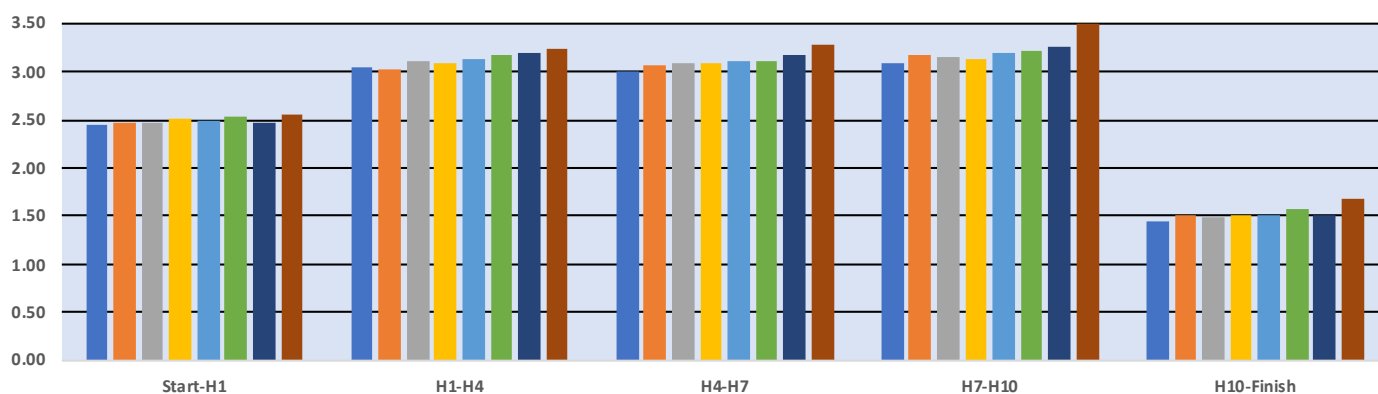
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
McLeod, Omar (JAM) (1994)	time		2.44	3.50	4.48	5.48	6.48	7.48	8.48	9.50	10.50	11.56		13.01	4 / 1			
	reaction time	0.147											1.45			3.04	3.00	3.08
	interval velocity		5.62	8.62	9.33	9.14	9.14	9.14	9.14	8.96	9.14	8.62	9.67	8.46		9.02	9.14	8.90
Pozzi, Andy (GBR) (1992)	time		2.48	3.52	4.50	5.50	6.52	7.54	8.56	9.60	10.64	11.74		13.25	3 / 2			
	reaction time	0.113											1.51			3.02	3.06	3.18
	interval velocity		5.53	8.79	9.33	9.14	8.96	8.96	8.96	8.79	8.79	8.31	9.28	8.30		9.08	8.96	8.62
Belocian, Wilhem (FRA) (1995)	time		2.48	3.52	4.56	5.58	6.60	7.64	8.66	9.68	10.76	11.82		13.31	6 / 3			
	reaction time	0.138											1.49			3.10	3.08	3.16
	interval velocity		5.53	8.79	8.79	8.96	8.96	8.79	8.96	8.96	8.46	8.62	9.41	8.26		8.85	8.90	8.68
Allen, Devon (USA) (1994)	time		2.52	3.56	4.58	5.60	6.62	7.64	8.68	9.72	10.76	11.82		13.32	5 / 4			
	reaction time	0.136											1.50			3.08	3.08	3.14
	interval velocity		5.44	8.79	8.96	8.96	8.96	8.96	8.79	8.79	8.79	8.62	9.35	8.26		8.90	8.90	8.73
Brathwaite, Shane (BAR) (1990)	time		2.50	3.56	4.60	5.64	6.66	7.68	8.74	9.80	10.86	11.94		13.46	1 / 5			
	reaction time	0.122											1.52			3.14	3.10	3.20
	interval velocity		5.49	8.62	8.79	8.79	8.96	8.96	8.62	8.62	8.62	8.46	9.22	8.17		8.73	8.85	8.57
Perini, Lorenzo (ITA) (1994)	time		2.54	3.60	4.68	5.72	6.76	7.80	8.84	9.90	10.98	12.06		13.63	8 / 6			
	reaction time	0.140											1.57			3.18	3.12	3.22
	interval velocity		5.40	8.62	8.46	8.79	8.79	8.79	8.79	8.62	8.46	8.46	8.93	8.07		8.62	8.79	8.52
Dal Molin, Paolo (ITA) (1987)	time		2.48	3.54	4.60	5.68	6.72	7.80	8.86	9.94	11.00	12.12		13.64	2 / 7			
	reaction time	0.142											1.52			3.20	3.18	3.26
	interval velocity		5.53	8.62	8.62	8.46	8.79	8.46	8.62	8.46	8.62	8.16	9.22	8.06		8.57	8.62	8.41
Martinet-Lagarde, Pascal (FRA) (1991)	time		2.56	3.64	4.74	5.80	6.88	7.98	9.08	10.24	11.42	12.58		14.26	7 / 8			
	reaction time	0.162											1.68			3.24	3.28	3.50
	interval velocity		5.36	8.46	8.31	8.62	8.46	8.31	8.31	7.88	7.75	7.88	8.35	7.71		8.46	8.36	7.83



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=fo1QXVBxBgQ>

Biomechanical Analysis

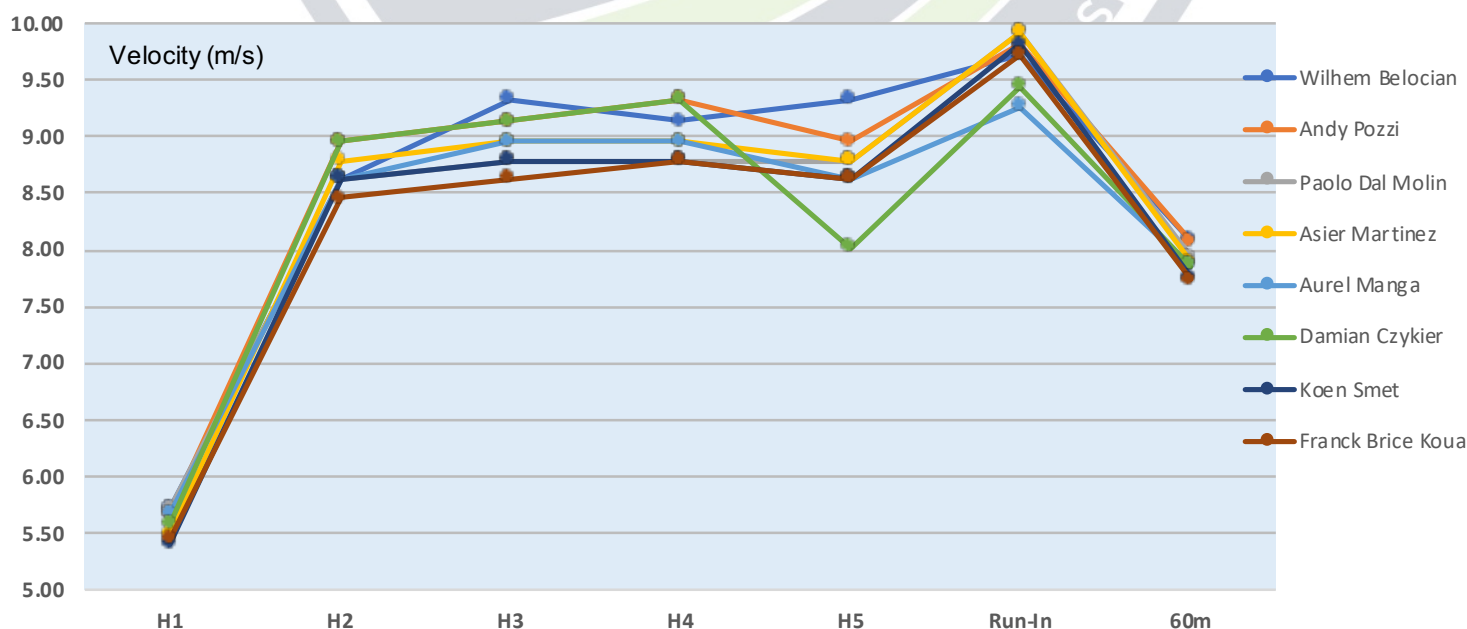
2021 European Indoor Championships (Toruń, POL) (TV Analysis)

Men's 60m Hurdles

Date: 2021.03.07

FINAL

		H1	H2	H3	H4	H5	Run-In	60m	Lane / Place
Belocian, Wilhem (FRA) (1995)	time	2.40	3.46	4.44	5.44	6.42		7.42	5 / 1
	reaction time	0.129						PB	
	interval velocity	5.72	8.62	9.33	9.14	9.33	9.72	8.09	
Pozzi, Andy (GBR) (1992)	time	2.42	3.44	4.44	5.42	6.44		7.43	6 / 2
	reaction time	0.151						=PB	
	interval velocity	7 steps 5.67	1.02 8.96	1.00 9.14	0.98 9.33	1.02 8.96	0.99 9.82	8.08	
Dal Molin, Paolo (ITA) (1987)	time	2.40	3.46	4.50	5.54	6.58		7.56	7 / 3
	reaction time	0.133							
	interval velocity	7 steps 5.72	1.06 8.62	1.04 8.79	1.04 8.79	1.04 8.79	0.98 9.92	7.94	
Martinez, Asier (ESP) (2000)	time	2.50	3.54	4.56	5.58	6.62		7.60	8 / 4
	reaction time	0.150						PB	
	interval velocity	7 steps 5.49	1.04 8.79	1.02 8.96	1.02 8.96	1.04 8.79	0.98 9.92	7.89	
Manga, Aurel (FRA) (1992)	time	2.42	3.48	4.50	5.52	6.58		7.63	3 / 5
	reaction time	0.152							
	interval velocity	7 steps 5.67	1.06 8.62	1.02 8.96	1.02 8.96	1.06 8.62	1.05 9.26	7.86	
Czykier, Damian (POL) (1992)	time	2.46	3.48	4.48	5.46	6.60		7.63	4 / 6
	reaction time	0.148							
	interval velocity	7 steps 5.58	1.02 8.96	1.00 9.14	0.98 9.33	1.14 8.02	1.03 9.44	7.86	
Smet, Koen (BEL) (1992)	time	2.54	3.60	4.64	5.68	6.74		7.73	1 / 7
	reaction time	0.144							
	interval velocity		1.06 5.40	1.04 8.62	1.04 8.79	1.06 8.62	0.99 9.82	7.76	
Koua, Franck Brice (ITA) (2001)	time	2.52	3.60	4.66	5.70	6.76		7.76	2 / 8
	reaction time	0.165							
	interval velocity		1.08 5.44	1.06 8.62	1.04 8.79	1.06 8.62	1.00 9.72	7.73	



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=uScuTGO4k8c>

Women's 100m Hurdles

2021 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	
Semi-Final 3 - 2020 Olympic Games (Tokyo, JPN) (TV Analysis)																		
date		1-Aug	time	2.53	3.53	4.49	5.44	6.38	7.31	8.25	9.21	10.17	11.17					
reaction time		0.175	interval		1.00	0.96	0.95	0.94	0.93	0.94	0.96	0.96	1.00	1.09		2.91	2.81	2.92
wind		-0.2 m/s	velocity	5.14	8.50	8.85	8.95	9.04	9.14	9.04	8.85	8.85	8.50	9.63	8.16	8.76	9.07	8.73
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 - 2021 Tom Jones Invitational (Gainesville, FL) (TV Analysis)																		
date		17-Apr	time	2.43	3.43	4.43	5.40	6.37	7.30	8.24	9.24	10.17	11.17					
reaction time			interval		1.00	1.00	0.97	0.97	0.93	0.94	1.00	0.93	1.00	1.15		2.97	2.84	2.93
wind		1.7 m/s	velocity	5.35	8.50	8.50	8.76	8.76	9.14	9.04	8.50	9.14	8.50	9.13	8.12	8.59	8.98	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 - 2021 István Gyulai Memorial (Székesfehérvár, HUN) (TV Analysis)																		
date		6-Jul	time	2.48	3.50	4.47	5.43	6.37	7.30	8.24	9.21	10.18	11.14					
reaction time		0.178	interval		1.02	0.97	0.96	0.94	0.93	0.94	0.97	0.97	0.96	1.20		2.95	2.81	2.90
wind		0.2 m/s	velocity	5.24	8.33	8.76	8.85	9.04	9.14	9.04	8.76	8.76	8.85	8.75	8.10	8.64	9.07	8.79
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 - 2020 Olympic Games (Tokyo, JPN) (TV Analysis)																		
date		2-Aug	time	2.44	3.44	4.42	5.38	6.32	7.26	8.20	9.14	10.10	11.14					
reaction time		0.149	interval		1.00	0.98	0.96	0.94	0.94	0.94	0.94	0.96	1.04	1.23		2.94	2.82	2.94
wind		-0.3 m/s	velocity	5.33	8.50	8.67	8.85	9.04	9.04	9.04	9.04	8.85	8.17	8.54	8.08	8.67	9.04	8.67
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 - 2021 Golden Gala Pietro Mennea (Florence, ITA) (TV Analysis)																		
date		10-Jun	time	2.46	3.46	4.44	5.40	6.34	7.28	8.22	9.20	10.18	11.18					
reaction time		0.153	interval		1.00	0.98	0.96	0.94	0.94	0.94	0.98	0.98	1.00	1.20		2.94	2.82	2.96
wind		-0.8 m/s	velocity	5.28	8.50	8.67	8.85	9.04	9.04	9.04	8.67	8.67	8.50	8.75	8.08	8.67	9.04	8.61
Anderson, Brittany (JAM) (2001)		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10	
Semi-Final 2 - 2020 Olympic Games (Tokyo, JPN) (TV Analysis)																		
date		1-Aug	time	2.50	3.50	4.52	5.50	6.45	7.38	8.30	9.25	10.25	11.25					
reaction time		0.166	interval		1.00	1.02	0.98	0.95	0.93	0.92	0.95	1.00	1.00	1.15		3.00	2.80	2.95
wind		0.0 m/s	velocity	5.20	8.50	8.33	8.67	8.95	9.14	9.24	8.95	8.50	8.50	9.13	8.06	8.50	9.11	8.64
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	
Heat 5 - 2020 Olympic Games (Tokyo, JPN) (TV Analysis)																		
date		31-Jul	time	2.52	3.52	4.52	5.49	6.44	7.39	8.37	9.32	10.29	11.29					
reaction time		0.153	interval		1.00	1.00	0.97	0.95	0.95	0.98	0.95	0.97	1.00	1.12		2.97	2.88	2.92
wind		0.3 m/s	velocity	5.16	8.50	8.50	8.76	8.95	8.95	8.67	8.95	8.76	8.50	9.37	8.06	8.59	8.85	8.73
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 - 2021 Weltklasse (Zürich, SUI) (TV Analysis)																		
date		9-Sep	time	2.50	3.50	4.48	5.42	6.36	7.32	8.26	9.24	10.22	11.26					
reaction time		0.134	interval		1.00	0.98	0.94	0.94	0.96	0.94	0.98	0.98	1.04	1.16		2.92	2.84	3.00
wind		0.4 m/s	velocity	5.20	8.50	8.67	9.04	9.04	8.85	9.04	8.67	8.67	8.17	9.05	8.05	8.73	8.98	8.50
Marshall, Tonea (USA) (1998)		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10	
Quarterfinal 1 - 2021 NCAA Championships Preliminary East Round (Jacksonville, FL) (TV Analysis)																		
date		29-May	time	2.40	3.40	4.36	5.32	6.30	7.27	8.23	9.20	10.22	11.24					
reaction time			interval		1.00	0.96	0.96	0.98	0.97	0.96	0.97	1.02	1.02	1.20		2.92	2.91	3.01
wind		0.8 m/s	velocity	5.42	8.50	8.85	8.85	8.67	8.76	8.85	8.76	8.33	8.33	8.75	8.04	8.73	8.76	8.47
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 - 2021 Fanny Blankers Koen Games (Hengelo, NED) (TV Analysis)																		
date		6-Jun	time	2.43	3.46	4.44	5.40	6.35	7.31	8.27	9.24	10.20	11.18					
reaction time			interval		1.03	0.98	0.96	0.95	0.96	0.96	0.97	0.96	0.98	1.26		2.97	2.87	2.91
wind		0.5 m/s	velocity	5.35	8.25	8.67	8.85	8.95	8.85	8.85	8.76	8.85	8.67	8.33	8.04	8.59	8.89	8.76
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 - 2021 USATF Grand Prix (Eugene, OR) (TV Analysis)																		
date		24-Apr	time	2.47	3.47	4.45	5.40	6.37	7.32	8.29	9.28	10.26	11.26					
reaction time			interval		1.00	0.98	0.95	0.97	0.95	0.97	0.99	0.98	1.00	1.20		2.93	2.89	2.97
wind		-0.3 m/s	velocity	5.26	8.50	8.67	8.95	8.76	8.95	8.76	8.59	8.67	8.50	8.75	8.03	8.70	8.82	8.59
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 - 2020 USA Olympic Trials (Eugene, OR) (TV Analysis)																		
date		20-Jun	time	2.45	3.45	4.43	5.39	6.34	7.30	8.26	9.22	10.22	11.24					
reaction time		0.186	interval		1.00	0.98	0.96	0.95	0.96	0.96	0.96	1.00	1.02	1.23		2.94	2.87	2.98
wind		0.8 m/s	velocity	5.31	8.50	8.67	8.85	8.95	8.85	8.85	8.85	8.50	8.33	8.54	8.02	8.67	8.89	8.56

2021 Weltklasse (Zürich, SUI) (TV Analysis)

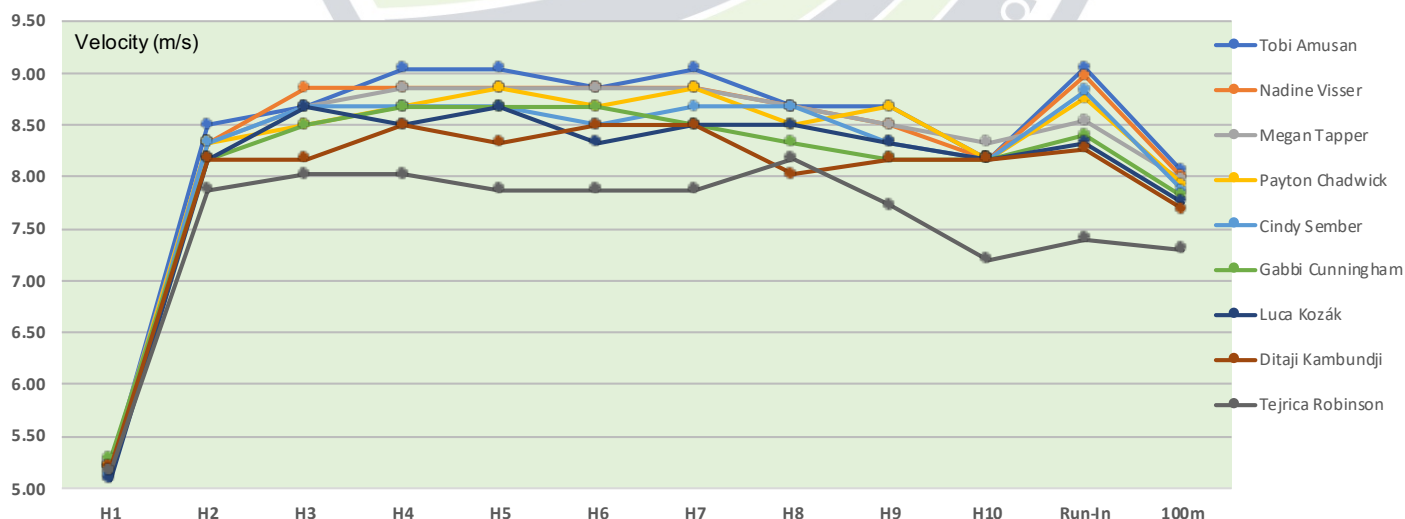
100m Hurdles

Date: 2021.09.09

Wind: 0.4 m/s

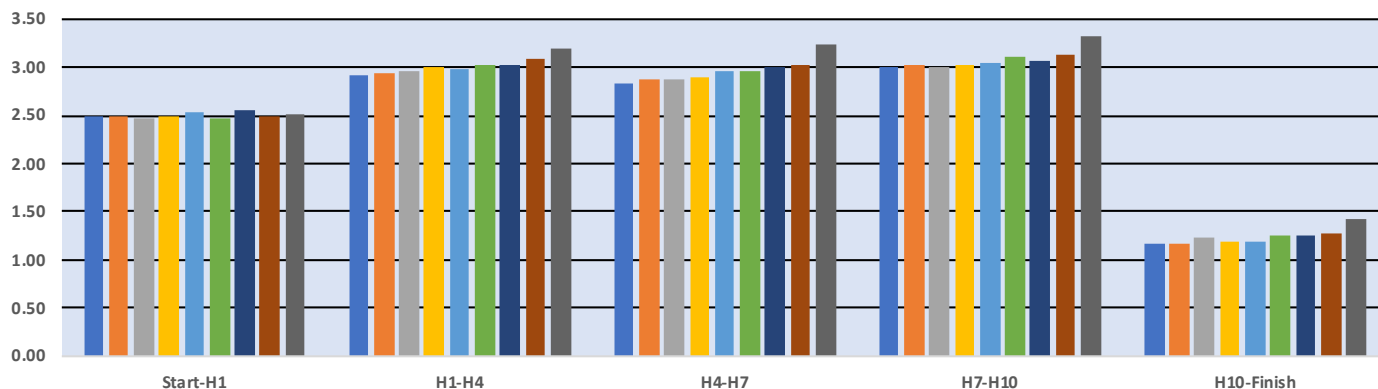
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Amusan, Tobi (NGR) (1997)	time		2.50	3.50	4.48	5.42	6.36	7.32	8.26	9.24	10.22	11.26		12.42	3 / 1			
	reaction time	0.134											1.16	AR		2.92	2.84	3.00
	interval velocity		5.20	8.50	8.67	9.04	9.04	8.85	9.04	8.67	8.67	8.17	9.05	8.05		8.73	8.98	8.50
Visser, Nadine (NED) (1995)	time		2.50	3.52	4.48	5.44	6.40	7.36	8.32	9.30	10.30	11.34		12.51	4 / 2			
	reaction time	0.141											1.17	NR PB		2.94	2.88	3.02
	interval velocity		5.20	8.33	8.85	8.85	8.85	8.85	8.85	8.67	8.50	8.17	8.97	7.99		8.67	8.85	8.44
Tapper, Megan (JAM) (1994)	time		2.48	3.50	4.48	5.44	6.40	7.36	8.32	9.30	10.30	11.32		12.55	5 / 3			
	reaction time	0.151											1.23			2.96	2.88	3.00
	interval velocity		5.24	8.33	8.67	8.85	8.85	8.85	8.85	8.67	8.50	8.33	8.54	7.97		8.61	8.85	8.50
Chadwick, Payton (USA) (1995)	time		2.50	3.52	4.52	5.50	6.46	7.44	8.40	9.40	10.38	11.42		12.62	7 / 4			
	reaction time	0.132											1.20	PB		3.00	2.90	3.02
	interval velocity		5.20	8.33	8.50	8.67	8.85	8.67	8.85	8.50	8.67	8.17	8.75	7.92		8.50	8.79	8.44
Sember, Cindy (GBR) (1994)	time		2.54	3.56	4.54	5.52	6.50	7.50	8.48	9.46	10.48	11.52		12.71	6 / 5			
	reaction time	0.161											1.19			2.98	2.96	3.04
	interval velocity		5.12	8.33	8.67	8.67	8.67	8.50	8.67	8.67	8.33	8.17	8.82	7.87		8.56	8.61	8.39
Cunningham, Gabbi (USA) (1998)	time		2.46	3.50	4.50	5.48	6.46	7.44	8.44	9.46	10.50	11.54		12.79	2 / 6			
	reaction time	0.140											1.25			3.02	2.96	3.10
	interval velocity		5.28	8.17	8.50	8.67	8.67	8.67	8.50	8.33	8.17	8.17	8.40	7.82		8.44	8.61	8.23
Kozák, Luca (HUN) (1996)	time		2.56	3.60	4.58	5.58	6.56	7.58	8.58	9.58	10.60	11.64		12.90	8 / 7			
	reaction time	0.187											1.26			3.02	3.00	3.06
	interval velocity		5.08	8.17	8.67	8.50	8.67	8.33	8.50	8.50	8.33	8.17	8.33	7.75		8.44	8.50	8.33
Kambundji, Ditaji (SUI) (2002)	time		2.50	3.54	4.58	5.58	6.60	7.60	8.60	9.66	10.70	11.74		13.01	9 / 8			
	reaction time	0.142											1.27			3.08	3.02	3.14
	interval velocity		5.20	8.17	8.17	8.50	8.33	8.50	8.50	8.02	8.17	8.17	8.27	7.69		8.28	8.44	8.12
Robinson, Tejrica (USA) (1998)	time		2.52	3.60	4.66	5.72	6.80	7.88	8.96	10.00	11.10	12.28		13.70	1 / 9			
	reaction time	0.134											1.42			3.20	3.24	3.32
	interval velocity		5.16	7.87	8.02	8.02	7.87	7.87	7.87	8.17	7.73	7.20	7.39	7.30		7.97	7.87	7.68



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1078 @ 25fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=vdPduqA76jQ>

2021 Memorial van Damme (Brussels, BEL) (TV Analysis)

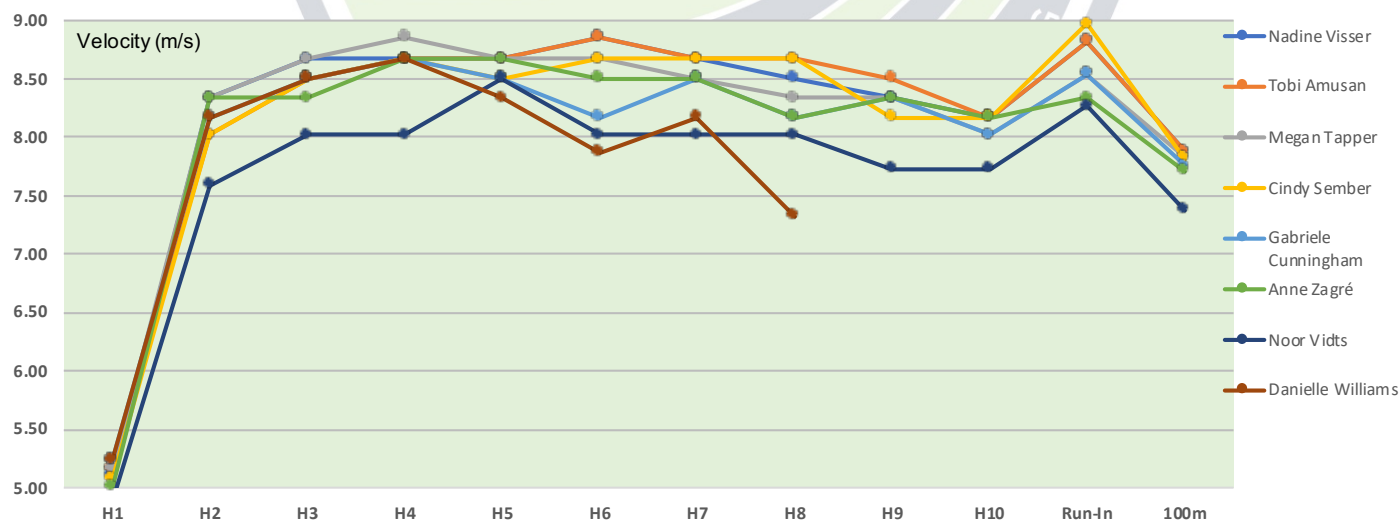
100m Hurdles

Date: 2021.09.03

Wind: 0.7 m/s

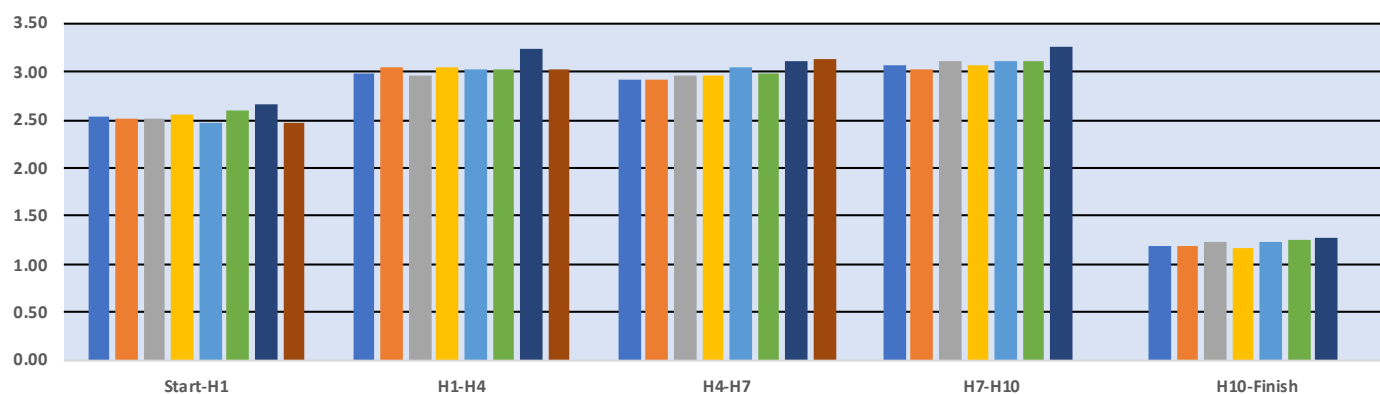
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Visser, Nadine (NED) (1995)	time		2.54	3.56	4.54	5.52	6.50	7.46	8.44	9.44	10.46	11.50		12.69	7 / 1			
	reaction time	0.141											1.19			2.98	2.92	3.06
	interval velocity		5.12	8.33	8.67	8.67	8.67	8.85	8.67	8.50	8.33	8.17	8.82	7.88		8.56	8.73	8.33
Amusan, Tobi (NGR) (1997)	time		2.52	3.58	4.58	5.56	6.54	7.50	8.48	9.46	10.46	11.50		12.69	5 / 2			
	reaction time	0.163											1.19			3.04	2.92	3.02
	interval velocity		5.16	8.02	8.50	8.67	8.67	8.85	8.67	8.67	8.50	8.17	8.82	7.88		8.39	8.73	8.44
Tapper, Megan (JAM) (1994)	time		2.52	3.54	4.52	5.48	6.46	7.44	8.44	9.46	10.48	11.54		12.77	6 / 3			
	reaction time	0.154											1.23			2.96	2.96	3.10
	interval velocity		5.16	8.33	8.67	8.85	8.67	8.67	8.50	8.33	8.33	8.02	8.54	7.83		8.61	8.61	8.23
Sember, Cindy (GBR) (1994)	time		2.56	3.62	4.62	5.60	6.60	7.58	8.56	9.54	10.58	11.62		12.79	2 / 4			
	reaction time	0.174											1.17			3.04	2.96	3.06
	interval velocity		5.08	8.02	8.50	8.67	8.50	8.67	8.67	8.67	8.17	8.17	8.97	7.82		8.39	8.61	8.33
Cunningham, Gabriele (USA) (1998)	time		2.48	3.52	4.52	5.50	6.50	7.54	8.54	9.58	10.60	11.66		12.89	4 / 5			
	reaction time	0.166											1.23			3.02	3.04	3.12
	interval velocity		5.24	8.17	8.50	8.67	8.50	8.17	8.50	8.17	8.33	8.02	8.54	7.76		8.44	8.39	8.17
Zagré, Anne (BEL) (1990)	time		2.60	3.62	4.64	5.62	6.60	7.60	8.60	9.64	10.66	11.70		12.96	8 / 6			
	reaction time	0.153											1.26			3.02	2.98	3.10
	interval velocity		5.00	8.33	8.33	8.67	8.67	8.50	8.50	8.17	8.33	8.17	8.33	7.72		8.44	8.56	8.23
Vidts, Noor (BEL) (1996)	time		2.66	3.78	4.84	5.90	6.90	7.96	9.02	10.08	11.18	12.28		13.55	1 / 7			
	reaction time	0.150											1.27			3.24	3.12	3.26
	interval velocity		4.89	7.59	8.02	8.02	8.50	8.02	8.02	8.02	7.73	7.73	8.27	7.38		7.87	8.17	7.82
Williams, Danielle (JAM) (1992)	time		2.48	3.52	4.52	5.50	6.52	7.60	8.64	9.80					3 / --			
	reaction time	0.129														3.02	3.14	
	interval velocity		5.24	8.17	8.50	8.67	8.33	7.87	8.17	7.33						8.44	8.12	



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 25fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=fwwaaSDTO74>

2021 Meeting de Paris (Paris, FRA) (TV Analysis)

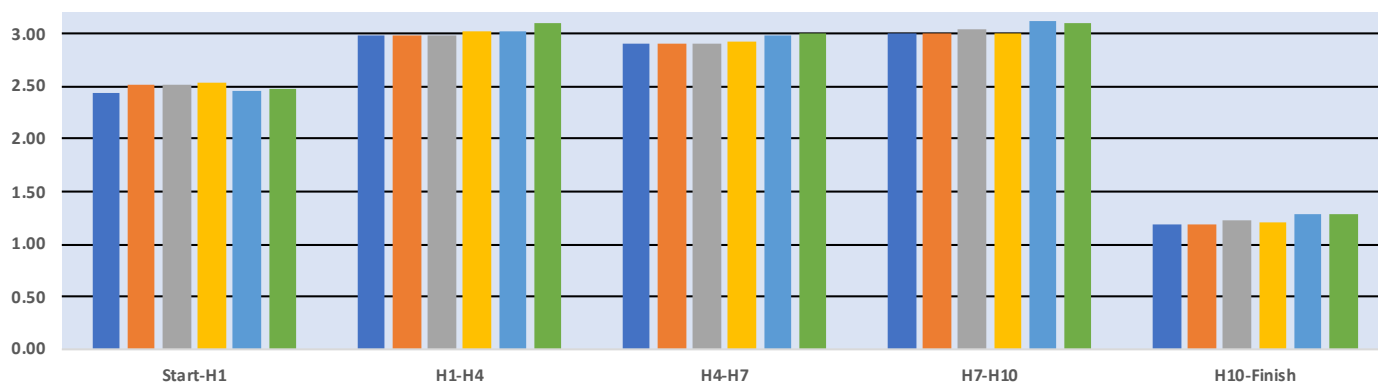
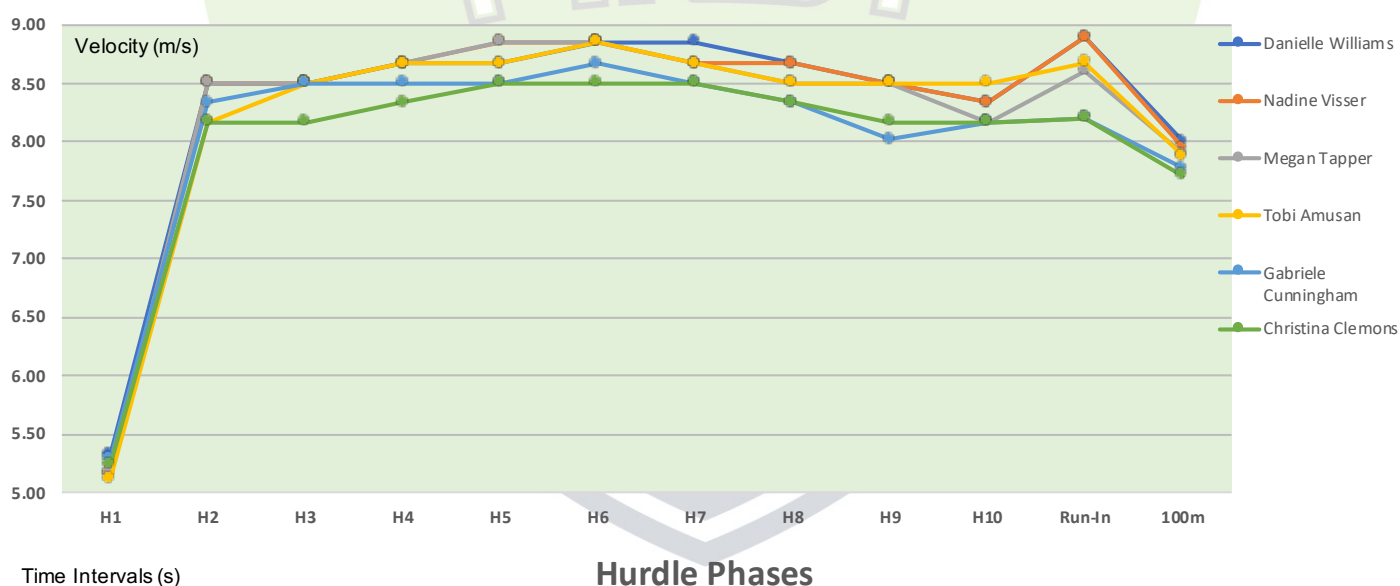
100m Hurdles

Date: 2021.08.28

Wind: 1.7 m/s

FINAL

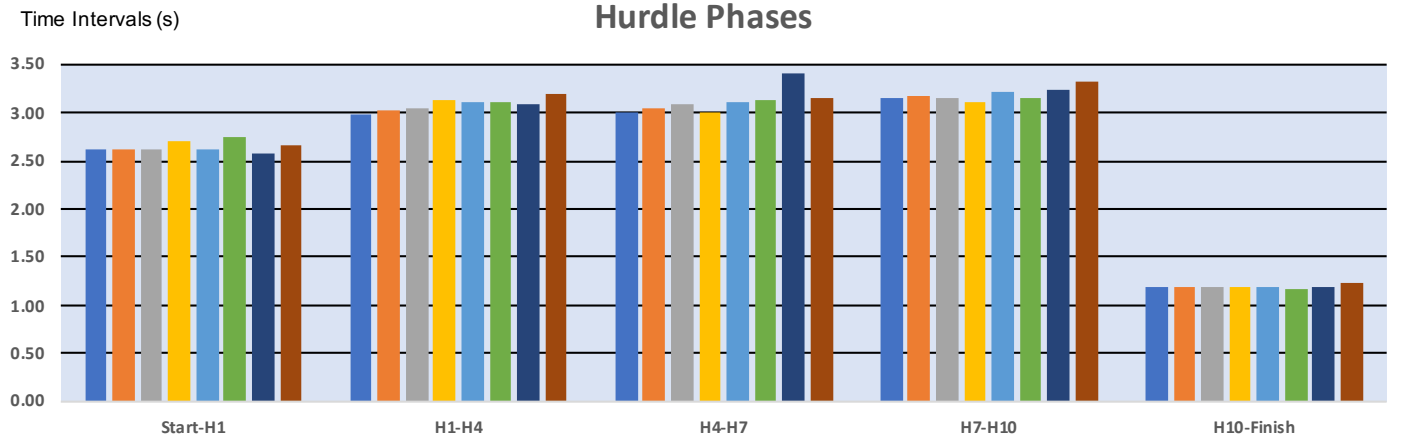
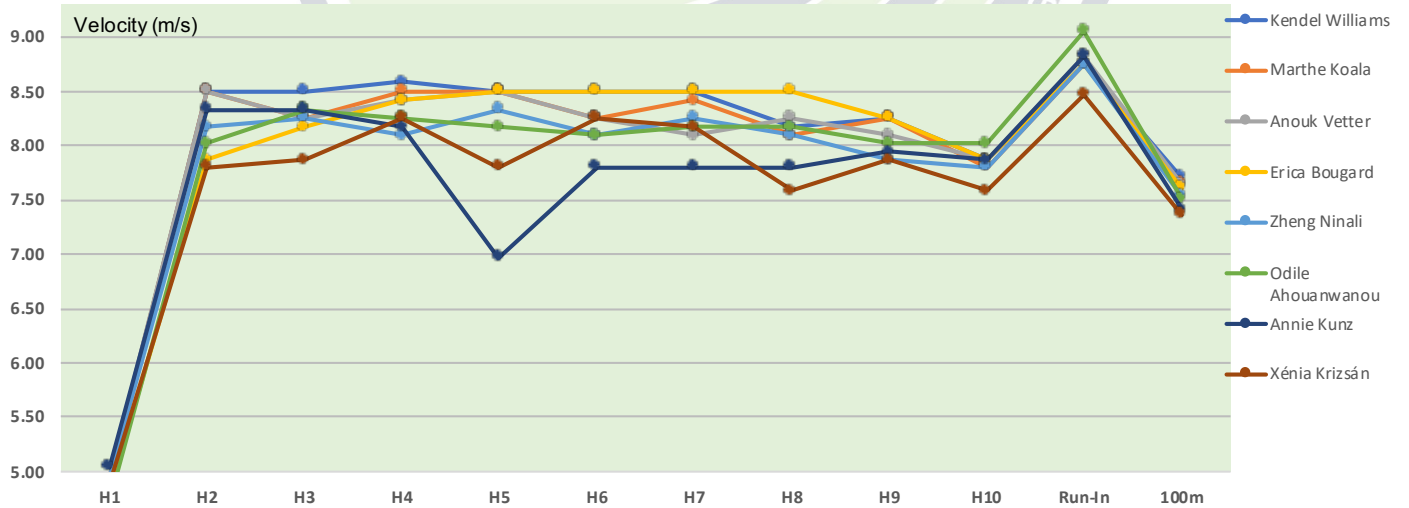
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Williams, Danielle (JAM) (1992)	time	2.44	3.44	4.44	5.42	6.40	7.36	8.32	9.30	10.30	11.32		12.50	2 / 1			
	reaction time	0.137										1.18			2.98	2.90	3.00
	interval velocity		1.00	1.00	0.98	0.98	0.96	0.96	0.98	1.00	1.02	1.18			8.56	8.79	8.50
Visser, Nadine (NED) (1995)	time	2.52	3.52	4.52	5.50	6.46	7.42	8.40	9.38	10.38	11.40		12.58	3 / 2			
	reaction time	0.152										1.18			2.98	2.90	3.00
	interval velocity		1.00	1.00	0.98	0.96	0.96	0.98	1.00	1.02	1.02	1.18			8.56	8.79	8.50
Tapper, Megan (JAM) (1994)	time	2.52	3.52	4.52	5.50	6.46	7.42	8.40	9.40	10.40	11.44		12.66	5 / 3			
	reaction time	0.152										1.22			2.98	2.90	3.04
	interval velocity		1.00	1.00	0.98	0.96	0.96	0.98	1.00	1.00	1.04	1.22			8.56	8.79	8.39
Amusan, Tobi (NGR) (1997)	time	2.54	3.58	4.58	5.56	6.54	7.50	8.48	9.48	10.48	11.48		12.69	4 / 4			
	reaction time	0.155										1.21			3.02	2.92	3.00
	interval velocity		1.04	1.00	0.98	0.98	0.96	0.98	1.00	1.00	1.00	1.21			8.44	8.73	8.50
Cunningham, Gabriele (USA) (1998)	time	2.46	3.48	4.48	5.48	6.48	7.46	8.46	9.48	10.54	11.58		12.86	6 / 5			
	reaction time	0.169										1.28			3.02	2.98	3.12
	interval velocity		1.02	1.00	1.00	1.00	0.98	1.00	1.02	1.06	1.04	1.28			8.44	8.56	8.17
Clemons, Christina (USA) (1990)	time	2.48	3.52	4.56	5.58	6.58	7.58	8.58	9.60	10.64	11.68		12.96	7 / 6			
	reaction time	0.150										1.28			3.10	3.00	3.10
	interval velocity		1.04	1.04	1.02	1.00	1.00	1.00	1.02	1.04	1.04	1.28			8.23	8.50	8.23



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 25fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=JF2MV57m2UA>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

100m Hurdles		Date: 2021.08.04		Wind: -0.8 m/s		Heptathlon - Heat 3											
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Williams, Kendel (USA) (1995)	time	2.63	3.63	4.63	5.62	6.62	7.62	8.62	9.66	10.69	11.77		12.97	6 / 1	2.99	3.00	3.15
	reaction time	0.149										1.20					
	interval		1.00	1.00	0.99	1.00	1.00	1.00	1.04	1.03	1.08	1.20					
Koala, Marthe (BUR) (1994)	time	2.63	3.63	4.66	5.66	6.66	7.69	8.70	9.75	10.78	11.87		13.07	7 / 2	3.03	3.04	3.17
	reaction time	0.139										1.20					
	interval		1.00	1.03	1.00	1.00	1.03	1.01	1.05	1.03	1.09	1.20					
Vetter, Anouk (NED) (1993)	time	2.62	3.62	4.65	5.66	6.66	7.69	8.74	9.77	10.82	11.90		13.09	5 / 3	3.04	3.08	3.16
	reaction time	0.134										1.19	PB				
	interval		1.00	1.03	1.01	1.00	1.03	1.05	1.03	1.05	1.08	1.19	7.64				
Bougard, Erica (USA) (1993)	time	2.70	3.78	4.82	5.83	6.83	7.83	8.83	9.83	10.86	11.94		13.14	2 / 4	3.13	3.00	3.11
	reaction time	0.176										1.20					
	interval		1.08	1.04	1.01	1.00	1.00	1.00	1.00	1.03	1.08	1.20					
Zheng Ninali (CHN) (1998)	time	2.63	3.67	4.70	5.75	6.77	7.82	8.85	9.90	10.98	12.07		13.27	3 / 5	3.12	3.10	3.22
	reaction time	0.123										1.20	PB				
	interval		1.04	1.03	1.05	1.02	1.05	1.03	1.05	1.08	1.09	1.20	7.54				
Ahouanwanou, Odile (BEN) (1991)	time	2.75	3.81	4.83	5.86	6.90	7.95	8.99	10.03	11.09	12.15		13.31	4 / 6	3.11	3.13	3.16
	reaction time	0.177										1.16					
	interval		1.06	1.02	1.03	1.04	1.05	1.04	1.04	1.06	1.06	1.16					
Kunz, Annie (USA) (1993)	time	2.58	3.60	4.62	5.66	6.88	7.97	9.06	10.15	11.22	12.30		13.49	9 / 7	3.08	3.40	3.24
	reaction time	0.137										1.19					
	interval		1.02	1.02	1.04	1.22	1.09	1.09	1.09	1.07	1.08	1.19					
Krizsán, Xénia (HUN) (1993)	time	2.66	3.75	4.83	5.86	6.95	7.98	9.02	10.14	11.22	12.34		13.58	8 / 8	3.20	3.16	3.32
	reaction time	0.152										1.24					
	interval		1.09	1.08	1.03	1.09	1.03	1.04	1.12	1.08	1.12	1.24					
	velocity		4.94	8.50	8.50	8.59	8.50	8.50	8.50	8.17	8.25	7.87	8.75		8.53	8.50	8.10
	velocity		4.94	8.50	8.25	8.50	8.50	8.25	8.42	8.10	8.25	7.80	8.75		8.42	8.39	8.04
	velocity		4.96	8.50	8.25	8.42	8.50	8.25	8.10	8.25	8.10	7.87	8.82		8.39	8.28	8.07
	velocity		4.81	7.87	8.17	8.42	8.50	8.50	8.50	8.50	8.25	7.87	8.75		8.15	8.50	8.20
	velocity		4.94	8.17	8.25	8.10	8.33	8.10	8.25	8.10	7.87	7.80	8.75		8.17	8.23	7.92
	velocity		4.73	8.02	8.33	8.25	8.17	8.10	8.17	8.17	8.02	8.02	9.05		8.20	8.15	8.07
	velocity		5.04	8.33	8.33	8.17	6.97	7.80	7.80	7.80	7.94	7.87	8.82		8.28	7.50	7.87
	velocity		4.89	7.80	7.87	8.25	7.80	8.25	8.17	7.59	7.87	7.59	8.47		7.97	8.07	7.68



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-12-morning-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

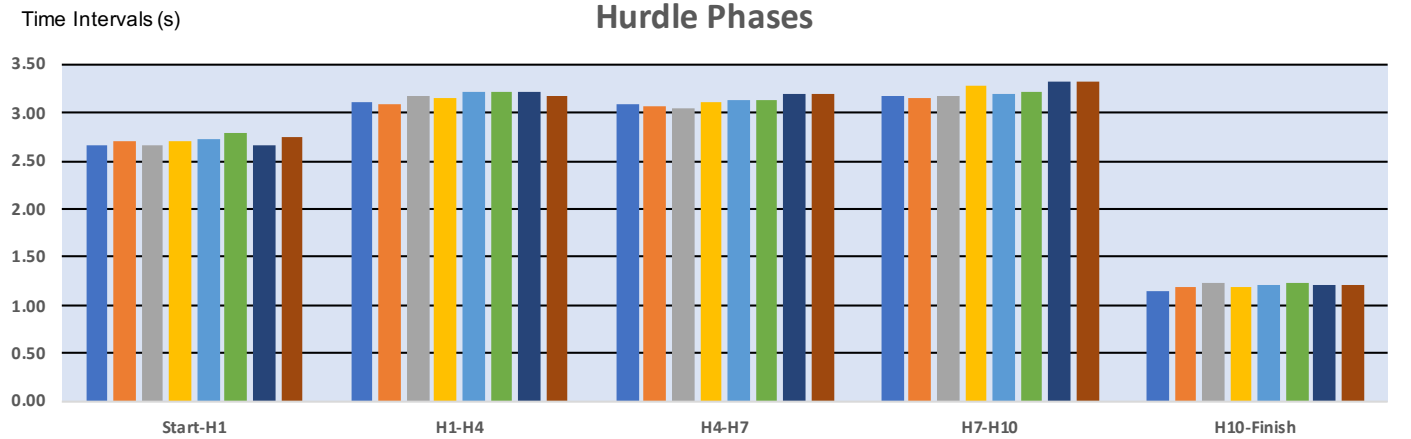
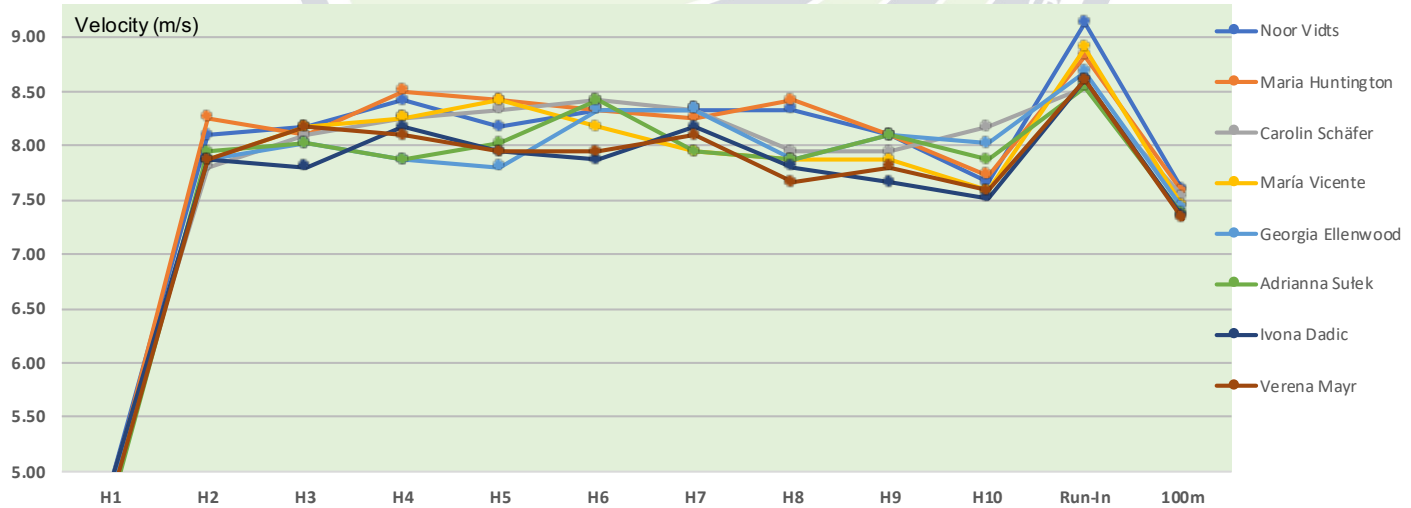
100m Hurdles

Date: 2021.08.04

Wind: 0.3 m/s

Heptathlon - Heat 2

		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	2.66	3.71	4.75	5.76	6.80	7.82	8.84	9.86	10.91	12.02		13.17	8 / 1			
	reaction time	0.129											PB		3.10	3.08	3.18
	interval velocity		1.05	1.04	1.01	1.04	1.02	1.02	1.02	1.05	1.11	1.15	7.59		8.23	8.28	8.02
Huntington, Maria (FIN) (1997)	time	2.71	3.74	4.79	5.79	6.80	7.82	8.85	9.86	10.91	12.01		13.20	6 / 2			
	reaction time	0.190										1.19			3.08	3.06	3.16
	interval velocity		1.03	1.05	1.00	1.01	1.02	1.03	1.01	1.05	1.10	1.19	7.58		8.28	8.33	8.07
Schäfer, Carolin (GER) (1991)	time	2.66	3.75	4.80	5.83	6.85	7.86	8.88	9.95	11.02	12.06		13.29	9 / 3			
	reaction time	0.141										1.23			3.17	3.05	3.18
	interval velocity		1.09	1.05	1.03	1.02	1.01	1.02	1.07	1.07	1.04	1.23	7.52		8.04	8.36	8.02
Vicente, Maria (ESP) (2001)	time	2.71	3.79	4.83	5.86	6.87	7.91	8.98	10.06	11.14	12.26		13.44	2 / 4			
	reaction time	0.154										1.18			3.15	3.12	3.28
	interval velocity		1.08	1.04	1.03	1.01	1.04	1.07	1.08	1.08	1.12	1.18	7.44		8.10	8.17	7.77
Ellenwood, Georgia (CAN) (1995)	time	2.72	3.80	4.86	5.94	7.03	8.05	9.07	10.15	11.20	12.26		13.47	5 / 5			
	reaction time	0.158										1.21			3.22	3.13	3.19
	interval velocity		1.08	1.06	1.08	1.09	1.02	1.02	1.08	1.05	1.06	1.21	7.42		7.92	8.15	7.99
Sulek, Adrianna (POL) (1999)	time	2.79	3.86	4.92	6.00	7.06	8.07	9.14	10.22	11.27	12.35		13.58	3 / 6			
	reaction time	0.182										1.23			3.21	3.14	3.21
	interval velocity		1.07	1.06	1.08	1.06	1.01	1.07	1.08	1.05	1.08	1.23	7.36		7.94	8.12	7.94
Dadic, Ivona (AUT) (1993)	time	2.66	3.74	4.83	5.87	6.94	8.02	9.06	10.15	11.26	12.39		13.61	7 / 7			
	reaction time	0.140										1.22			3.21	3.19	3.33
	interval velocity		7 steps 1.08	1.09	1.04	1.07	1.08	1.04	1.09	1.11	1.13	1.22	7.35		7.94	7.99	7.66
Mayr, Verena (AUT) (1995)	time	2.75	3.83	4.87	5.92	6.99	8.06	9.11	10.22	11.31	12.43		13.65	4 / 8			
	reaction time	0.149										1.22			3.17	3.19	3.32
	interval velocity		1.08	1.04	1.05	1.07	1.07	1.05	1.11	1.09	1.12	1.22	7.33		8.04	7.99	7.68



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-12-morning-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

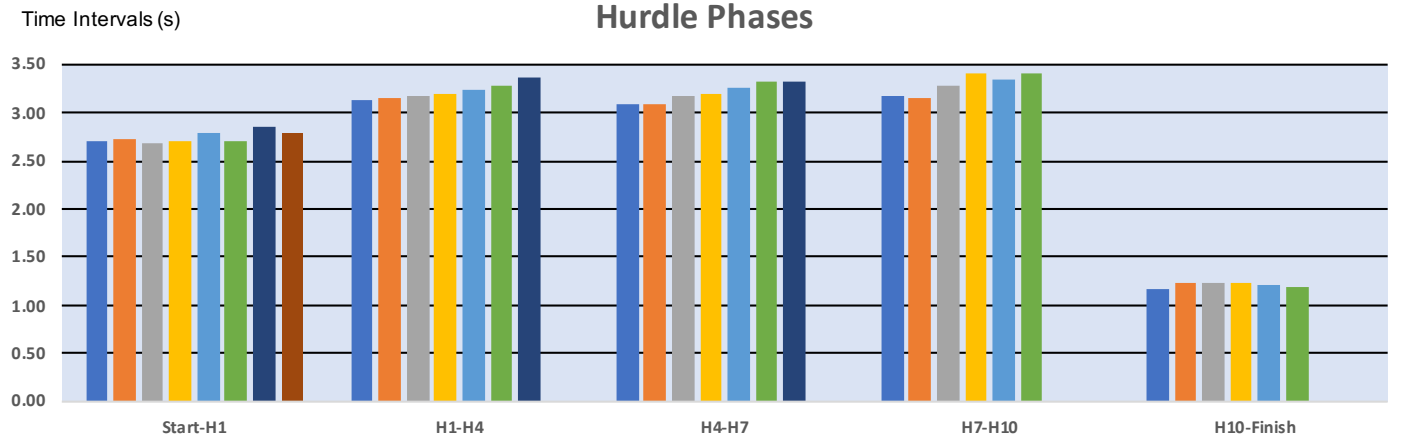
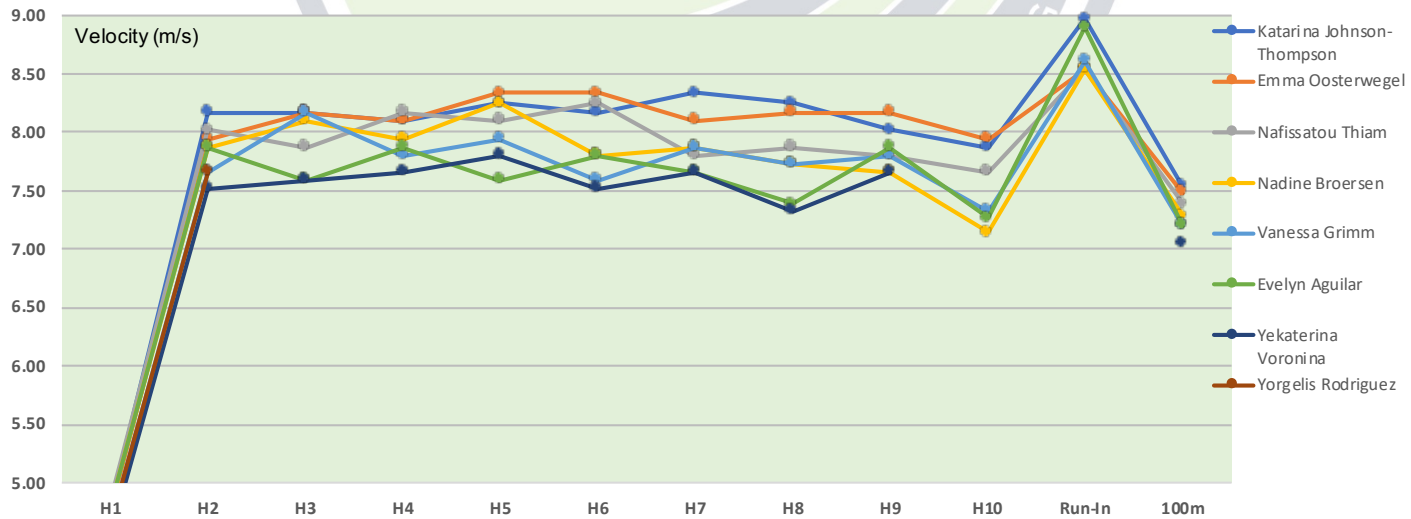
100m Hurdles

Date: 2021.08.04

Wind: 0.2 m/s

Heptathlon - Heat 1

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Johnson-Thompson, Katarina (GBR)	time		2.71	3.75	4.79	5.84	6.87	7.91	8.93	9.96	11.02	12.10		13.27	7 / 1			
	reaction time	0.166														3.13	3.09	3.17
	interval velocity		7 steps 4.80	1.04 8.17	1.04 8.17	1.05 8.10	1.03 8.25	1.04 8.17	1.02 8.33	1.03 8.25	1.06 8.02	1.08 7.87	1.17 8.97		7.54		8.15	8.25
Oosterwegel, Emma (NED) (1998)	time		2.73	3.80	4.84	5.89	6.91	7.93	8.98	10.02	11.06	12.13		13.36	5 / 2			
	reaction time	0.176														3.16	3.09	3.15
	interval velocity		4.76	7.94	8.17	8.10	8.33	8.33	8.10	8.17	8.17	7.94	8.54	7.49		8.07	8.25	8.10
Thiam, Nafissatou (BEL) (1994)	time		2.68	3.74	4.82	5.86	6.91	7.94	9.03	10.11	11.20	12.31		13.54	8 / 3			
	reaction time	0.156														3.18	3.17	3.28
	interval velocity		4.85	8.02	7.87	8.17	8.10	8.25	7.80	7.87	7.80	7.66	8.54	7.39		8.02	8.04	7.77
Broersen, Nadine (NED) (1990)	time		2.71	3.79	4.84	5.91	6.94	8.03	9.11	10.21	11.32	12.51		13.74	3 / 4			
	reaction time	0.146														3.20	3.20	3.40
	interval velocity		4.80	7.87	8.10	7.94	8.25	7.80	7.87	7.73	7.66	7.14	8.54	7.28		7.97	7.97	7.50
Grimm, Vanessa (GER) (1997)	time		2.80	3.91	4.95	6.04	7.11	8.23	9.31	10.41	11.50	12.66		13.88	6 / 5			
	reaction time	0.176														3.24	3.27	3.35
	interval velocity		4.64	7.66	8.17	7.80	7.94	7.59	7.87	7.73	7.80	7.33	8.61	7.20		7.87	7.80	7.61
Aguilar, Evelyn (COL) (1993)	time		2.71	3.79	4.91	5.99	7.11	8.20	9.31	10.46	11.54	12.71		13.89	4 / 6			
	reaction time	0.133														3.28	3.32	3.40
	interval velocity		4.80	7.87	7.59	7.87	7.59	7.80	7.66	7.39	7.87	7.26	8.90	7.20		7.77	7.68	7.50
Voronina, Yekaterina (UZB) (1992)	time		2.86	3.99	5.11	6.22	7.31	8.44	9.55	10.71	11.82			14.19	9 / 7			
	reaction time	0.179														3.36	3.33	
	interval velocity		4.55	7.52	7.59	7.66	7.80	7.52	7.66	7.33	7.66			7.05		7.59	7.66	
Rodriguez, Yorgelis (CUB) (1995)	time		2.80	3.91										dnf	2 / --			
	reaction time	0.132																
	interval velocity		4.64	7.66														



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-12-morning-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

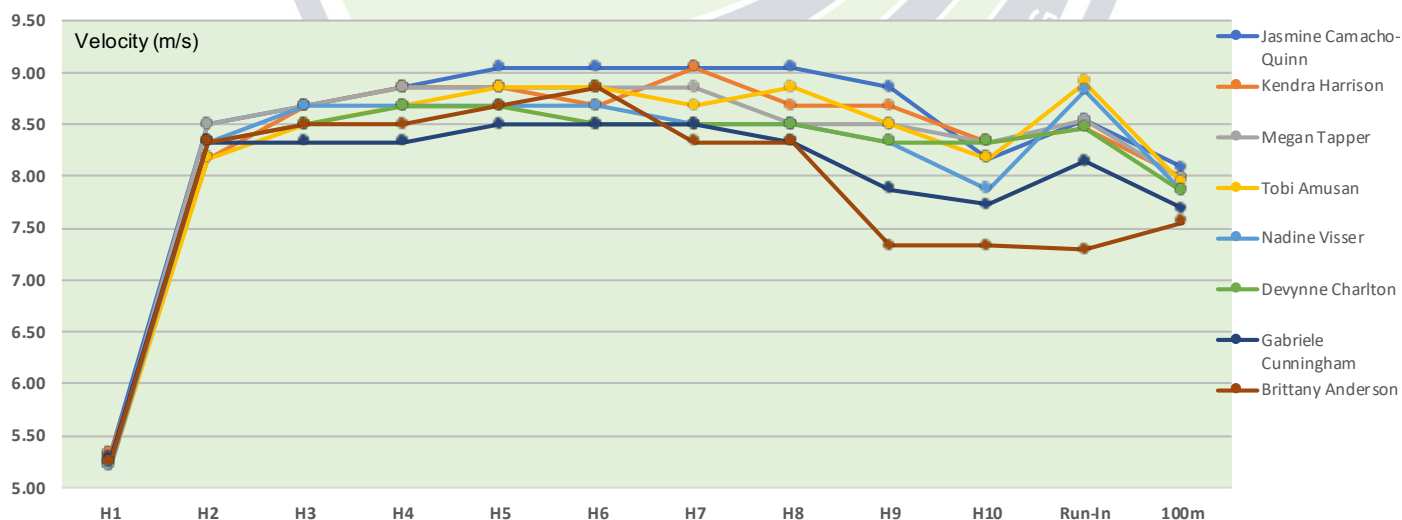
100m Hurdles

Date: 2021.08.02

Wind: -0.3 m/s

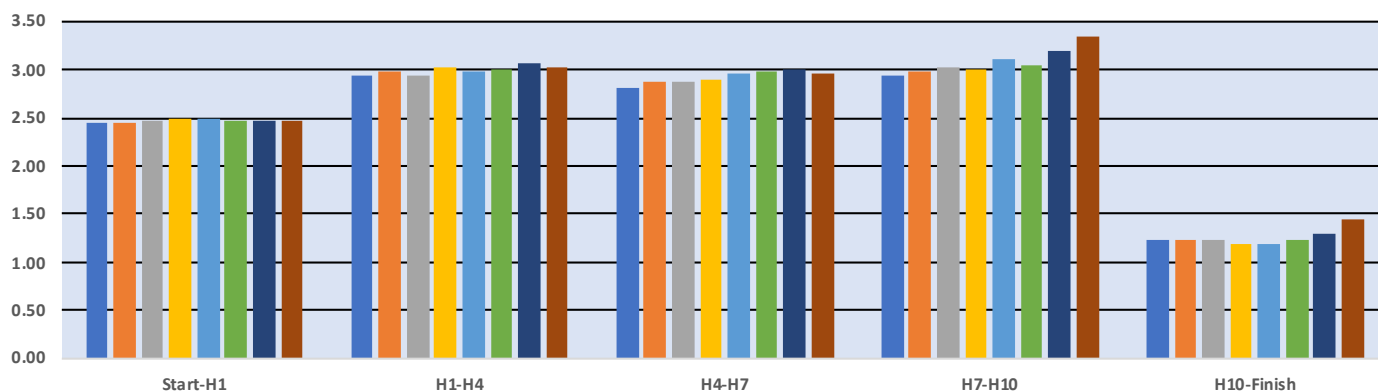
FINAL

			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		2.44	3.44	4.42	5.38	6.32	7.26	8.20	9.14	10.10	11.14		12.37	5 / 1			
	reaction time	0.149											1.23			2.94	2.82	2.94
	interval velocity		5.33	8.50	8.67	8.85	9.04	9.04	9.04	9.04	8.85	8.17	8.54	8.08		8.67	9.04	8.67
Harrison, Kendra (USA) (1992)	time		2.44	3.48	4.46	5.42	6.38	7.36	8.30	9.28	10.26	11.28		12.52	4 / 2			
	reaction time	0.158											1.24			2.98	2.88	2.98
	interval velocity		5.33	8.17	8.67	8.85	8.85	8.67	9.04	8.67	8.67	8.33	8.47	7.99		8.56	8.85	8.56
Tapper, Megan (JAM) (1994)	time		2.48	3.48	4.46	5.42	6.38	7.34	8.30	9.30	10.30	11.32		12.55	9 / 3			
	reaction time	0.166											1.23			2.94	2.88	3.02
	interval velocity		5.24	8.50	8.67	8.85	8.85	8.85	8.85	8.50	8.50	8.33	8.54	7.97		8.67	8.85	8.44
Amusan, Tobi (NGR) (1997)	time		2.50	3.54	4.54	5.52	6.48	7.44	8.42	9.38	10.38	11.42		12.60	6 / 4			
	reaction time	0.161											1.18			3.02	2.90	3.00
	interval velocity		5.20	8.17	8.50	8.67	8.85	8.85	8.67	8.85	8.50	8.17	7.94			8.44	8.79	8.50
Visser, Nadine (NED) (1995)	time		2.50	3.52	4.50	5.48	6.46	7.44	8.44	9.44	10.46	11.54		12.73	3 / 5			
	reaction time	0.152											1.19			2.98	2.96	3.10
	interval velocity		5.20	8.33	8.67	8.67	8.67	8.67	8.50	8.50	8.33	7.87	8.82	7.86		8.56	8.61	8.23
Charlton, Devynne (BAH) (1995)	time		2.48	3.50	4.50	5.48	6.46	7.46	8.46	9.46	10.48	11.50		12.74	8 / 6			
	reaction time	0.144											1.24			3.00	2.98	3.04
	interval velocity		5.24	8.33	8.50	8.67	8.67	8.50	8.50	8.50	8.33	8.33	8.47	7.85		8.50	8.56	8.39
Cunningham, Gabriele (USA) (1998)	time		2.46	3.48	4.50	5.52	6.52	7.52	8.52	9.54	10.62	11.72		13.01	2 / 7			
	reaction time	0.172											1.29			3.06	3.00	3.20
	interval velocity		5.28	8.33	8.33	8.33	8.50	8.50	8.50	8.33	7.87	7.73	8.14	7.69		8.33	8.50	7.97
Anderson, Brittany (JAM) (2001)	time		2.48	3.50	4.50	5.50	6.48	7.44	8.46	9.48	10.64	11.80		13.24	7 / 8			
	reaction time	0.164											1.44			3.02	2.96	3.34
	interval velocity		5.24	8.33	8.50	8.50	8.67	8.85	8.33	8.33	7.33	7.33	7.29	7.55		8.44	8.61	7.63



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 25fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=9hrIYSJokPA>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

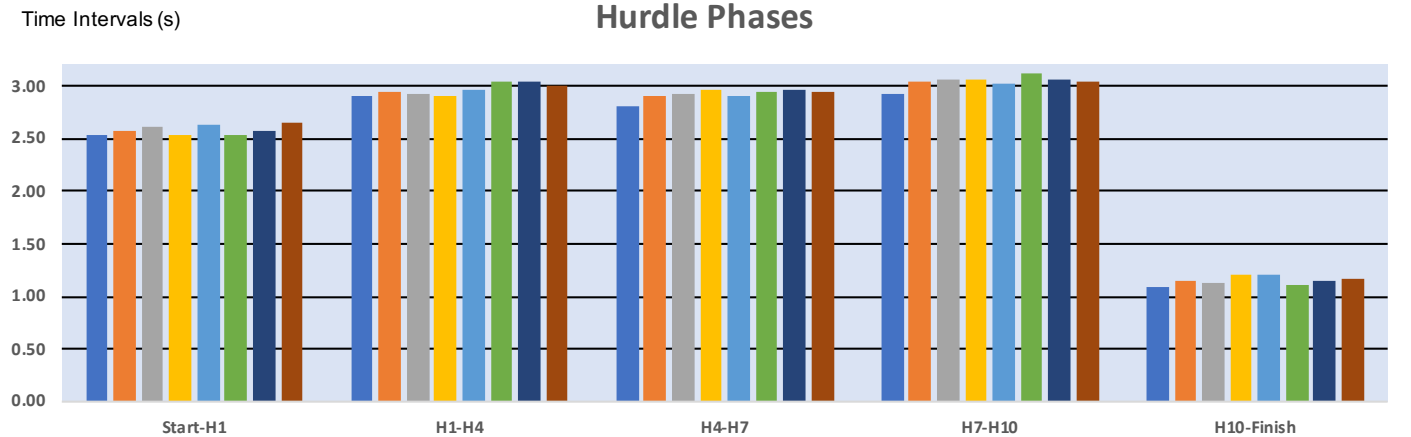
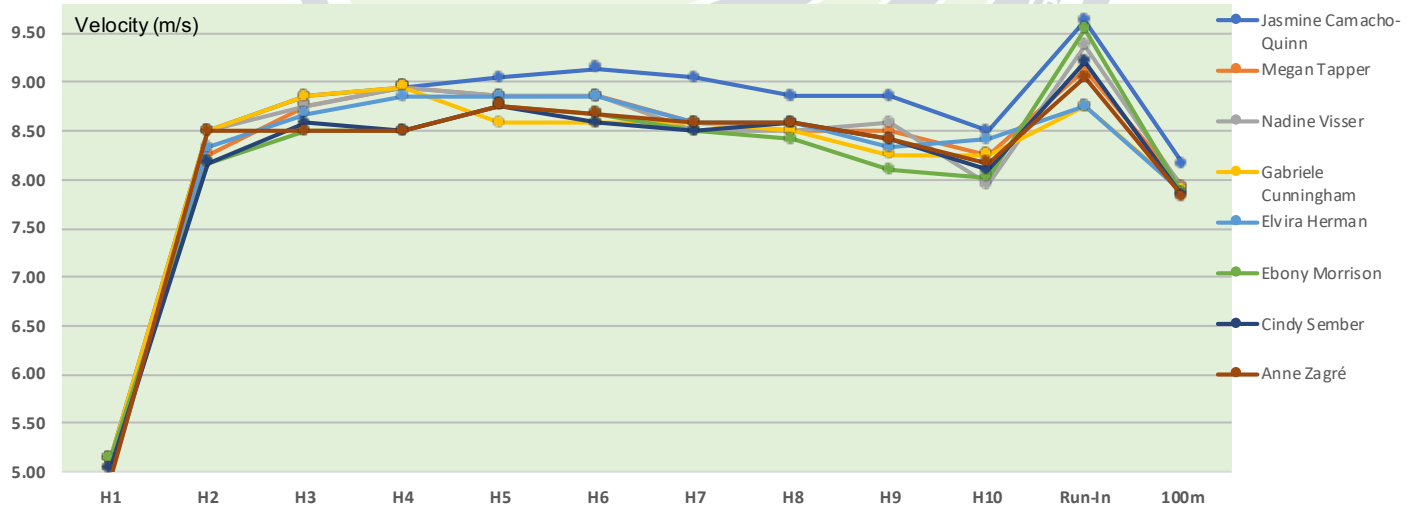
100m Hurdles

Date: 2021.08.01

Wind: -0.2 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			2.53	3.53	4.49	5.44	6.38	7.31	8.25	9.21	10.17	11.17		12.26	7 / 1			
	reaction time	0.175														2.91	2.81	2.92
	interval			1.00	0.96	0.95	0.94	0.93	0.94	0.96	0.96	1.00	1.09	OR AR PB		8.76	9.07	8.73
Tapper, Megan (JAM) (1994) time			2.58	3.61	4.58	5.53	6.49	7.45	8.44	9.44	10.44	11.47		12.62	4 / 2			
	reaction time	0.155														2.95	2.91	3.03
	interval			1.03	0.97	0.95	0.96	0.96	0.99	1.00	1.00	1.03	1.15			8.64	8.76	8.42
Visser, Nadine (NED) (1995) time			2.61	3.61	4.58	5.53	6.49	7.45	8.45	9.45	10.44	11.51		12.63	6 / 3			
	reaction time	0.156														2.92	2.92	3.06
	interval			1.00	0.97	0.95	0.96	0.96	1.00	1.00	0.99	1.07	1.12			8.73	8.73	8.33
Cunningham, Gabriele (USA) (1998) time			2.53	3.53	4.49	5.44	6.43	7.42	8.41	9.41	10.44	11.47		12.67	8 / 4			
	reaction time	0.165														2.91	2.97	3.06
	interval			1.00	0.96	0.95	0.99	0.99	0.99	1.00	1.03	1.03	1.20			8.76	8.59	8.33
Herman, Elvira (BLR) (1997) time			2.62	3.64	4.62	5.58	6.54	7.50	8.49	9.48	10.50	11.51		12.71	9 / 5			
	reaction time	0.129														2.96	2.91	3.02
	interval			1.02	0.98	0.96	0.96	0.96	0.99	0.99	1.02	1.01	1.20			8.61	8.76	8.44
Morrison, Ebony (LBR) (1994) time			2.53	3.57	4.57	5.57	6.54	7.52	8.52	9.53	10.58	11.64		12.74	2 / 6			
	reaction time	0.144														3.04	2.95	3.12
	interval			1.04	1.00	1.00	0.97	0.98	1.00	1.01	1.05	1.06	1.10	NR PB		8.39	8.64	8.17
Sember, Cindy (GBR) (1994) time			2.58	3.62	4.61	5.61	6.58	7.57	8.57	9.56	10.57	11.62		12.76	3 / 7			
	reaction time	0.163														3.03	2.96	3.05
	interval			1.04	0.99	1.00	0.97	0.99	1.00	0.99	1.01	1.05	1.14			8.42	8.61	8.36
Zagré, Anne (BEL) (1990) time			2.64	3.64	4.64	5.64	6.61	7.59	8.58	9.57	10.58	11.62		12.78	5 / 8			
	reaction time	0.153														3.00	2.94	3.04
	interval			1.00	1.00	1.00	0.97	0.98	0.99	0.99	1.01	1.04	1.16			8.50	8.67	8.39



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-9-evening-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

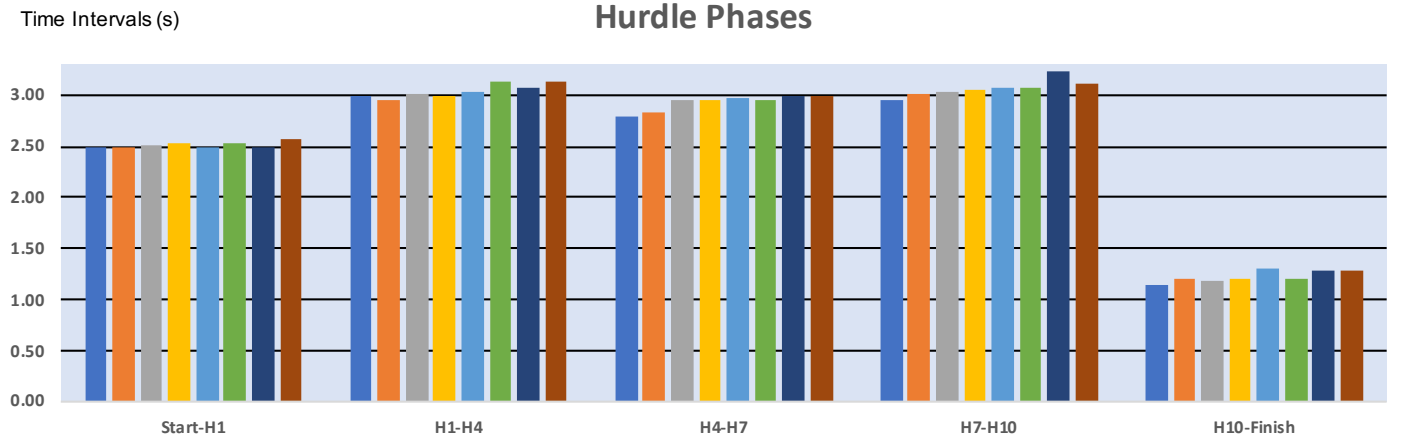
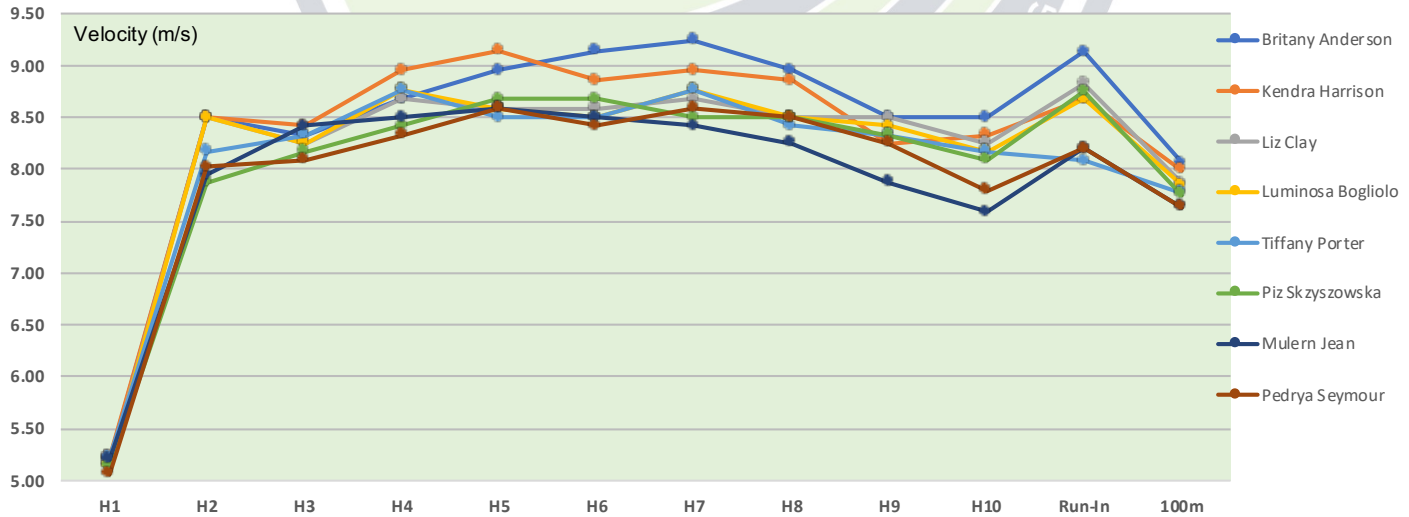
100m Hurdles

Date: 2021.08.01

Wind: 0.0 m/s

Semi-Final 2

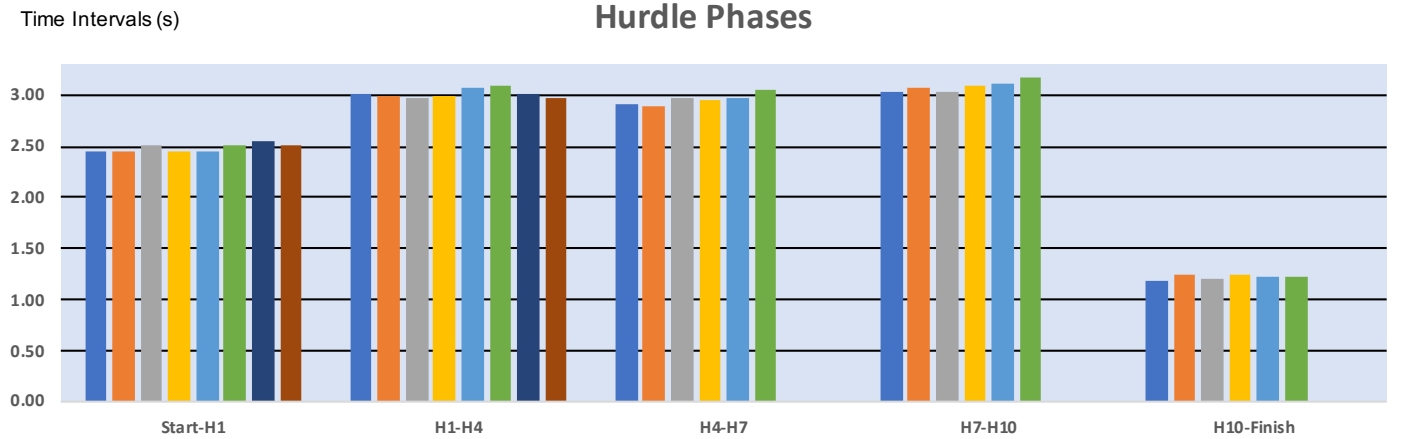
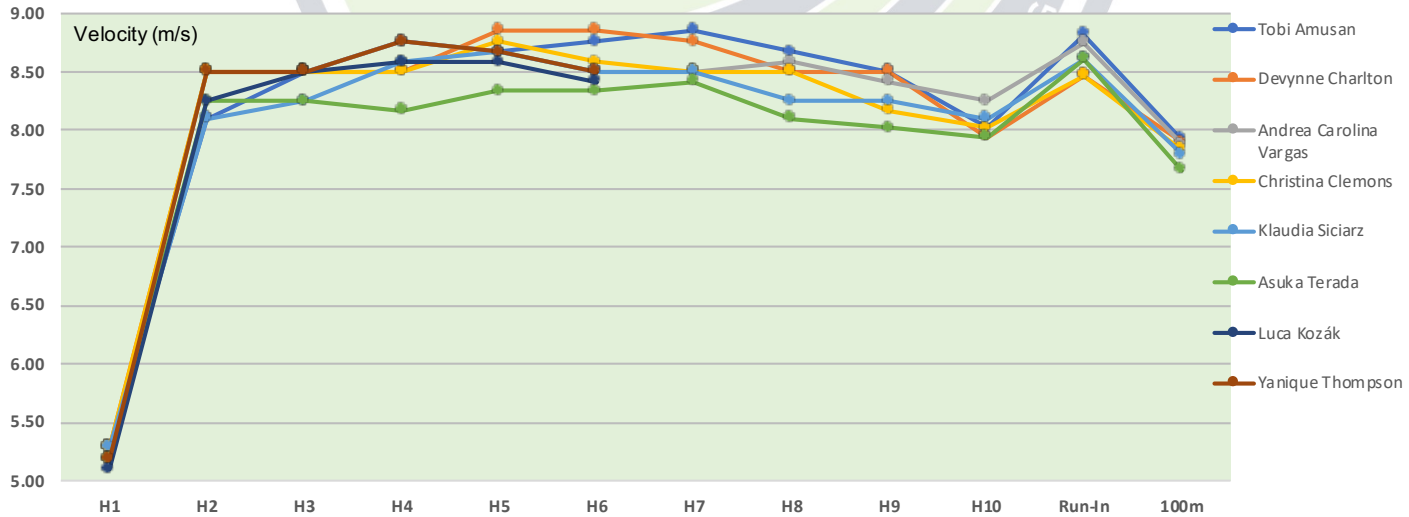
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Anderson, Britany (JAM) (2001)	time		2.50	3.50	4.52	5.50	6.45	7.38	8.30	9.25	10.25	11.25		12.40	4 / 1	3.00	2.80	2.95
	reaction time	0.166												PB				
	interval			1.00	1.02	0.98	0.95	0.93	0.92	0.95	1.00	1.00	1.15	8.06				
	velocity		5.20	8.50	8.33	8.67	8.95	9.14	9.24	8.95	8.50	8.50	9.13	8.06		8.50	9.11	8.64
Harrison, Kendra (USA) (1992)	time		2.49	3.49	4.50	5.45	6.38	7.34	8.29	9.25	10.28	11.30		12.51	7 / 2	2.96	2.84	3.01
	reaction time	0.153												1.21				
	interval			1.00	1.01	0.95	0.93	0.96	0.95	0.96	1.03	1.02	1.21	8.68				7.99
	velocity		5.22	8.50	8.42	8.95	9.14	8.85	8.95	8.85	8.25	8.33	8.68	7.99		8.61	8.98	8.47
Clay, Liz (AUS) (1995)	time		2.52	3.52	4.55	5.53	6.52	7.51	8.49	9.49	10.49	11.52		12.71	6 / 3	3.01	2.96	3.03
	reaction time	0.142												PB				
	interval			1.00	1.03	0.98	0.99	0.99	0.98	1.00	1.00	1.03	1.19	8.82				7.87
	velocity		5.16	8.50	8.25	8.67	8.59	8.59	8.67	8.50	8.50	8.25	8.82	7.87		8.47	8.61	8.42
Bogliolo, Luminosa (ITA) (1995)	time		2.53	3.53	4.56	5.53	6.52	7.52	8.49	9.49	10.50	11.54		12.75	8 / 4	3.00	2.96	3.05
	reaction time	0.143												NR PB				
	interval			1.00	1.03	0.97	0.99	1.00	0.97	1.00	1.01	1.04	1.21	8.68				7.84
	velocity		5.14	8.50	8.25	8.76	8.59	8.50	8.76	8.50	8.42	8.17	8.68	7.84		8.50	8.61	8.36
Porter, Tiffany (GBR) (1987)	time		2.49	3.53	4.55	5.52	6.52	7.52	8.49	9.50	10.52	11.56		12.86	9 / 5	3.03	2.97	3.07
	reaction time	0.150												1.30				
	interval			1.04	1.02	0.97	1.00	1.00	0.97	1.01	1.02	1.04	1.30	8.08				7.78
	velocity		5.22	8.17	8.33	8.76	8.50	8.50	8.76	8.42	8.33	8.17	8.08	7.78		8.42	8.59	8.31
Skrzyszowska, Pia (POL) (2001)	time		2.53	3.61	4.65	5.66	6.64	7.62	8.62	9.62	10.64	11.69		12.89	5 / 6	3.13	2.96	3.07
	reaction time	0.128												1.20				
	interval			1.08	1.04	1.01	0.98	0.98	1.00	1.00	1.02	1.05	1.20	8.75				7.76
	velocity		5.14	7.87	8.17	8.42	8.67	8.67	8.50	8.50	8.33	8.10	8.75	7.76		8.15	8.61	8.31
Jean, Mulern (HAI) (1992)	time		2.50	3.57	4.58	5.58	6.57	7.57	8.58	9.61	10.69	11.81		13.09	2 / 7	3.08	3.00	3.23
	reaction time	0.156												1.28				
	interval			1.07	1.01	1.00	0.99	1.00	1.01	1.03	1.08	1.12	1.28	8.20				7.64
	velocity		5.20	7.94	8.42	8.50	8.59	8.50	8.42	8.25	7.87	7.59	8.20	7.64		8.28	8.50	7.89
Seymour, Pedrya (BAH) (1995)	time		2.57	3.63	4.68	5.70	6.69	7.70	8.69	9.69	10.72	11.81		13.09	3 / 8	3.13	2.99	3.12
	reaction time	0.185												1.28				
	interval			1.06	1.05	1.02	0.99	1.01	0.99	1.00	1.03	1.09	1.28	7.64				
	velocity		5.06	8.02	8.10	8.33	8.59	8.42	8.59	8.50	8.25	7.80	8.20	7.64		8.15	8.53	8.17



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-9-evening-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

100m Hurdles			Date: 2021.08.01			Wind: -0.8 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	
Amusan, Tobi (NGR) (1997)	time		2.46	3.51	4.51	5.48	6.46	7.43	8.39	9.37	10.37	11.43		12.62	5 / 1				
	reaction time	0.148											1.19			3.02	2.91	3.04	
	interval			1.05	1.00	0.97	0.98	0.97	0.96	0.98	1.00	1.06		8.44		8.76	8.39		
Charlton, Devynne (BAH) (1995)	time		2.46	3.46	4.46	5.46	6.42	7.38	8.35	9.35	10.35	11.42		12.66	8 / 2				
	reaction time	0.134											1.24			3.00	2.89	3.07	
	interval			1.00	1.00	1.00	0.96	0.96	0.97	1.00	1.00	1.07	1.24			8.50	8.82	8.31	
Vargas, Andrea Carolina (CRC) (1996)	time		2.51	3.51	4.51	5.48	6.46	7.46	8.46	9.45	10.46	11.49		12.69	4 / 3				
	reaction time	0.139											1.20			2.97	2.98	3.03	
	interval			1.00	1.00	0.97	0.98	1.00	1.00	0.99	1.01	1.03	1.20			8.59	8.56	8.42	
Clemons, Christina (USA) (1990)	time		2.46	3.46	4.46	5.46	6.43	7.42	8.42	9.42	10.46	11.52		12.76	7 / 4				
	reaction time	0.118											1.24			3.00	2.96	3.10	
	interval			1.00	1.00	1.00	0.97	0.99	1.00	1.00	1.04	1.06	1.24			8.50	8.61	8.23	
Siciarz, Klaudia (POL) (1998)	time		2.46	3.51	4.54	5.53	6.51	7.51	8.51	9.54	10.57	11.62		12.84	2 / 5				
	reaction time	0.146											1.22			3.07	2.98	3.11	
	interval			1.05	1.03	0.99	0.98	1.00	1.00	1.03	1.03	1.05	1.22			8.31	8.56	8.20	
Terada, Asuka (JPN) (1990)	time		2.51	3.54	4.57	5.61	6.63	7.65	8.66	9.71	10.77	11.84		13.06	3 / 6				
	reaction time	0.163											1.22			3.10	3.05	3.18	
	interval			1.03	1.03	1.04	1.02	1.02	1.01	1.05	1.06	1.07	1.22			8.23	8.36	8.02	
Kozák, Luca (HUN) (1996)	time		2.55	3.58	4.58	5.57	6.56	7.57						dnf	9 / --				
	reaction time	0.164														3.02			
	interval			1.03	1.00	0.99	0.99	1.01								8.44			
Thompson, Yanique (JAM) (1996)	time		2.51	3.51	4.51	5.48	6.46	7.46						dnf	6 / --				
	reaction time	0.145														2.97			
	interval			1.00	1.00	0.97	0.98	1.00								8.59			



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-9-evening-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

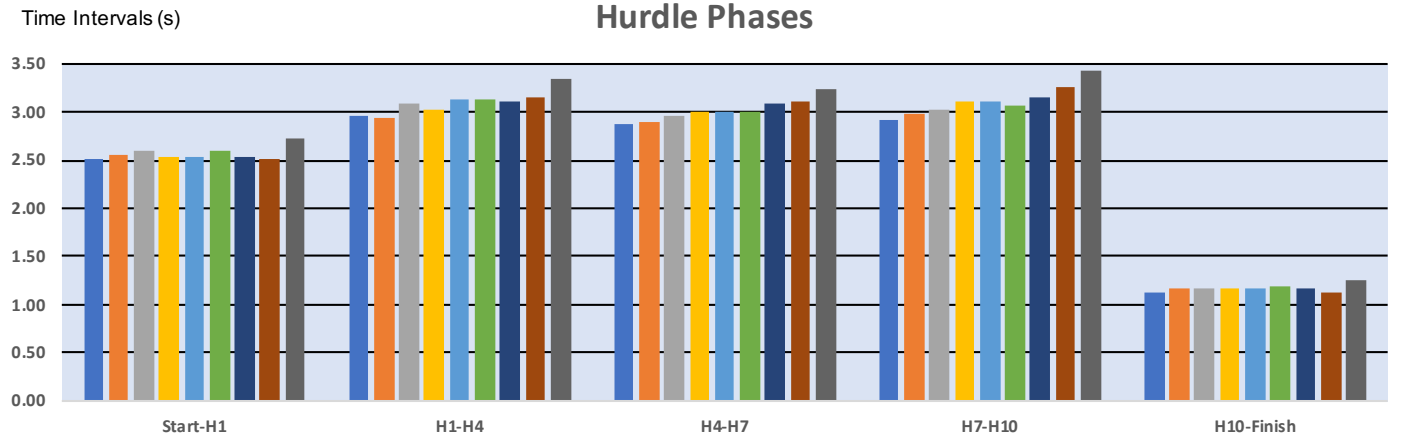
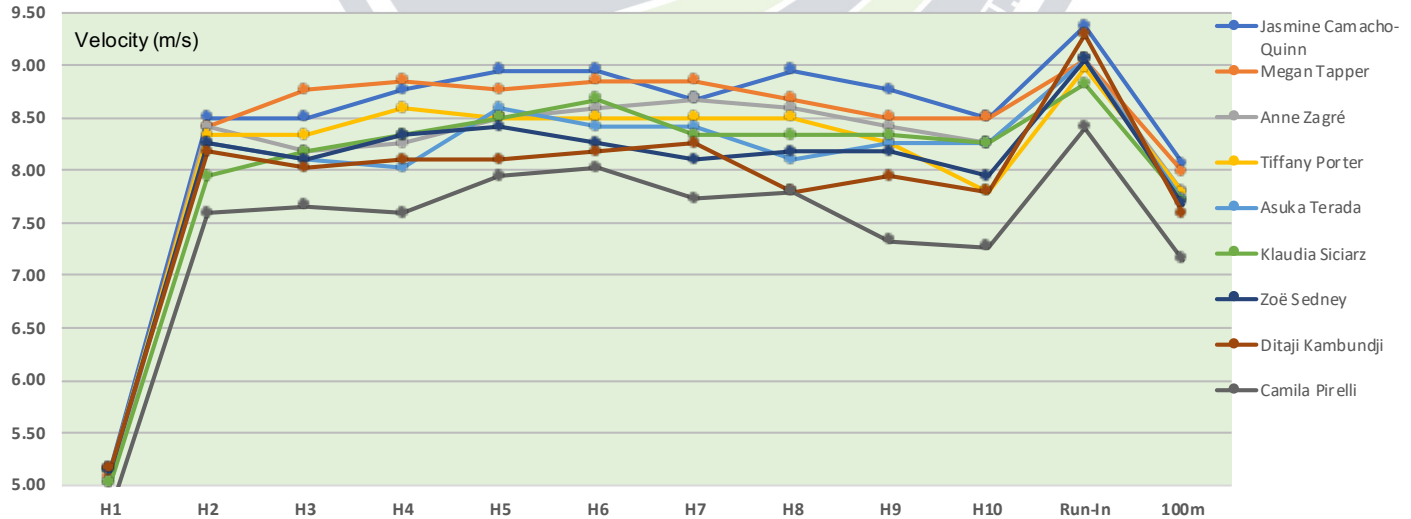
100m Hurdles

Date: 2021.07.31

Wind: 0.3 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
Camacho-Quinn, Jasmine (PUR) (199 time)	reaction time	0.153												12.41	2 / 1			
	interval			1.00	1.00	0.97	0.95	0.95	0.98	0.95	0.97	1.00	1.12			2.97	2.88	2.92
	velocity		5.16	8.50	8.50	8.76	8.95	8.95	8.67	8.95	8.76	8.50	9.37	8.06		8.59	8.85	8.73
Tapper, Megan (JAM) (1994 time)	reaction time	0.163												12.53	5 / 2			
	interval			1.01	0.97	0.96	0.97	0.96	0.96	0.98	1.00	1.00	1.16	PB		2.94	2.89	2.98
	velocity		5.08	8.42	8.76	8.85	8.76	8.85	8.85	8.67	8.50	8.50	9.05	7.98		8.67	8.82	8.56
Zagré, Anne (BEL) (1990 time)	reaction time	0.153												12.83	8 / 3			
	interval			1.01	1.04	1.03	1.00	0.99	0.98	0.99	1.01	1.03	1.16			3.08	2.97	3.03
	velocity		5.02	8.42	8.17	8.25	8.50	8.59	8.67	8.59	8.42	8.25	9.05	7.79		8.28	8.59	8.42
Porter, Tiffany (GBR) (1987 time)	reaction time	0.139												12.85	6 / 4			
	interval			1.02	1.02	0.99	1.00	1.00	1.00	1.03	1.09	1.09	1.17			3.03	3.00	3.12
	velocity		5.14	8.33	8.33	8.59	8.50	8.50	8.50	8.50	8.25	7.80	8.97	7.78		8.42	8.50	8.17
Terada, Asuka (JPN) (1990 time)	reaction time	0.164												12.95	4 / 5			
	interval			1.03	1.05	1.06	0.99	1.01	1.01	1.05	1.03	1.03	1.16			3.14	3.01	3.11
	velocity		5.14	8.25	8.10	8.02	8.59	8.42	8.42	8.10	8.25	8.25	9.05	7.72		8.12	8.47	8.20
Siciarz, Klaudia (POL) (1998 time)	reaction time	0.165												12.98	3 / 6			
	interval			1.07	1.04	1.02	1.00	0.98	1.02	1.02	1.02	1.03	1.19			3.13	3.00	3.07
	velocity		5.02	7.94	8.17	8.33	8.50	8.67	8.33	8.33	8.33	8.25	8.82	7.70		8.15	8.50	8.31
Sedney, Zoë (NED) (2001 time)	reaction time	0.162												13.03	9 / 7			
	interval			1.03	1.05	1.02	1.01	1.03	1.05	1.04	1.04	1.04	1.16			3.10	3.09	3.15
	velocity		5.14	8.25	8.10	8.33	8.42	8.25	8.10	8.17	8.17	7.94	9.05	7.67		8.23	8.25	8.10
Kambundji, Ditaji (SUI) (2002 time)	reaction time	0.138												13.17	7 / 8			
	interval			1.04	1.06	1.05	1.05	1.04	1.03	1.09	1.07	1.09	1.13			3.15	3.12	3.25
	velocity		5.16	8.17	8.02	8.10	8.10	8.17	8.25	7.80	7.94	7.80	9.29	7.59		8.10	8.17	7.85
Pirelli, Camila (PAR) (1989 time)	reaction time	0.166												13.98	1 / 9			
	interval			1.12	1.11	1.12	1.07	1.06	1.10	1.09	1.16	1.17	1.25			3.35	3.23	3.42
	velocity		4.76	7.59	7.66	7.59	7.94	8.02	7.73	7.80	7.33	7.26	8.40	7.15		7.61	7.89	7.46



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-8-morning-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

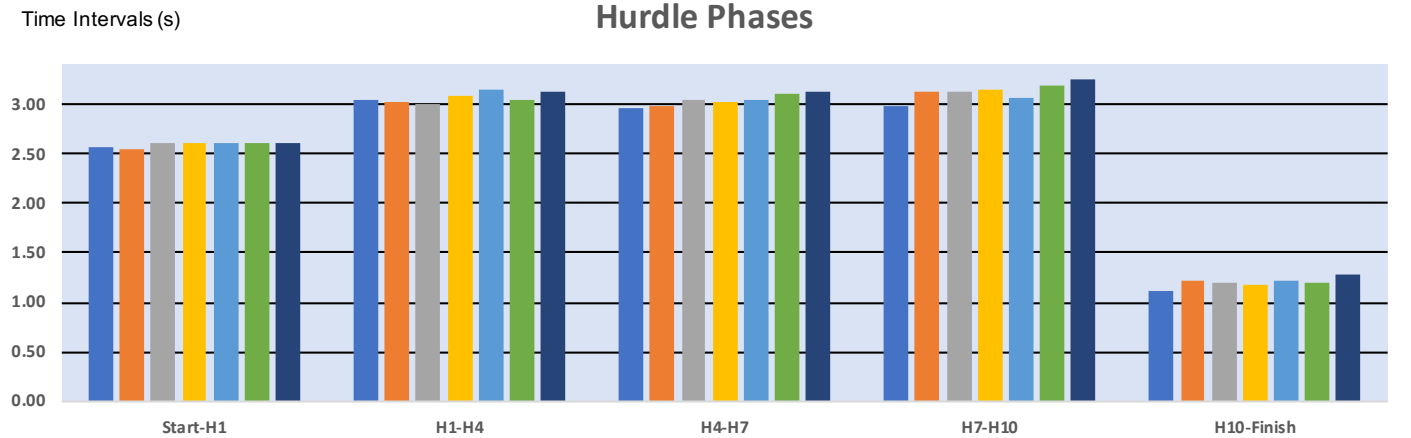
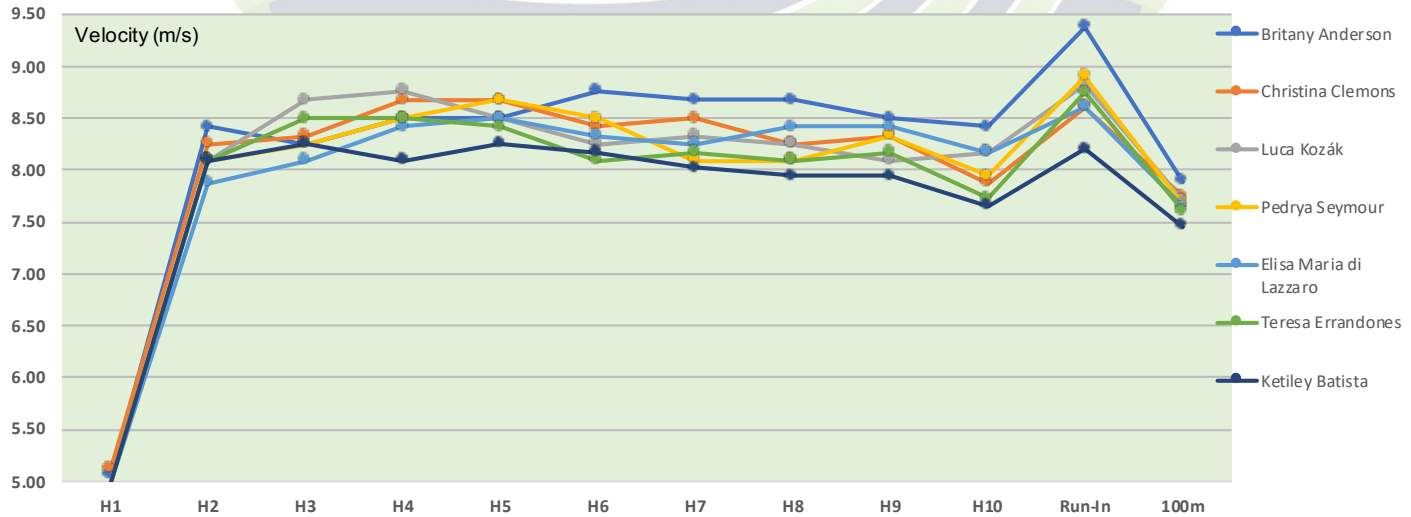
100m Hurdles

Date: 2021.07.31

Wind: -1.1 m/s

Heat 4

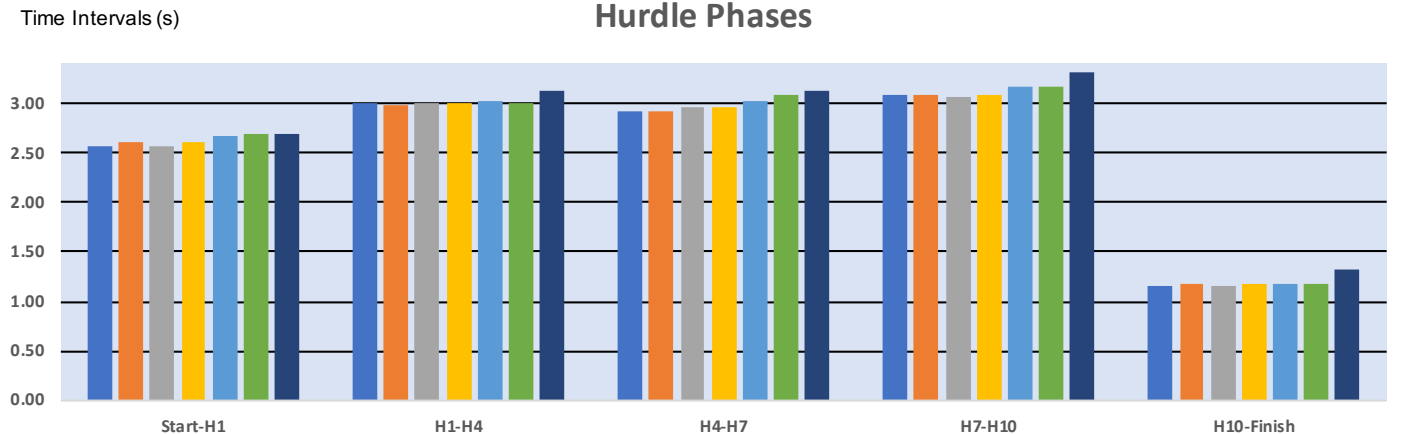
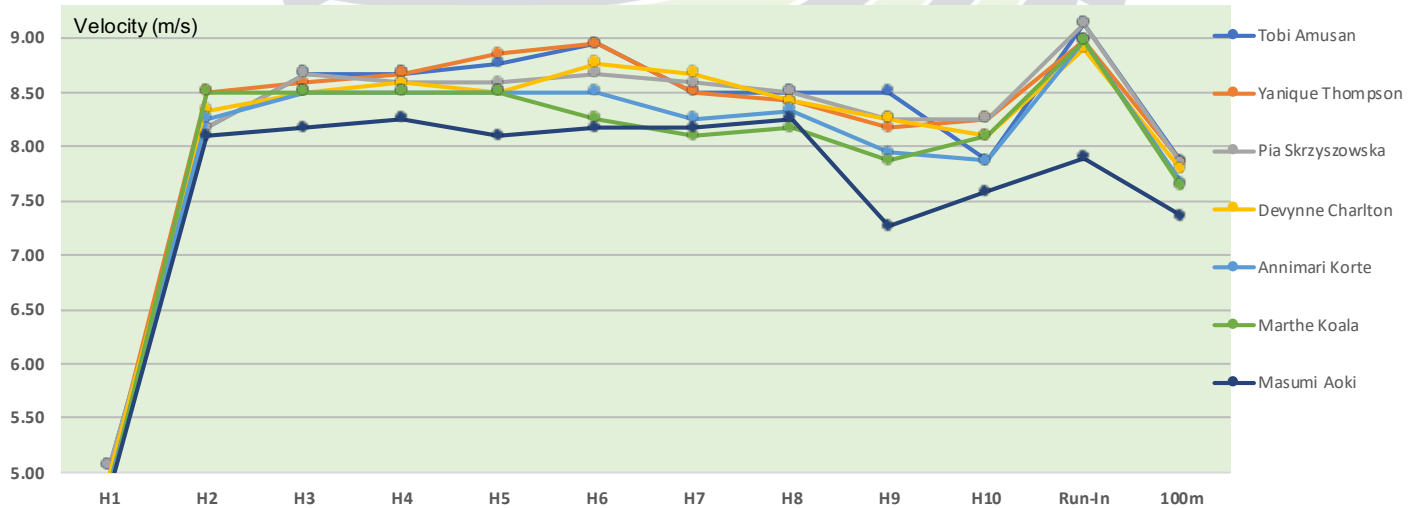
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Anderson, Britany (JAM) (2001)	time	2.57	3.58	4.61	5.61	6.61	7.58	8.56	9.54	10.54	11.55		12.67	9 / 1			
	reaction time											1.12			3.04	2.95	2.99
	interval		1.01	1.03	1.00	1.00	0.97	0.98	0.98	1.00	1.01	1.12			8.39	8.64	8.53
Clemons, Christina (USA) (1990)	time	2.54	3.57	4.59	5.57	6.55	7.56	8.56	9.59	10.61	11.69		12.91	3 / 2			
	reaction time											1.22			3.03	2.99	3.13
	interval		1.03	1.02	0.98	0.98	1.01	1.00	1.03	1.02	1.08	1.22			8.42	8.53	8.15
Kozák, Luca (HUN) (1996)	time	2.61	3.66	4.64	5.61	6.61	7.64	8.66	9.69	10.74	11.78		12.97	4 / 3			
	reaction time											1.19			3.00	3.05	3.12
	interval		1.05	0.98	0.97	1.00	1.03	1.02	1.03	1.05	1.04	1.19			8.50	8.36	8.17
Seymour, Pedrya (BAH) (1995)	time	2.61	3.66	4.69	5.69	6.67	7.67	8.72	9.77	10.79	11.86		13.04	7 / 4			
	reaction time											1.18			3.08	3.03	3.14
	interval		1.05	1.03	1.00	0.98	1.00	1.05	1.05	1.02	1.07	1.18			8.28	8.42	8.12
di Lazzaro, Elisa Maria (ITA) (1998)	time	2.61	3.69	4.74	5.75	6.75	7.77	8.80	9.81	10.82	11.86		13.08	5 / 5			
	reaction time											1.22			3.14	3.05	3.06
	interval		1.08	1.05	1.01	1.00	1.02	1.03	1.01	1.01	1.04	1.22			8.12	8.36	8.33
Errandonea, Teresa (ESP) (1994)	time	2.61	3.66	4.66	5.66	6.67	7.72	8.76	9.81	10.85	11.95		13.15	2 / 6			
	reaction time											1.20			3.05	3.10	3.19
	interval		1.05	1.00	1.00	1.01	1.05	1.04	1.05	1.04	1.10	1.20			8.36	8.23	7.99
Batista, Ketiley (BRA) (1999)	time	2.61	3.66	4.69	5.74	6.77	7.81	8.87	9.94	11.01	12.12		13.40	8 / 7			
	reaction time											1.28			3.13	3.13	3.25
	interval		1.05	1.03	1.05	1.03	1.04	1.06	1.07	1.07	1.11	1.28			8.15	8.15	7.85
	velocity	4.98	8.10	8.25	8.50	8.50	8.76	8.67	8.67	8.50	8.42	9.38	7.89				



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field/day-8-morning-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

100m Hurdles				Date: 2021.07.31		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				
Amusan, Tobi (NGR) (1997)	time			2.57	3.61	4.59	5.57	6.54	7.49	8.49	9.49	10.49	11.57		12.72	4 / 1							
	reaction time	0.134			1.04	0.98	0.98	0.97	0.95	1.00	1.00	1.00	1.08	1.15				3.00	2.92	3.08			
	interval																	8.50	8.73	8.28			
	velocity			5.06	8.17	8.67	8.67	8.76	8.95	8.50	8.50	8.50	7.87	9.13	7.86								
Thompson, Yanique (JAM) (1996)	time			2.61	3.61	4.60	5.58	6.54	7.49	8.49	9.50	10.54	11.57		12.74	8 / 2							
	reaction time	0.147			1.00	0.99	0.98	0.96	0.95	1.00	1.01	1.04	1.03	1.17				2.97	2.91	3.08			
	interval																	8.59	8.76	8.28			
	velocity			4.98	8.50	8.59	8.67	8.85	8.95	8.50	8.42	8.17	8.25	8.97	7.85								
Skrzysowska, Pia (POL) (2001)	time			2.57	3.61	4.59	5.58	6.57	7.55	8.54	9.54	10.57	11.60		12.75	6 / 3							
	reaction time	0.144			1.04	0.98	0.99	0.99	0.98	0.99	1.00	1.03	1.03	1.15	PB			3.01	2.96	3.06			
	interval																	8.47	8.61	8.33			
	velocity			5.06	8.17	8.67	8.59	8.59	8.67	8.59	8.50	8.25	8.25	9.13	7.84								
Charlton, Devynne (BAH) (1995)	time			2.61	3.63	4.63	5.62	6.62	7.59	8.57	9.58	10.61	11.66		12.84	9 / 4							
	reaction time	0.135			1.02	1.00	0.99	1.00	0.97	0.98	1.01	1.03	1.05	1.18				3.01	2.95	3.09			
	interval																	8.47	8.64	8.25			
	velocity			4.98	8.33	8.50	8.59	8.50	8.76	8.67	8.42	8.25	8.10	8.90	7.79								
Korte, Annimari (FIN) (1988)	time			2.66	3.69	4.69	5.69	6.69	7.69	8.72	9.74	10.81	11.89		13.06	7 / 5							
	reaction time	0.146			1.03	1.00	1.00	1.00	1.00	1.03	1.02	1.07	1.08	1.17				3.03	3.03	3.17			
	interval																	8.42	8.42	8.04			
	velocity			4.89	8.25	8.50	8.50	8.50	8.50	8.25	8.33	7.94	7.87	8.97	7.66								
Koala, Marthe (BUR) (1994)	time			2.69	3.69	4.69	5.69	6.69	7.72	8.77	9.81	10.89	11.94		13.11	3 / 6							
	reaction time	0.148			1.00	1.00	1.00	1.00	1.03	1.05	1.04	1.08	1.05	1.17				3.00	3.08	3.17			
	interval																	8.50	8.28	8.04			
	velocity			4.83	8.50	8.50	8.50	8.50	8.25	8.10	8.17	7.87	8.10	8.97	7.63								
Aoki, Masumi (JPN) (1994)	time			2.69	3.74	4.78	5.81	6.86	7.90	8.94	9.97	11.14	12.26		13.59	2 / 7							
	reaction time	0.141			1.05	1.04	1.03	1.05	1.04	1.04	1.03	1.17	1.12	1.33				3.12	3.13	3.32			
	interval																	8.17	8.15	7.68			
	velocity			4.83	8.10	8.17	8.25	8.10	8.17	8.17	8.25	7.26	7.59	7.89	7.36								
Pesiridou, Elisávet (GRE) (1992)				0.162	fell into hurdle 1														dnf	5 / --			



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-8-morning-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

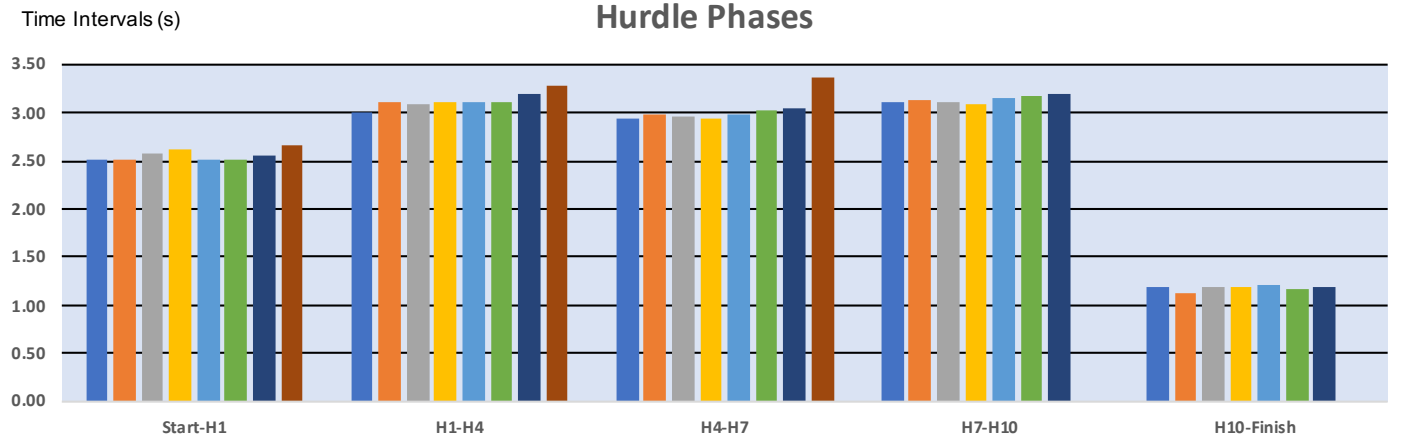
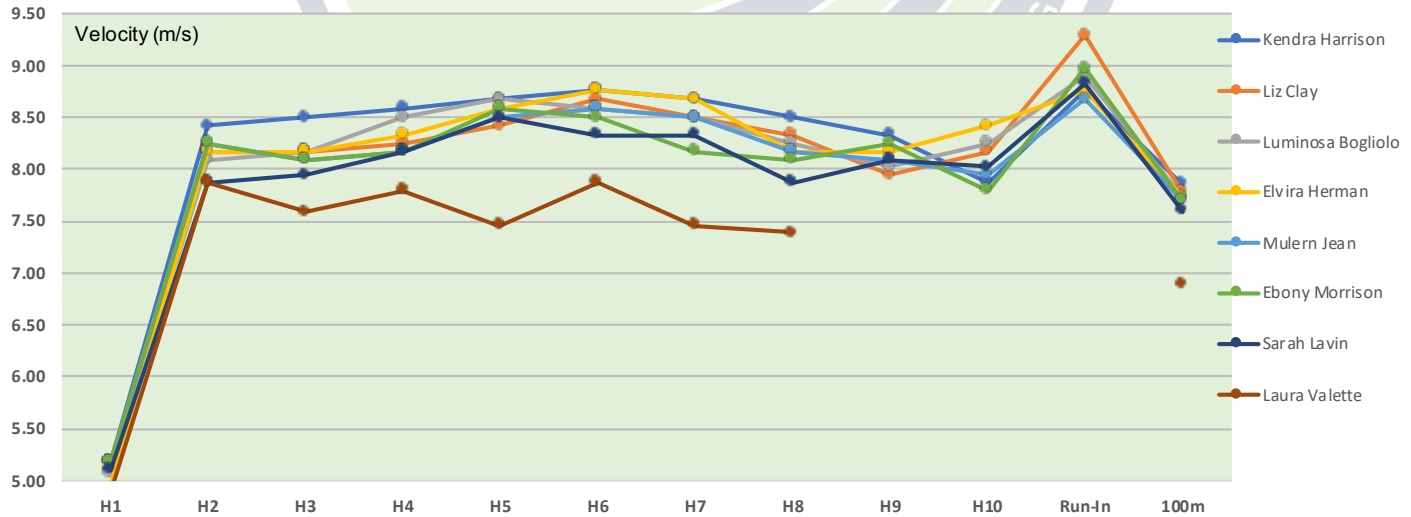
100m Hurdles

Date: 2021.07.31

Wind: 0.4 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
Harrison, Kendra (USA) (1992)	time	2.51	3.52	4.52	5.51	6.49	7.46	8.44	9.44	10.46	11.54		12.74	6 / 1			
	reaction time	0.152										1.20			3.00	2.93	3.10
	interval		1.01	1.00	0.99	0.98	0.97	0.98	1.00	1.02	1.08	1.20			8.50	8.70	8.23
Clay, Liz (AUS) (1995)	time	2.51	3.55	4.59	5.62	6.63	7.61	8.61	9.63	10.70	11.74		12.87	3 / 2			
	reaction time	0.127										1.13			3.11	2.99	3.13
	interval		1.04	1.04	1.03	1.01	0.98	1.00	1.02	1.07	1.04	1.13			8.20	8.53	8.15
Bogliolo, Luminosa (ITA) (1995)	time	2.57	3.62	4.66	5.66	6.64	7.63	8.63	9.66	10.72	11.75		12.93	2 / 3			
	reaction time	0.165										1.18			3.09	2.97	3.12
	interval		1.05	1.04	1.00	0.98	0.99	1.00	1.03	1.06	1.03	1.18			8.25	8.59	8.17
Herman, Elvira (BLR) (1997)	time	2.62	3.66	4.70	5.72	6.71	7.68	8.66	9.70	10.74	11.75		12.95	4 / 4			
	reaction time	0.144										1.20			3.10	2.94	3.09
	interval		1.04	1.04	1.02	0.99	0.97	0.98	1.04	1.04	1.01	1.20			8.23	8.67	8.25
Jean, Mulern (HAI) (1992)	time	2.51	3.54	4.59	5.63	6.63	7.62	8.62	9.66	10.71	11.78		12.99	7 / 5			
	reaction time	0.155										1.21			3.12	2.99	3.16
	interval		1.03	1.05	1.04	1.00	0.99	1.00	1.04	1.05	1.07	1.21			8.17	8.53	8.07
Morrison, Ebony (LBR) (1994)	time	2.51	3.54	4.59	5.63	6.62	7.62	8.66	9.71	10.74	11.83		13.00	9 / 6			
	reaction time	0.150										1.17			3.12	3.03	3.17
	interval		1.03	1.05	1.04	0.99	1.00	1.04	1.05	1.03	1.09	1.17			8.17	8.42	8.04
Lavin, Sarah (IRL) (1994)	time	2.55	3.63	4.70	5.74	6.74	7.76	8.78	9.86	10.91	11.97		13.16	8 / 7			
	reaction time	0.141										1.19			3.19	3.04	3.19
	interval		1.08	1.07	1.04	1.00	1.02	1.02	1.08	1.05	1.06	1.19			7.99	8.39	7.99
Valette, Laura (FRA) (1997)	time	2.66	3.74	4.86	5.95	7.09	8.17	9.31	10.46				14.52	5 / 8			
	reaction time	0.155													3.29	3.36	
	interval		1.08	1.12	1.09	1.14	1.08	1.14	1.15						7.75	7.59	
	velocity		5.18	8.42	8.50	8.59	8.67	8.76	8.67	8.50	8.33	7.87	8.75				
	velocity		5.18	8.17	8.17	8.25	8.42	8.67	8.50	8.33	7.94	8.17	7.77				
	velocity		5.06	8.10	8.17	8.50	8.67	8.59	8.50	8.25	8.02	8.25	7.73				
	velocity		4.96	8.17	8.17	8.33	8.59	8.76	8.67	8.17	8.17	8.42	7.72				
	velocity		5.18	8.25	8.10	8.17	8.50	8.59	8.50	8.17	8.10	7.94	7.70				
	velocity		5.18	8.25	8.10	8.17	8.50	8.59	8.50	8.17	8.10	7.94	7.70				
	velocity		5.18	8.25	8.10	8.17	8.50	8.59	8.50	8.17	8.10	7.94	7.70				
	velocity		5.10	7.87	7.94	8.17	8.50	8.33	8.33	7.87	8.10	8.02	7.60				
	velocity		5.10	7.87	7.94	8.17	8.50	8.33	8.33	7.87	8.10	8.02	7.60				
	velocity		4.89	7.87	7.59	7.80	7.46	7.87	7.46	7.39			6.89				
	velocity		4.89	7.87	7.59	7.80	7.46	7.87	7.46	7.39			6.89				



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field/day-8-morning-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

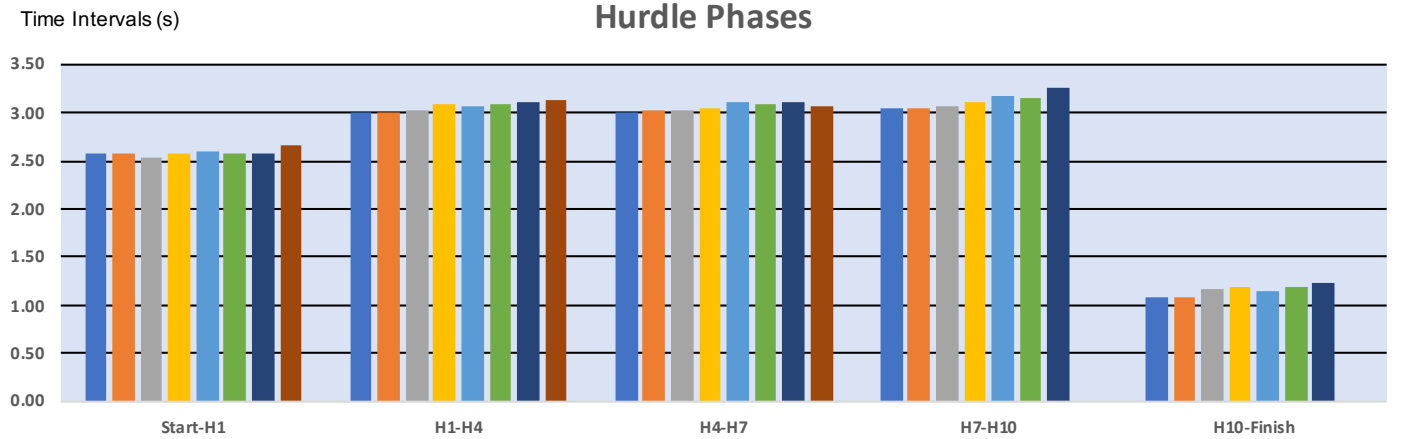
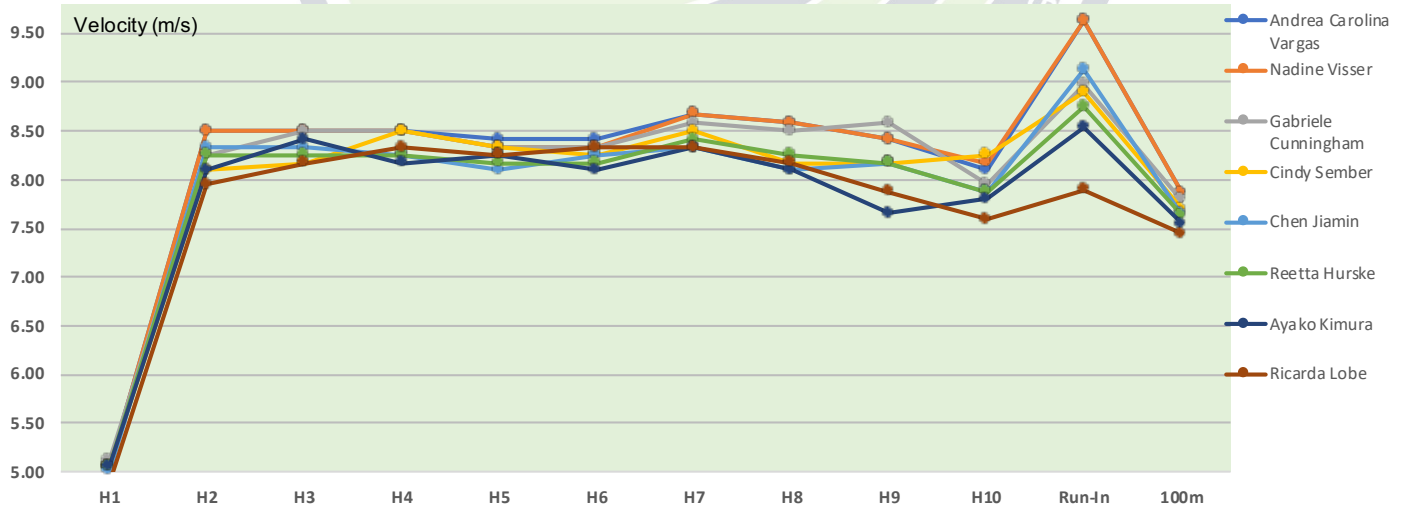
100m Hurdles

Date: 2021.07.31

Wind: 1.0 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
Vargas, Andrea Carolina (CRC) (1996)	time		2.57	3.57	4.57	5.57	6.58	7.59	8.57	9.56	10.57	11.62		12.71	6 / 1			
	reaction time	0.157														3.00	3.00	3.05
	interval			1.00	1.00	1.00	1.01	1.01	0.98	0.99	1.01	1.05	1.09			8.50	8.50	8.36
Visser, Nadine (NED) (1995)	time		2.57	3.57	4.57	5.57	6.59	7.61	8.59	9.58	10.59	11.63		12.72	9 / 2			
	reaction time	0.144														3.00	3.02	3.04
	interval			1.00	1.00	1.00	1.02	1.02	0.98	0.99	1.01	1.04	1.09			8.50	8.44	8.39
Cunningham, Gabriele (USA) (1998)	time		2.54	3.57	4.57	5.57	6.59	7.61	8.60	9.60	10.59	11.66		12.83	8 / 3			
	reaction time	0.172														3.03	3.03	3.06
	interval			1.03	1.00	1.00	1.02	1.02	0.99	1.00	0.99	1.07	1.17			8.42	8.42	8.33
Sember, Cindy (GBR) (1994)	time		2.57	3.62	4.66	5.66	6.68	7.71	8.71	9.75	10.79	11.82		13.00	5 / 4			
	reaction time	0.178														3.09	3.05	3.11
	interval			1.05	1.04	1.00	1.02	1.03	1.00	1.04	1.04	1.03	1.18			8.25	8.36	8.20
Chen Jiamin (CHN) (1996)	time		2.60	3.62	4.64	5.67	6.72	7.75	8.77	9.82	10.86	11.94		13.09	3 / 5			
	reaction time	0.144														3.07	3.10	3.17
	interval			1.02	1.02	1.03	1.05	1.03	1.02	1.05	1.04	1.08	1.15			8.31	8.23	8.04
Hurske, Reetta (FIN) (1995)	time		2.57	3.60	4.63	5.66	6.70	7.74	8.75	9.78	10.82	11.90		13.10	4 / 6			
	reaction time	0.125														3.09	3.09	3.15
	interval			1.03	1.03	1.03	1.04	1.04	1.01	1.03	1.04	1.08	1.20			8.25	8.25	8.10
Kimura, Ayako (JPN) (1988)	time		2.57	3.62	4.63	5.67	6.70	7.75	8.77	9.82	10.93	12.02		13.25	2 / 7			
	reaction time	0.146														3.10	3.10	3.25
	interval			1.05	1.01	1.04	1.03	1.05	1.02	1.05	1.11	1.09	1.23			8.23	8.23	7.85
Lobe, Ricarda (GER) (1994)	time		2.66	3.73	4.77	5.79	6.82	7.84	8.86	9.90	10.98	12.10		13.43	7 / 8			
	reaction time	0.139														3.13	3.07	
	interval			1.07	1.04	1.02	1.03	1.02	1.02	1.04	1.08	1.12	1.33			8.15	8.31	
	velocity		5.06	8.10	8.42	8.17	8.25	8.10	8.33	8.10	7.66	7.80	8.54	7.55				
			4.89	7.94	8.17	8.33	8.25	8.33	8.33	8.17	7.87	7.59	7.89	7.45				



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field/day-8-morning-session-athletics-tokyo-2020-replays>

2021 Müller British Grand Prix (Gateshead, GBR) (TV Analysis)

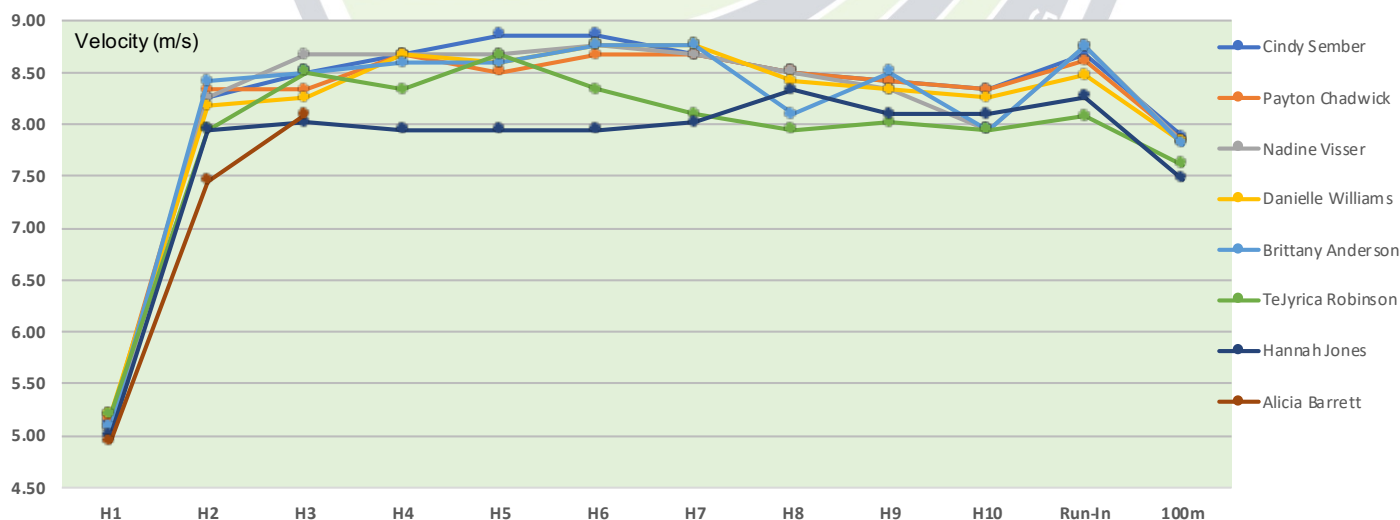
100m Hurdles

Date: 2021.07.13

Wind: 1.5 m/s

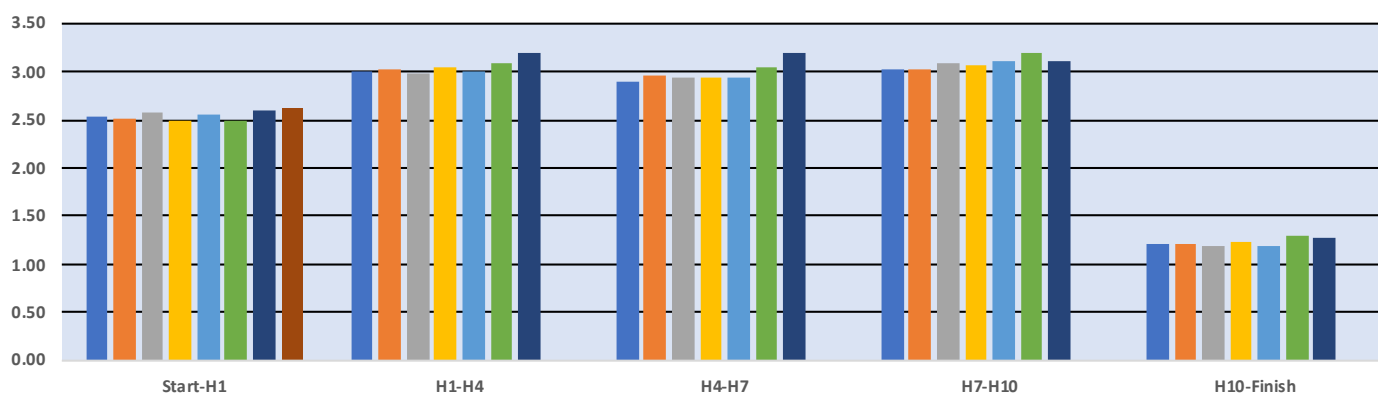
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Sember, Cindy (GBR) (1994)	time	2.54	3.57	4.57	5.55	6.51	7.47	8.45	9.45	10.46	11.48		12.69	4 / 1			
	reaction time	0.195													3.01	2.90	3.03
	interval velocity		1.03	1.00	0.98	0.96	0.96	0.98	1.00	1.01	1.02	1.21			8.47	8.79	8.42
Chadwick, Payton (USA) (1995)	time	2.52	3.54	4.56	5.54	6.54	7.52	8.50	9.50	10.51	11.53		12.75	3 / 2			
	reaction time	0.172													3.02	2.96	3.03
	interval velocity		1.02	1.02	0.98	1.00	0.98	0.98	1.00	1.01	1.02	1.22			8.44	8.61	8.42
Visser, Nadine (NED) (1995)	time	2.57	3.60	4.58	5.56	6.54	7.51	8.49	9.49	10.51	11.58		12.78	7 / 3			
	reaction time	0.180													2.99	2.93	3.09
	interval velocity		1.03	0.98	0.98	0.98	0.97	0.98	1.00	1.02	1.07	1.20			8.53	8.70	8.25
Williams, Danielle (JAM) (1992)	time	2.50	3.54	4.57	5.55	6.54	7.51	8.48	9.49	10.51	11.54		12.78	6 / 4			
	reaction time	0.158													3.05	2.93	3.06
	interval velocity		1.04	1.03	0.98	0.99	0.97	0.97	1.01	1.02	1.03	1.24			8.36	8.70	8.33
Anderson, Brittany (JAM) (2001)	time	2.56	3.57	4.57	5.56	6.55	7.52	8.49	9.54	10.54	11.61		12.81	5 / 5			
	reaction time	0.191													3.00	2.93	3.12
	interval velocity		1.01	1.00	0.99	0.99	0.97	0.97	1.05	1.00	1.07	1.20			8.50	8.70	8.17
Robinson, TeJyrica (USA) (1998)	time	2.50	3.57	4.57	5.59	6.57	7.59	8.64	9.71	10.77	11.84		13.14	2 / 6			
	reaction time	0.147													3.09	3.05	3.20
	interval velocity		1.07	1.00	1.02	0.98	1.02	1.05	1.07	1.06	1.07	1.30			8.25	8.36	7.97
Jones, Hannah (AUS) (1995)	time	2.60	3.67	4.73	5.80	6.87	7.94	9.00	10.02	11.07	12.12		13.39	8 / 7			
	reaction time	0.175													3.20	3.20	3.12
	interval velocity		1.07	1.06	1.07	1.07	1.07	1.06	1.02	1.05	1.05	1.27			7.97	7.97	8.17
Barrett, Alicia (GBR) (1998)	time	2.63	3.77	4.82									dnf	1 / --			
	reaction time	0.180															
	interval velocity		1.14	1.05													
			4.94	7.46	8.10												



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=Wd8ybBUY-Js>

2021 István Gyulai Memorial (Székesfehérvár, HUN) (TV Analysis)

100m Hurdles

Date: 2021.07.06

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		2.48	3.50	4.47	5.43	6.37	7.30	8.24	9.21	10.18	11.14		12.34	4 / 1			
	reaction time	0.178														2.95	2.81	2.90
	interval velocity		5.24	8.33	8.76	8.85	9.04	9.14	9.04	8.76	8.76	8.85	8.75	8.10		8.64	9.07	8.79
Herman, Elvira (BLR) (1997)	time		2.58	3.60	4.58	5.57	6.54	7.51	8.49	9.47	10.47	11.49		12.67	3 / 2			
	reaction time	0.152														2.99	2.92	3.00
	interval velocity		5.04	8.33	8.67	8.59	8.76	8.76	8.67	8.67	8.50	8.33	8.90	7.89		8.53	8.73	8.50
Cunningham, Gabbi (USA) (1998)	time		2.47	3.49	4.50	5.50	6.47	7.44	8.41	9.44	10.47	11.51		12.75	7 / 3			
	reaction time	0.171														3.03	2.91	3.10
	interval velocity		5.26	8.33	8.42	8.50	8.76	8.76	8.76	8.25	8.25	8.17	8.47	7.84		8.42	8.76	8.23
Nelvis, Sharika (USA) (1990)	time		2.57	3.60	4.58	5.56	6.52	7.50	8.48	9.50	10.51	11.54		12.80	1 / 4			
	reaction time	0.152														2.99	2.92	3.06
	interval velocity		5.06	8.25	8.67	8.67	8.85	8.67	8.67	8.33	8.42	8.25	8.33	7.81		8.53	8.73	8.33
Anderson, Brittany (JAM) (2001)	time		2.48	3.50	4.53	5.50	6.48	7.47	8.46	9.50	10.51	11.56		12.80	2 / 4			
	reaction time	0.134														3.02	2.96	3.10
	interval velocity		5.24	8.33	8.25	8.76	8.67	8.59	8.59	8.17	8.42	8.10	8.47	7.81		8.44	8.61	8.23
Visser, Nadine (NED) (1995)	time		2.57	3.58	4.58	5.54	6.54	7.54	8.54	9.54	10.57	11.62		12.85	5 / 6			
	reaction time	0.152														2.97	3.00	3.08
	interval velocity		5.06	8.42	8.50	8.85	8.50	8.50	8.50	8.50	8.25	8.10	8.54	7.78		8.59	8.50	8.28
Kozák, Luca (HUN) (1996)	time		2.50	3.54	4.57	5.54	6.54	7.54	8.54	9.54	10.57	11.64		12.85	6 / 7			
	reaction time	0.150														3.04	3.00	3.10
	interval velocity		5.20	8.17	8.25	8.76	8.50	8.50	8.50	8.50	8.25	7.94	8.68	7.78		8.39	8.50	8.23

2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

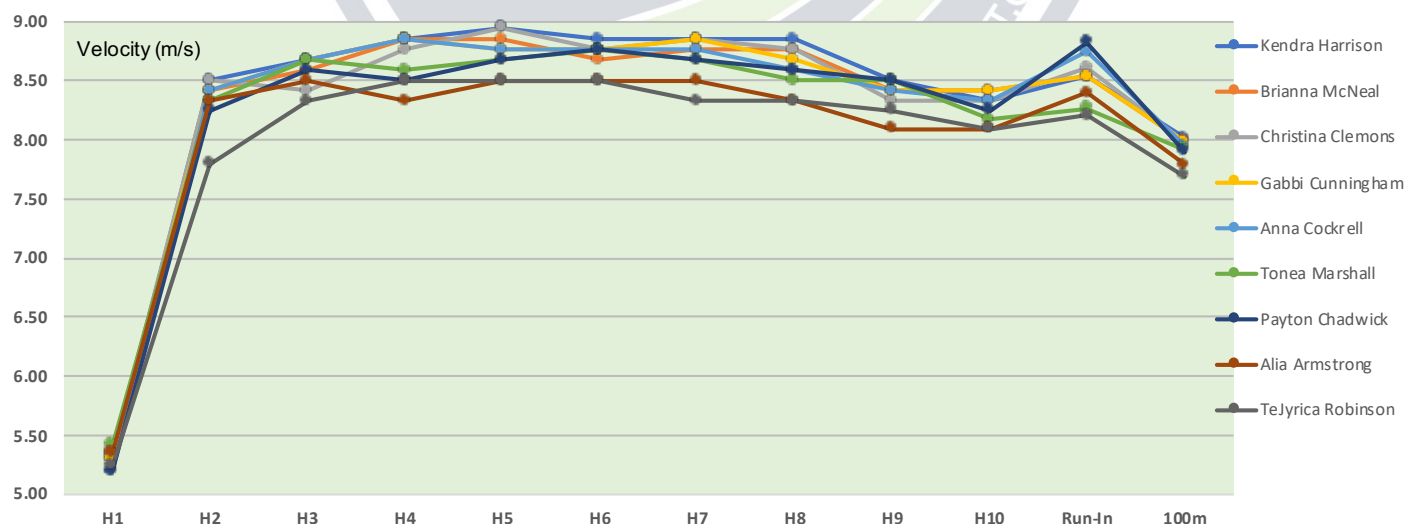
100m Hurdles

Date: 2021.06.20

Wind: 0.8 m/s

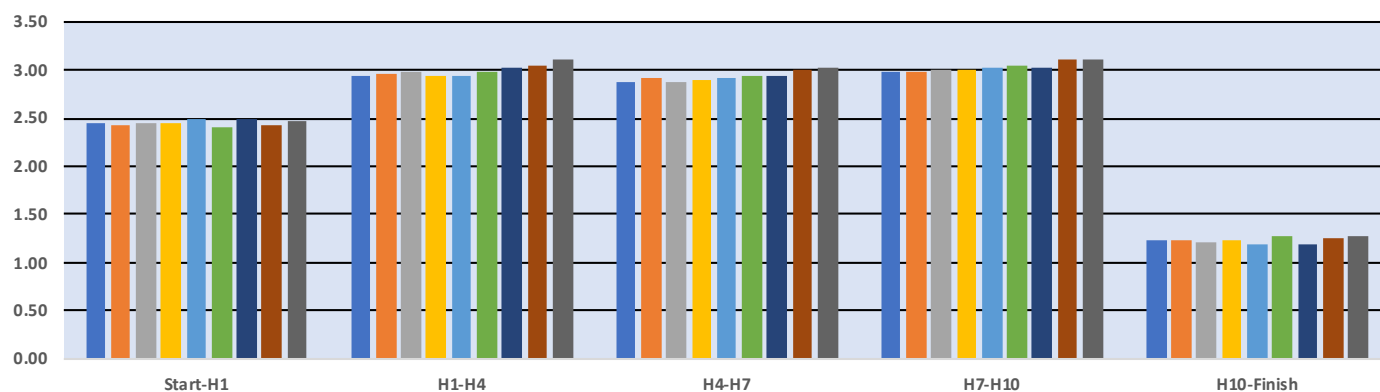
FINAL

		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	2.45	3.45	4.43	5.39	6.34	7.30	8.26	9.22	10.22	11.24		12.47	4 / 1			
	reaction time	0.186													2.94	2.87	2.98
	interval		1.00	0.98	0.96	0.95	0.96	0.96	0.96	1.00	1.02	1.23			8.67	8.89	8.56
McNeal, Brianna (USA) (1991)	time	2.42	3.43	4.42	5.38	6.34	7.32	8.29	9.26	10.27	11.28		12.51	2 / 2			
	reaction time	0.152													2.96	2.91	2.99
	interval		1.01	0.99	0.96	0.96	0.98	0.97	0.97	1.01	1.01	1.23			8.61	8.76	8.53
Clemons, Christina (USA) (1990)	time	2.44	3.44	4.45	5.42	6.37	7.34	8.30	9.27	10.29	11.31		12.53	6 / 3			
	reaction time	0.139													2.98	2.88	3.01
	interval		1.00	1.01	0.97	0.95	0.97	0.96	0.97	1.02	1.02	1.22			8.56	8.85	8.47
Cunningham, Gabbi (USA) (1998)	time	2.45	3.46	4.44	5.40	6.37	7.34	8.30	9.28	10.29	11.30		12.53	8 / 4			
	reaction time	0.153													2.95	2.90	3.00
	interval		1.01	0.98	0.96	0.97	0.97	0.96	0.98	1.01	1.01	1.23			8.64	8.79	8.50
Cockrell, Anna (USA) (1997)	time	2.50	3.51	4.49	5.45	6.42	7.39	8.36	9.35	10.36	11.38		12.58	3 / 5			
	reaction time	0.147													2.95	2.91	3.02
	interval		1.01	0.98	0.96	0.97	0.97	0.97	0.99	1.01	1.02	1.20			8.64	8.76	8.44
Marshall, Tonea (USA) (1998)	time	2.40	3.42	4.40	5.39	6.37	7.34	8.32	9.32	10.32	11.36		12.63	5 / 6			
	reaction time	0.130													2.99	2.93	3.04
	interval		1.02	0.98	0.99	0.98	0.97	0.98	1.00	1.00	1.04	1.27			8.53	8.70	8.39
Chadwick, Payton (USA) (1995)	time	2.50	3.53	4.52	5.52	6.50	7.47	8.45	9.44	10.44	11.47		12.66	7 / 7			
	reaction time	0.190													3.02	2.93	3.02
	interval		1.03	0.99	1.00	0.98	0.97	0.98	0.99	1.00	1.03	1.19			8.44	8.70	8.44
Armstrong, Alia (USA) (2000)	time	2.43	3.45	4.45	5.47	6.47	7.47	8.47	9.49	10.54	11.59		12.84	1 / 8			
	reaction time	0.153													3.04	3.00	3.12
	interval		1.02	1.00	1.02	1.00	1.00	1.00	1.02	1.05	1.05	1.25			8.39	8.50	8.17
Robinson, TeJyrica (USA) (1998)	time	2.48	3.57	4.59	5.59	6.59	7.59	8.61	9.63	10.66	11.71		12.99	9 / 9			
	reaction time	0.143													3.11	3.02	3.10
	interval		1.09	1.02	1.00	1.00	1.00	1.02	1.02	1.03	1.05	1.28			8.20	8.44	8.23
	time																
	interval																
	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=G15l57y6nBM>

2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

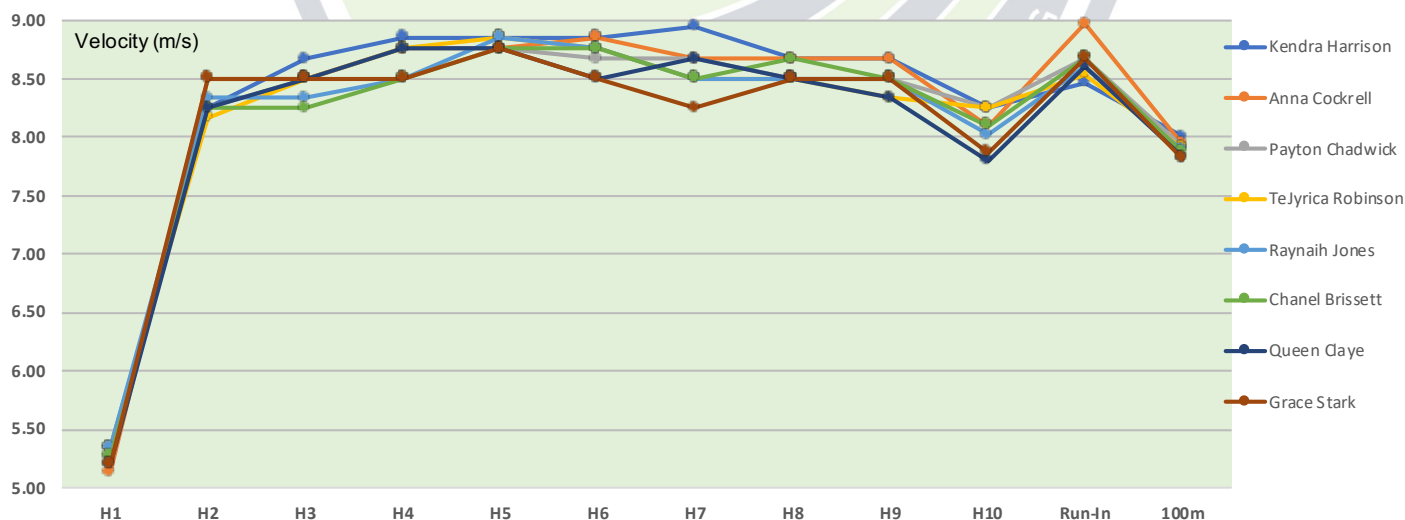
100m Hurdles

Date: 2021.06.20

Wind: 1.3 m/s

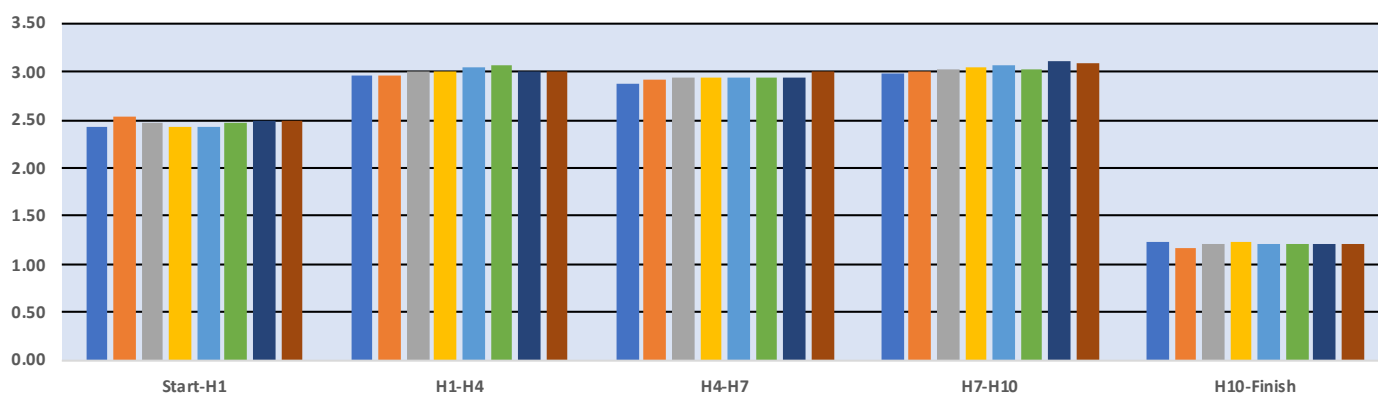
Semi-Final 2

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Harrison, Kendra (USA) (1992)	time	2.43	3.46	4.44	5.40	6.36	7.32	8.27	9.25	10.23	11.26		12.50	5 / 1			
	reaction time	0.211													2.97	2.87	2.99
	interval		1.03	0.98	0.96	0.96	0.96	0.95	0.98	0.98	1.03	1.24			8.59	8.89	8.53
Cockrell, Anna (USA) (1997)	time	2.53	3.53	4.53	5.50	6.47	7.43	8.41	9.39	10.37	11.42		12.59	4 / 2			
	reaction time	0.172													2.97	2.91	3.01
	interval		1.00	1.00	0.97	0.97	0.96	0.98	0.98	1.05	1.17				8.59	8.76	8.47
Chadwick, Payton (USA) (1995)	time	2.47	3.50	4.50	5.47	6.44	7.42	8.40	9.40	10.40	11.43		12.64	7 / 3			
	reaction time	0.175													3.00	2.93	3.03
	interval		1.03	1.00	0.97	0.97	0.98	0.98	1.00	1.00	1.03	1.21	PB		8.50	8.70	8.42
Robinson, TeJyrica (USA) (1998)	time	2.43	3.47	4.47	5.44	6.40	7.37	8.37	9.37	10.39	11.42		12.65	1 / 4			
	reaction time	0.173													3.01	2.93	3.05
	interval		1.04	1.00	0.97	0.96	0.97	1.00	1.00	1.02	1.03	1.23	PB		8.47	8.70	8.36
Jones, Rayniah (USA) (2001)	time	2.43	3.45	4.47	5.47	6.43	7.40	8.40	9.40	10.40	11.46		12.68	6 / 5			
	reaction time	0.141													3.04	2.93	3.06
	interval		1.02	1.02	1.00	0.96	0.97	1.00	1.00	1.00	1.06	1.22			8.39	8.70	8.33
Brissett, Chanel (USA) (1999)	time	2.47	3.50	4.53	5.53	6.50	7.47	8.47	9.45	10.45	11.50		12.71	8 / 6			
	reaction time	0.192													3.06	2.94	3.03
	interval		1.03	1.03	1.00	0.97	0.97	1.00	0.98	1.00	1.05	1.21			8.33	8.67	8.42
Claye, Queen (USA) (1988)	time	2.50	3.53	4.53	5.50	6.47	7.47	8.45	9.45	10.47	11.56		12.78	2 / 7			
	reaction time	0.174													3.00	2.95	3.11
	interval		1.03	1.00	0.97	0.97	1.00	0.98	1.00	1.02	1.09	1.22			8.50	8.64	8.20
Stark, Grace (USA) (2001)	time	2.50	3.50	4.50	5.50	6.47	7.47	8.50	9.50	10.50	11.58		12.79	3 / 8			
	reaction time	0.193													3.00	3.00	3.08
	interval		1.00	1.00	1.00	0.97	1.00	1.03	1.00	1.00	1.08	1.21			8.50	8.50	8.28
	velocity		5.35	8.25	8.67	8.85	8.85	8.95	8.67	8.67	8.25	8.47	8.00				



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=R44xyEnCZ-w&t=7s>

2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

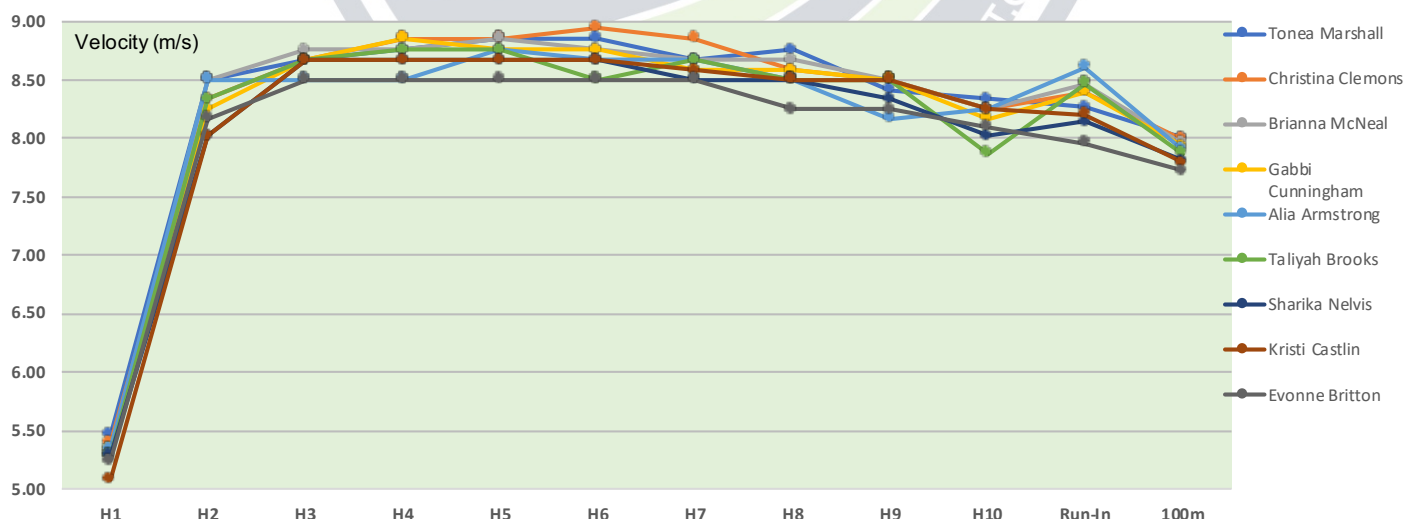
100m Hurdles

Date: 2021.06.20

Wind: 1.2 m/s

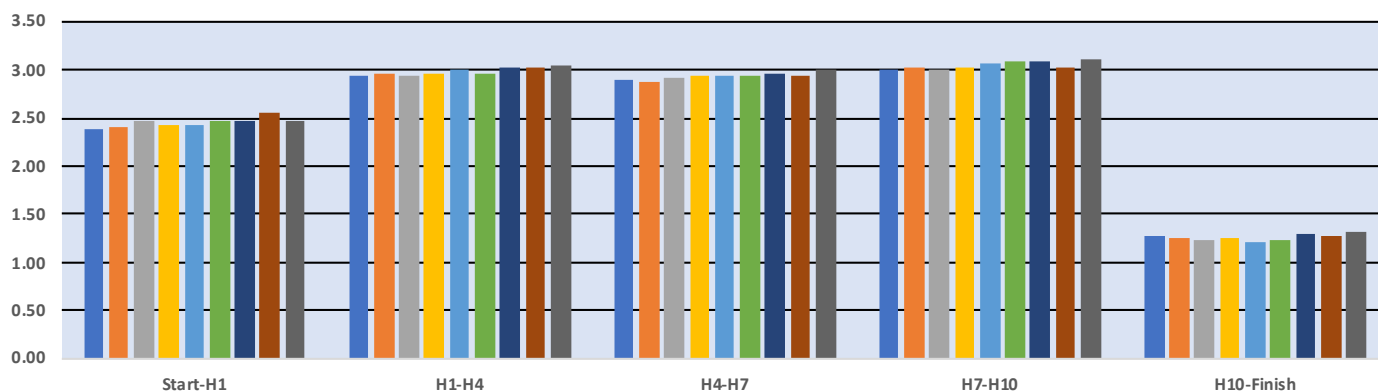
Semi-Final 1

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Marshall, Tonia (USA) (1998)	time	2.38	3.38	4.36	5.33	6.29	7.25	8.23	9.20	10.21	11.23		12.50	2 / 1			
	reaction time	0.137													2.95	2.90	3.00
	interval velocity		1.00	0.98	0.97	0.96	0.96	0.98	0.97	1.01	1.02	1.27			8.64	8.79	8.50
Clemons, Christina (USA) (1990)	time	2.41	3.43	4.41	5.37	6.33	7.28	8.24	9.23	10.23	11.26		12.51	3 / 2			
	reaction time	0.142													2.96	2.87	3.02
	interval velocity		1.02	0.98	0.96	0.96	0.95	0.96	0.99	1.00	1.03	1.25	PB		8.61	8.89	8.44
McNeal, Brianna (USA) (1991)	time	2.46	3.46	4.43	5.40	6.36	7.33	8.31	9.29	10.29	11.32		12.56	4 / 3			
	reaction time	0.173													2.94	2.91	3.01
	interval velocity		1.00	0.97	0.97	0.96	0.97	0.98	0.98	1.00	1.03	1.24			8.67	8.76	8.47
Cunningham, Gabbi (USA) (1998)	time	2.43	3.46	4.44	5.40	6.37	7.34	8.33	9.32	10.32	11.36		12.61	6 / 4			
	reaction time	0.158													2.97	2.93	3.03
	interval velocity		1.03	0.98	0.96	0.97	0.97	0.99	0.99	1.00	1.04	1.25	PB		8.59	8.70	8.42
Armstrong, Alia (USA) (2000)	time	2.43	3.43	4.43	5.43	6.40	7.38	8.36	9.36	10.40	11.43		12.65	1 / 5			
	reaction time	0.154													3.00	2.93	3.07
	interval velocity		1.00	1.00	1.00	0.97	0.98	0.98	1.00	1.04	1.03	1.22	PB		8.50	8.70	8.31
Brooks, Talyah (USA) (1995)	time	2.46	3.48	4.46	5.43	6.40	7.40	8.38	9.38	10.38	11.46		12.70	5 / 6			
	reaction time	0.156													2.97	2.95	3.08
	interval velocity		1.02	0.98	0.97	0.97	1.00	0.98	1.00	1.00	1.08	1.24			8.59	8.64	8.28
Nelvis, Sharika (USA) (1990)	time	2.46	3.52	4.50	5.48	6.46	7.44	8.44	9.44	10.46	11.52		12.81	7 / 7			
	reaction time	0.160													3.02	2.96	3.08
	interval velocity		1.06	0.98	0.98	0.98	0.98	1.00	1.00	1.02	1.06	1.29			8.44	8.61	8.28
Castlin, Kristi (USA) (1988)	time	2.56	3.62	4.60	5.58	6.56	7.54	8.53	9.53	10.53	11.56		12.84	8 / 8			
	reaction time	0.162													3.02	2.95	3.03
	interval velocity		1.06	0.98	0.98	0.98	0.98	0.99	1.00	1.00	1.03	1.28			8.44	8.64	8.42
Britton, Evonne (USA) (1991)	time	2.48	3.52	4.52	5.52	6.52	7.52	8.52	9.55	10.58	11.63		12.95	9 / 9			
	reaction time	0.144													3.04	3.00	3.11
	interval velocity		1.04	1.00	1.00	1.00	1.00	1.00	1.03	1.03	1.05	1.32			8.39	8.50	8.20



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=yvzQpw1bmlM&t=9s>

2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

100m Hurdles

Date: 2021.06.19

Wind: 0.1 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
McNeal, Brianna (USA) (1991)	time	2.43	3.46	4.42	5.38	6.34	7.30	8.26	9.26	10.26	11.26		12.50	1 / 1			
	reaction time	0.162													2.95	2.88	3.00
	interval		1.03	0.96	0.96	0.96	0.96	0.96	1.00	1.00	1.00	1.24			8.64	8.85	8.50
	velocity	5.35	8.25	8.85	8.85	8.85	8.85	8.85	8.50	8.50	8.50	8.47	8.00				
Cunningham, Gabbi (USA) (1998)	time	2.43	3.46	4.44	5.42	6.40	7.36	8.36	9.36	10.40	11.42		12.67	7 / 2			
	reaction time	0.162													2.99	2.94	3.06
	interval		1.03	0.98	0.98	0.98	0.96	1.00	1.00	1.04	1.02	1.25	PB		8.53	8.67	8.33
	velocity	5.35	8.25	8.67	8.67	8.67	8.85	8.50	8.50	8.17	8.33	8.40	7.89				

Date: 2021.06.19

Wind: 1.0 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
Cockrell, Anna (USA) (1997)	time	2.50	3.53	4.53	5.53	6.50	7.46	8.43	9.43	10.43	11.46		12.63	4 / 1			
	reaction time	0.163													3.03	2.90	3.03
	interval		1.03	1.00	1.00	0.97	0.96	0.97	1.00	1.03	1.03	1.17			8.42	8.79	8.42
	velocity	5.20	8.25	8.50	8.50	8.76	8.85	8.76	8.50	8.50	8.25	8.97	7.92				
Jones, Rayniah (USA) (2001)	time	2.43	3.45	4.46	5.46	6.43	7.43	8.40	9.40	10.40	11.43		12.64	2 / 2			
	reaction time	0.142													3.03	2.94	3.03
	interval		1.02	1.01	1.00	0.97	1.00	0.97	1.00	1.03	1.21	PB			8.42	8.67	8.42
	velocity	5.35	8.33	8.42	8.50	8.76	8.50	8.76	8.50	8.50	8.25	8.68	7.91				
Chadwick, Payton (USA) (1995)	time	2.46	3.52	4.54	5.53	6.50	7.47	8.43	9.43	10.43	11.43		12.66	6 / 3			
	reaction time	0.182													3.07	2.90	3.00
	interval		1.06	1.02	0.99	0.97	0.97	0.96	1.00	1.00	1.00	1.23	PB		8.31	8.79	8.50
	velocity	5.28	8.02	8.33	8.59	8.76	8.76	8.85	8.50	8.50	8.50	8.54	7.90				

Date: 2021.06.19

Wind: 0.8 m/s

Heat 2

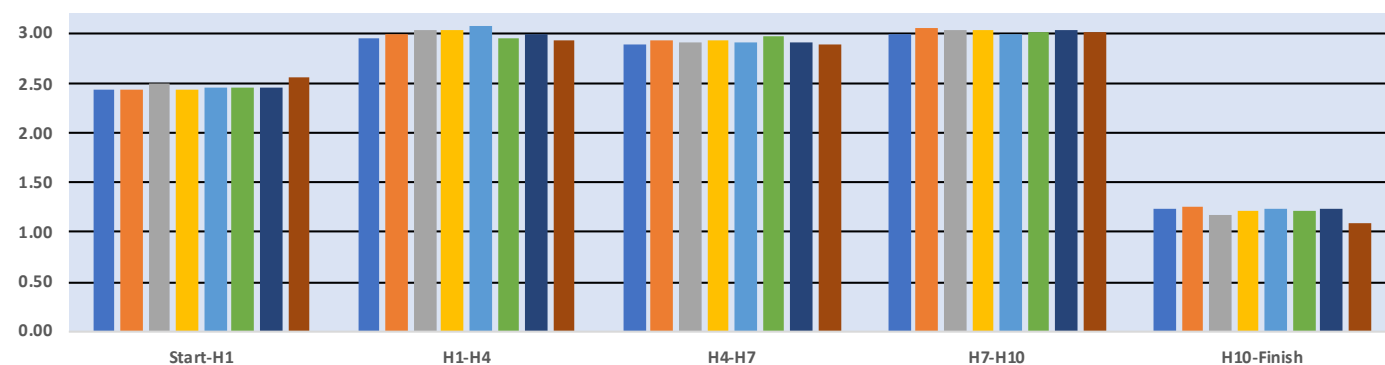
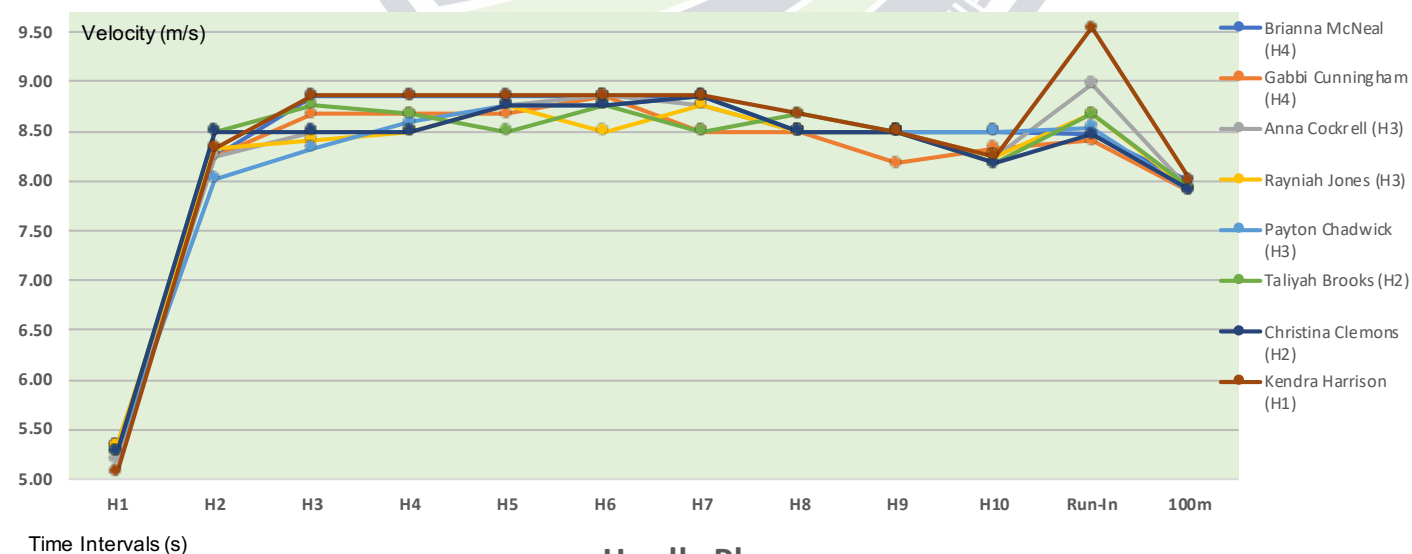
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Brooks, Taliyah (USA) (1995)	time	2.46	3.46	4.43	5.41	6.41	7.38	8.38	9.36	10.36	11.40		12.61	7 / 1			
	reaction time	0.167													2.95	2.97	3.02
	interval		7 steps	1.00	0.97	0.98	1.00	0.97	1.00	0.98	1.04	1.21	PB		8.64	8.59	8.44
	velocity	5.28	8.50	8.76	8.67	8.50	8.76	8.50	8.67	8.50	8.17	8.68	7.93				
Clemons, Christina (USA) (1990)	time	2.46	3.46	4.46	5.46	6.43	7.40	8.36	9.36	10.36	11.40		12.64	4 / 2			
	reaction time	0.143													3.00	2.90	3.04
	interval		1.00	1.00	1.00	0.97	0.97	0.96	1.00	1.00	1.04	1.24			8.50	8.79	8.39
	velocity	5.28	8.50	8.50	8.50	8.76	8.76	8.85	8.50	8.50	8.17	8.47	7.91				

Date: 2021.06.19

Wind: -0.3 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
Harrison, Kendra (USA) (1992)	time	2.56	3.58	4.54	5.50	6.46	7.42	8.38	9.36	10.36	11.39		12.49	2 / 1			
	reaction time	0.291													2.94	2.88	3.01
	interval		1.02	0.96	0.96	0.96	0.96	0.96	0.98	1.00	1.03	1.10			8.67	8.85	8.47
	velocity	5.08	8.33	8.85	8.85	8.85	8.85	8.85	8.67	8.50	8.25	9.55	8.01				



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 30fps
 Timing From: Gun Flash (Heat 1)
 First Movement (Heats 2-4)
 Source: <https://www.youtube.com/watch?v=kanydEqsN0s>

2021 NCAA Championships (Eugene, OR) (TV Analysis)

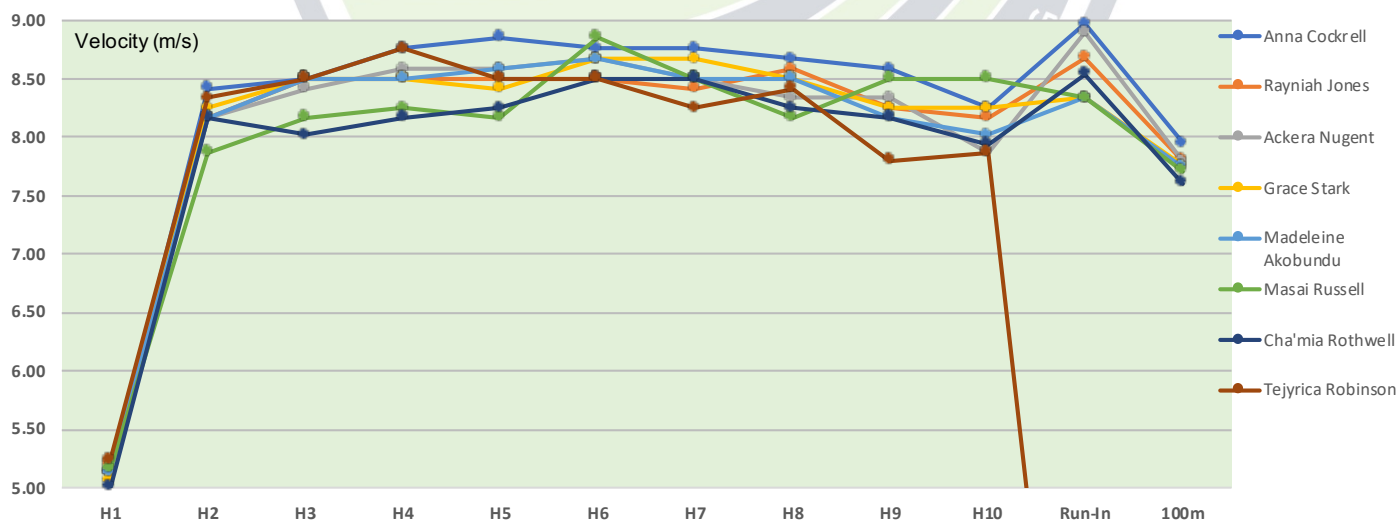
100m Hurdles

Date: 2021.06.12

Wind: 0.4 m/s

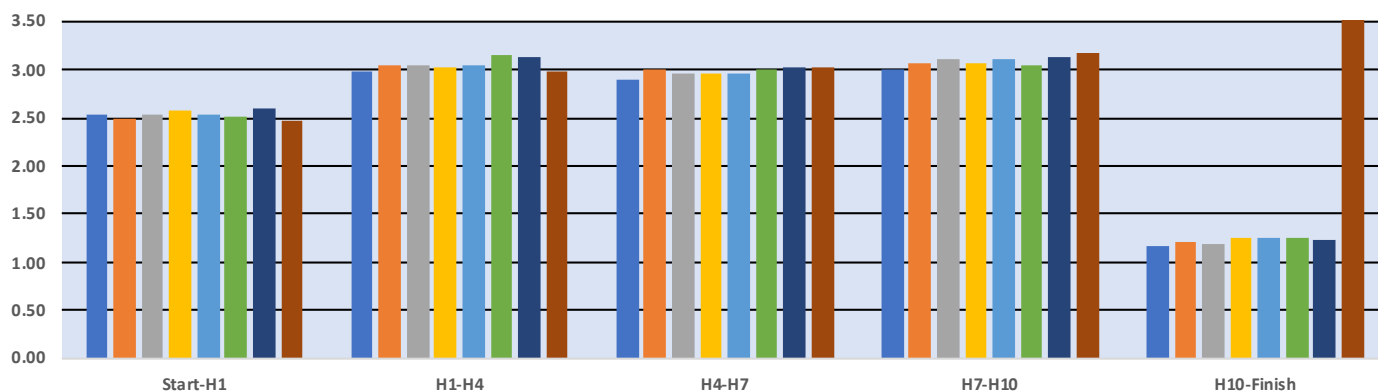
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Cockrell, Anna (USA) (1997)	time		2.53	3.54	4.54	5.51	6.47	7.44	8.41	9.39	10.38	11.41		12.58	7 / 1			
	reaction time	0.159		1.01	1.00	0.97	0.96	0.97	0.97	0.98	0.99	1.03	1.17			2.98	2.90	3.00
	interval velocity		5.14	8.42	8.50	8.76	8.85	8.76	8.76	8.67	8.59	8.25	8.97	7.95		8.56	8.79	8.50
Jones, Rayniah (USA) (2001)	time		2.50	3.54	4.54	5.54	6.54	7.54	8.55	9.54	10.57	11.61		12.82	2 / 2			
	reaction time	0.138		1.04	1.00	1.00	1.00	1.00	1.01	0.99	1.03	1.04	1.21			3.04	3.01	3.06
	interval velocity		5.20	8.17	8.50	8.50	8.50	8.50	8.42	8.59	8.25	8.17	8.68	7.80		8.39	8.47	8.33
Nugent, Ackera (JAM) (2002)	time		2.53	3.57	4.58	5.57	6.56	7.54	8.54	9.56	10.58	11.66		12.84	4 / 3			
	reaction time	0.148		1.04	1.01	0.99	0.99	0.98	1.00	1.02	1.02	1.08	1.18			3.04	2.97	3.12
	interval velocity		5.14	8.17	8.42	8.59	8.59	8.67	8.50	8.33	8.33	7.87	8.90	7.79		8.39	8.59	8.17
Stark, Grace (USA) (2001)	time		2.57	3.60	4.60	5.60	6.61	7.59	8.57	9.57	10.60	11.63		12.89	6 / 4			
	reaction time	0.207		1.03	1.00	1.00	1.01	0.98	0.98	1.00	1.03	1.03	1.26			3.03	2.97	3.06
	interval velocity		5.06	8.25	8.50	8.50	8.42	8.67	8.67	8.50	8.25	8.25	8.33	7.76		8.42	8.59	8.33
Akobundu, Madeleine (USA) (1998)	time		2.53	3.57	4.57	5.57	6.56	7.54	8.54	9.54	10.58	11.64		12.90	1 / 5			
	reaction time	0.196		1.04	1.00	1.00	0.99	0.98	1.00	1.00	1.04	1.06	1.26			3.04	2.97	3.10
	interval velocity		5.14	8.17	8.50	8.50	8.59	8.67	8.50	8.50	8.17	8.02	8.33	7.75		8.39	8.59	8.23
Russell, Masai (USA) (2000)	time		2.52	3.60	4.64	5.67	6.71	7.67	8.67	9.71	10.71	11.71		12.97	9 / 6			
	reaction time	0.233		1.08	1.04	1.03	1.04	0.96	1.00	1.04	1.00	1.00	1.26			3.15	3.00	3.04
	interval velocity		5.16	7.87	8.17	8.25	8.17	8.85	8.50	8.17	8.50	8.50	8.33	7.71		8.10	8.50	8.39
Rothwell, Cha'mia (USA) (1998)	time		2.60	3.64	4.70	5.74	6.77	7.77	8.77	9.80	10.84	11.91		13.14	8 / 7			
	reaction time	0.175		1.04	1.06	1.04	1.03	1.00	1.03	1.04	1.04	1.07	1.23			3.14	3.03	3.14
	interval velocity		5.00	8.17	8.02	8.17	8.25	8.50	8.50	8.25	8.17	7.94	8.54	7.61		8.12	8.42	8.12
Robinson, Tejryica (USA) (1998)	time		2.48	3.50	4.50	5.47	6.47	7.47	8.50	9.51	10.60	11.68		29.11	3 / 8			
	reaction time	0.152		1.02	1.00	0.97	1.00	1.00	1.03	1.01	1.09	1.08	17.43			2.99	3.03	3.18
	interval velocity		5.24	8.33	8.50	8.76	8.50	8.50	8.25	8.42	7.80	7.87	0.60	3.44		8.53	8.42	8.02



Time Intervals (s)

Hurdle Phases



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

Biomechanical Analysis

2021 NCAA Championships (Eugene, OR) (TV Analysis)

100m Hurdles

Date: 2021.06.10

Wind: -0.5 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
Marshall, Tonia (USA) (1998)	time	2.40	3.40	4.40	5.37	6.33	7.30	8.29	9.27	10.27	11.27		12.48	5 / 1			
	reaction time	0.114										1.21			2.97	2.92	2.98
	interval		1.00	1.00	0.97	0.96	0.97	0.99	0.98	1.00	1.00	1.21			8.59	8.73	8.56
Cockrell, Anna (USA) (1997)	time	2.53	3.53	4.50	5.47	6.43	7.40	8.37	9.33	10.33	11.37		12.54	6 / 2			
	reaction time	0.138										1.17			2.94	2.90	3.00
	interval		1.00	0.97	0.97	0.96	0.97	0.97	0.96	1.00	1.04	1.17			8.67	8.79	8.50
	velocity	5.42	8.50	8.50	8.76	8.85	8.76	8.59	8.67	8.50	8.50	8.68	8.01				
	velocity	5.14	8.50	8.76	8.76	8.85	8.76	8.76	8.85	8.50	8.17	8.97	7.97				

2021 NCAA Championships Preliminary East Round (Jacksonville, FL) (TV Analysis)

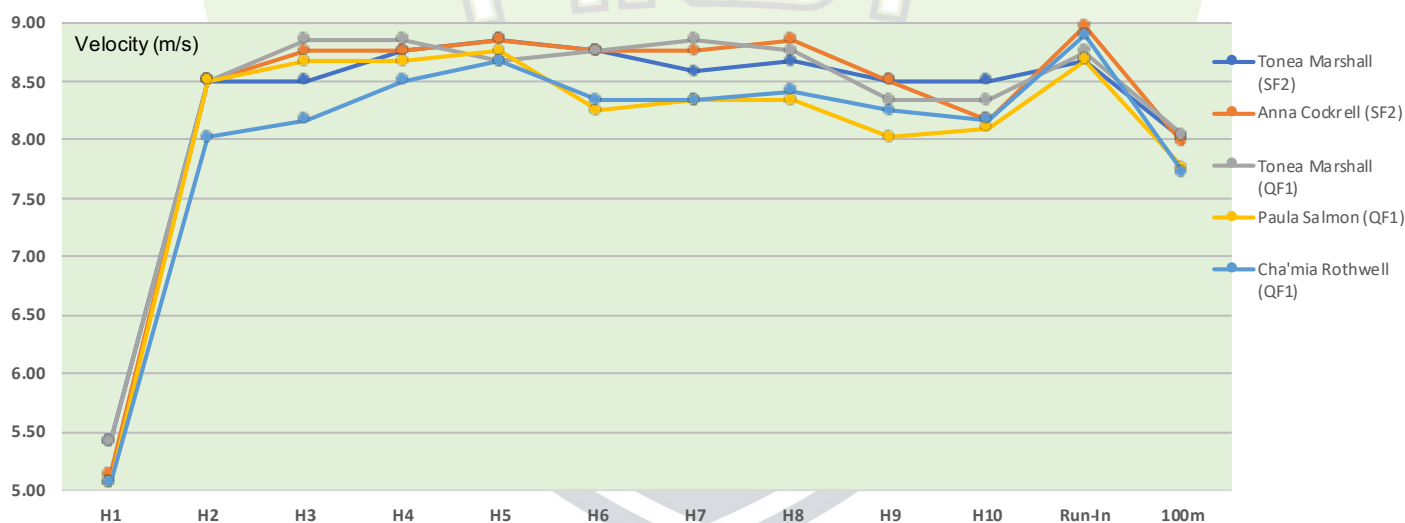
100m Hurdles

Date: 2021.05.29

Wind: 0.8 m/s

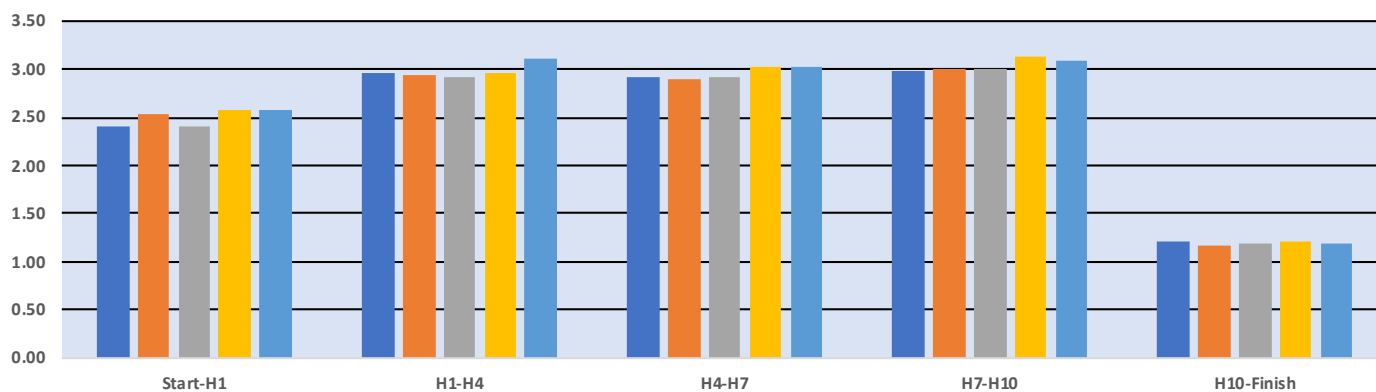
Quarter Final 1

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Marshall, Tonia (USA) (1998)	time	2.40	3.40	4.36	5.32	6.30	7.27	8.23	9.20	10.22	11.24		12.44	5 / 1			
	reaction time											1.20			2.92	2.91	3.01
	interval		1.00	0.96	0.96	0.98	0.97	0.96	0.97	1.02	1.02	1.20			8.73	8.76	8.47
Salmon, Paula (USA) (1999)	time	2.57	3.57	4.55	5.53	6.50	7.53	8.55	9.57	10.63	11.68		12.89	4 / 2			
	reaction time											1.21			2.96	3.02	3.13
	interval		1.00	0.98	0.98	0.97	1.03	1.02	1.02	1.06	1.05	1.21			8.61	8.44	8.15
Rothwell, Cha'mia (USA) (1998)	time	2.57	3.63	4.67	5.67	6.65	7.67	8.69	9.70	10.73	11.77		12.95	3 / 3			
	reaction time											1.18			3.10	3.02	3.08
	interval		1.06	1.04	1.00	0.98	1.02	1.02	1.01	1.03	1.04	1.18			8.23	8.44	8.28
	velocity	5.06	8.02	8.17	8.50	8.67	8.33	8.33	8.42	8.25	8.17	8.90	7.72				



Time Intervals (s)

Hurdle Phases



NCAA Championships Semi Final

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=Ldv0QjaFXY&t=48s>

NCAA Championships Preliminary East Round Quarter Final

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=9vIEIkZ018>

2021 Golden Gala Pietro Mennea (Florence, ITA) (TV Analysis)

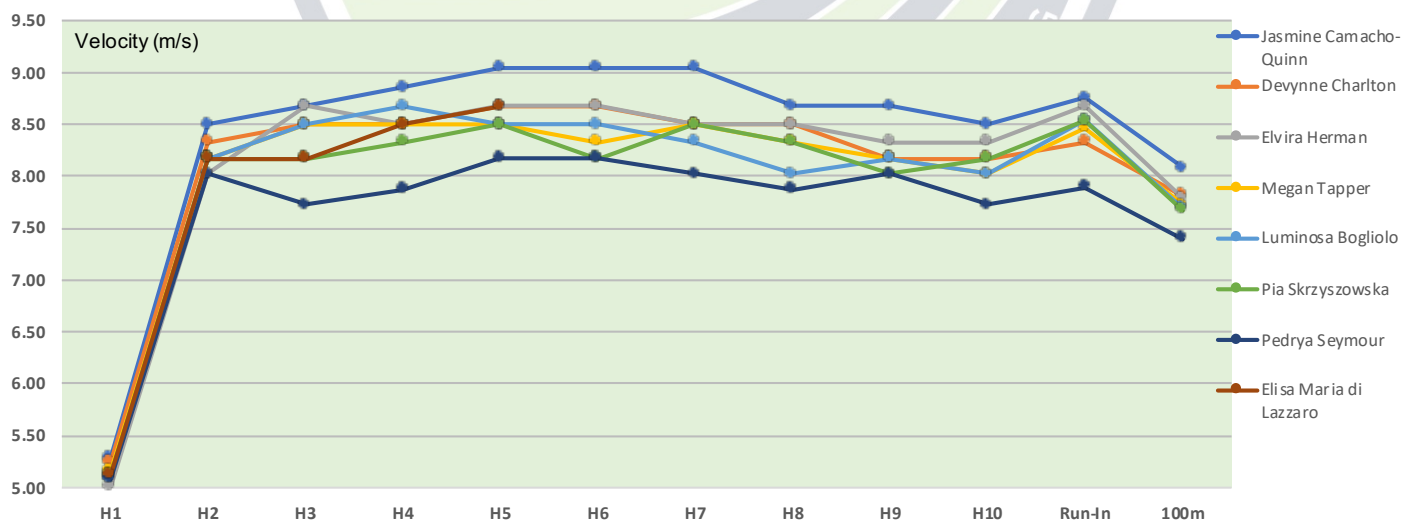
100m Hurdles

Date: 2021.06.10

Wind: -0.8 m/s

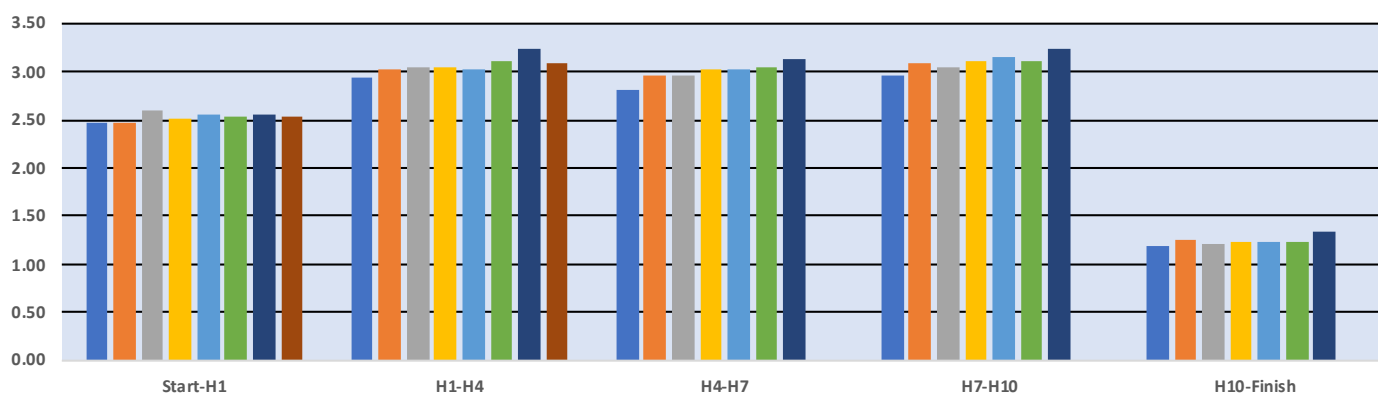
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Camacho-Quinn, Jasmine (PUR) (199)	time		2.46	3.46	4.44	5.40	6.34	7.28	8.22	9.20	10.18	11.18		12.38	5 / 1			
	reaction time	0.153											1.20			2.94	2.82	2.96
	interval			1.00	0.98	0.96	0.94	0.94	0.94	0.98	0.98	1.00	1.20			8.67	9.04	8.61
	velocity		5.28	8.50	8.67	8.85	9.04	9.04	9.04	8.67	8.67	8.50	8.75	8.08				
Charlton, Devynne (BAH) (1995)	time		2.48	3.50	4.50	5.50	6.48	7.46	8.46	9.46	10.50	11.54		12.80	2 / 2			
	reaction time	0.147											1.26			3.02	2.96	3.08
	interval			1.02	1.00	1.00	0.98	0.98	1.00	1.00	1.04	1.04	1.26			8.44	8.61	8.28
	velocity		5.24	8.33	8.50	8.50	8.67	8.67	8.50	8.50	8.17	8.17	8.33	7.81				
Herman, Elvira (BLR) (1997)	time		2.60	3.66	4.64	5.64	6.62	7.60	8.60	9.60	10.62	11.64		12.85	3 / 3			
	reaction time	0.132											1.21			3.04	2.96	3.04
	interval			1.06	0.98	1.00	0.98	0.98	1.00	1.00	1.02	1.02	1.21			8.39	8.61	8.39
	velocity		5.00	8.02	8.67	8.50	8.67	8.67	8.50	8.50	8.33	8.33	8.68	7.78				
Tapper, Megan (JAM) (1994)	time		2.52	3.56	4.56	5.56	6.56	7.58	8.58	9.60	10.64	11.70		12.94	4 / 4			
	reaction time	0.170											1.24			3.04	3.02	3.12
	interval			1.04	1.00	1.00	1.00	1.02	1.00	1.02	1.04	1.06	1.24			8.39	8.44	8.17
	velocity		5.16	8.17	8.50	8.50	8.50	8.33	8.50	8.33	8.17	8.02	8.47	7.73				
Bogliolo, Luminosa (ITA) (1995)	time		2.56	3.60	4.60	5.58	6.58	7.58	8.60	9.66	10.70	11.76		12.99	6 / 5			
	reaction time	0.161											1.23			3.02	3.02	3.16
	interval			1.04	1.00	0.98	1.00	1.00	1.02	1.06	1.04	1.06	1.23			8.44	8.44	8.07
	velocity		5.08	8.17	8.50	8.67	8.50	8.50	8.33	8.02	8.17	8.02	8.54	7.70				
Skrzysowska, Pia (POL) (2001)	time		2.54	3.58	4.62	5.64	6.64	7.68	8.68	9.70	10.76	11.80		13.03	7 / 6			
	reaction time	0.151											1.23			3.10	3.04	3.12
	interval			1.04	1.04	1.02	1.00	1.04	1.00	1.02	1.06	1.04	1.23			8.23	8.39	8.17
	velocity		5.12	8.17	8.17	8.33	8.50	8.17	8.50	8.33	8.02	8.17	8.54	7.67				
Seymour, Pedrya (BAH) (1995)	time		2.56	3.62	4.72	5.80	6.84	7.88	8.94	10.02	11.08	12.18		13.51	1 / 7			
	reaction time	0.168											1.33			3.24	3.14	3.24
	interval			1.06	1.10	1.08	1.04	1.04	1.06	1.08	1.06	1.10	1.33			7.87	8.12	7.87
	velocity		5.08	8.02	7.73	7.87	8.17	8.17	8.02	7.87	8.02	7.73	7.89	7.40				
di Lazzaro, Elisa Maria (ITA) (1998)	time		2.54	3.58	4.62	5.62	6.60							dnf	8 / --			
	reaction time	0.143														3.08		
	interval			1.04	1.04	1.00	0.98									8.28		
	velocity		5.12	8.17	8.17	8.50	8.67											



Time Intervals (s)

Hurdle Phases



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

2021 Müller Grand Prix (Gateshead, GBR) (TV Analysis)

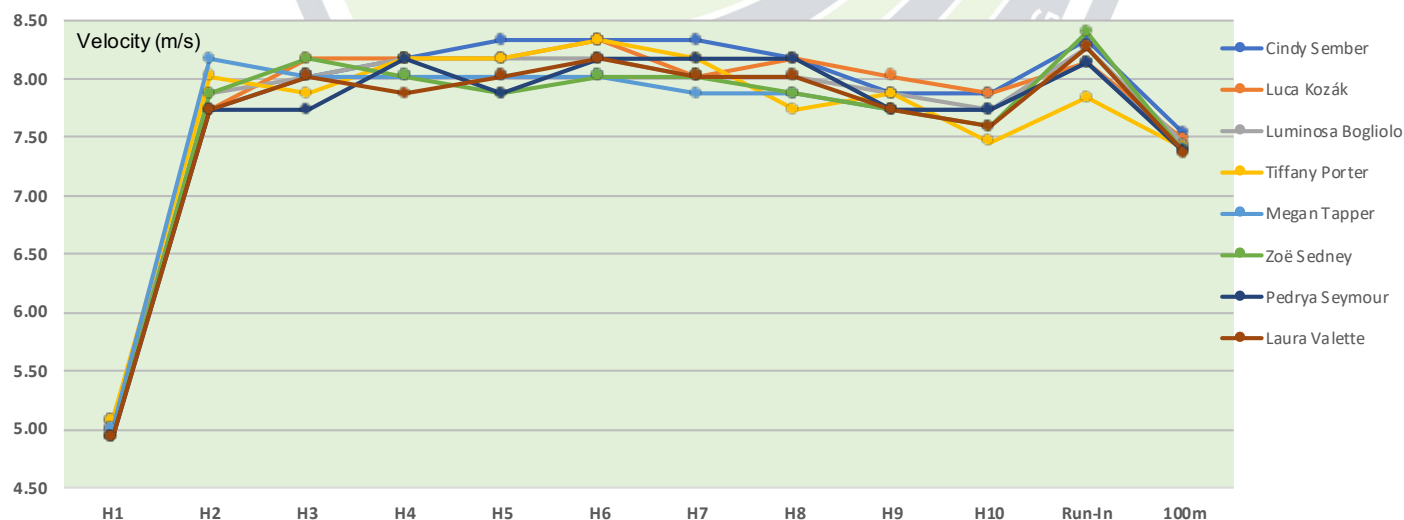
100m Hurdles

Date: 2021.05.23

Wind: -3.9 m/s

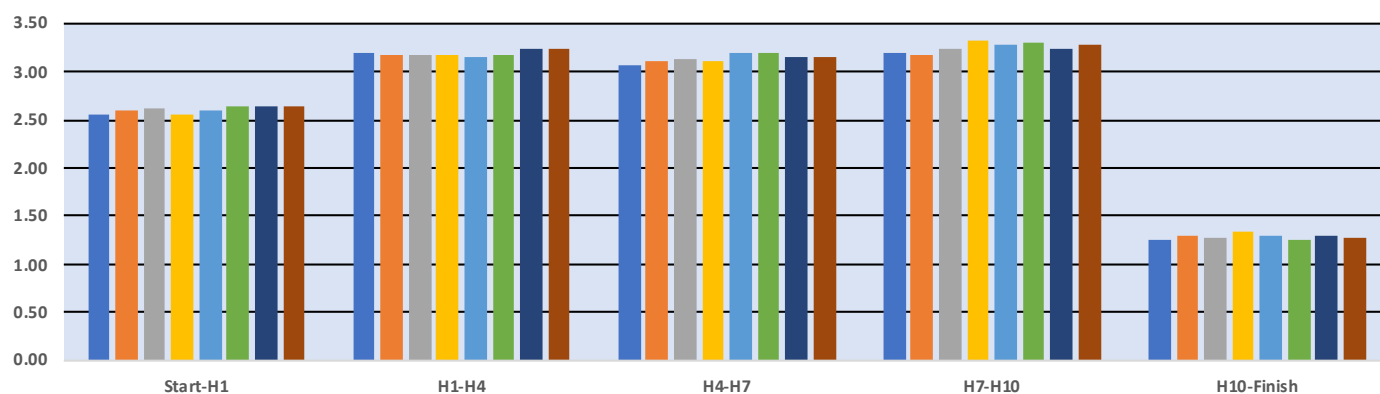
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Sember, Cindy (GBR) (1994)	time		2.56	3.66	4.72	5.76	6.78	7.80	8.82	9.86	10.94	12.02		13.28	5 / 1			
	reaction time	0.159		1.10	1.06	1.04	1.02	1.02	1.02	1.04	1.08	1.08	1.26			3.20	3.06	3.20
	interval velocity		5.08	7.73	8.02	8.17	8.33	8.33	8.33	8.17	7.87	7.87	8.33	7.53		7.97	8.33	7.97
Kozák, Luca (HUN) (1996)	time		2.60	3.70	4.74	5.78	6.82	7.84	8.90	9.94	11.00	12.08		13.37	6 / 2			
	reaction time	0.161		1.10	1.04	1.04	1.04	1.02	1.06	1.04	1.06	1.08	1.29			3.18	3.12	3.18
	interval velocity		5.00	7.73	8.17	8.17	8.17	8.33	8.02	8.17	8.02	7.87	8.14	7.48		8.02	8.17	8.02
Bogliolo, Luminosa (ITA) (1995)	time		2.62	3.70	4.76	5.80	6.84	7.88	8.94	10.00	11.08	12.18		13.45	3 / 3			
	reaction time	0.155		1.08	1.06	1.04	1.04	1.04	1.06	1.06	1.08	1.10	1.27			3.18	3.14	3.24
	interval velocity		4.96	7.87	8.02	8.17	8.17	8.17	8.02	8.02	7.87	7.73	8.27	7.43		8.02	8.12	7.87
Porter, Tiffany (GBR) (1987)	time		2.56	3.62	4.70	5.74	6.78	7.80	8.84	9.94	11.02	12.16		13.50	4 / 4			
	reaction time	0.131		1.06	1.08	1.04	1.04	1.02	1.04	1.10	1.08	1.14	1.34			3.18	3.10	3.32
	interval velocity		5.08	8.02	7.87	8.17	8.17	8.33	8.17	7.73	7.87	7.46	7.84	7.41		8.02	8.23	7.68
Tapper, Megan (JAM) (1994)	time		2.60	3.64	4.70	5.76	6.82	7.88	8.96	10.04	11.14	12.24		13.53	1 / 5			
	reaction time	0.153		1.04	1.06	1.06	1.06	1.06	1.08	1.08	1.10	1.10	1.29			3.16	3.20	3.28
	interval velocity		5.00	8.17	8.02	8.02	8.02	8.02	7.87	7.87	7.73	7.73	8.14	7.39		8.07	7.97	7.77
Sedney, Zoë (NED) (2001)	time		2.64	3.72	4.76	5.82	6.90	7.96	9.02	10.10	11.20	12.32		13.57	2 / 6			
	reaction time	0.186		1.08	1.04	1.06	1.08	1.06	1.06	1.08	1.10	1.12	1.25			3.18	3.20	3.30
	interval velocity		4.92	7.87	8.17	8.02	7.87	8.02	8.02	7.87	7.73	7.59	8.40	7.37		8.02	7.97	7.73
Seymour, Pedrya (BAH) (1995)	time		2.64	3.74	4.84	5.88	6.96	8.00	9.04	10.08	11.18	12.28		13.57	8 / 7			
	reaction time	0.191		1.10	1.10	1.04	1.08	1.04	1.04	1.04	1.10	1.10	1.29			3.24	3.16	3.24
	interval velocity		4.92	7.73	7.73	8.17	7.87	8.17	8.17	8.17	7.73	7.73	8.14	7.37		7.87	8.07	7.87
Valette, Laura (FRA) (1997)	time		2.64	3.74	4.80	5.88	6.94	7.98	9.04	10.10	11.20	12.32		13.59	7 / 8			
	reaction time	0.142		1.10	1.06	1.08	1.06	1.04	1.06	1.06	1.10	1.12	1.27			3.24	3.16	3.28
	interval velocity		4.92	7.73	8.02	7.87	8.02	8.17	8.02	8.02	7.73	7.59	8.27	7.36		7.87	8.07	7.77



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 60fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=ugk3SiZ5bjw>

Biomechanical Analysis

2021 Fanny Blankers Koen Games (Hengelo, NED) (TV Analysis)

100m Hurdles

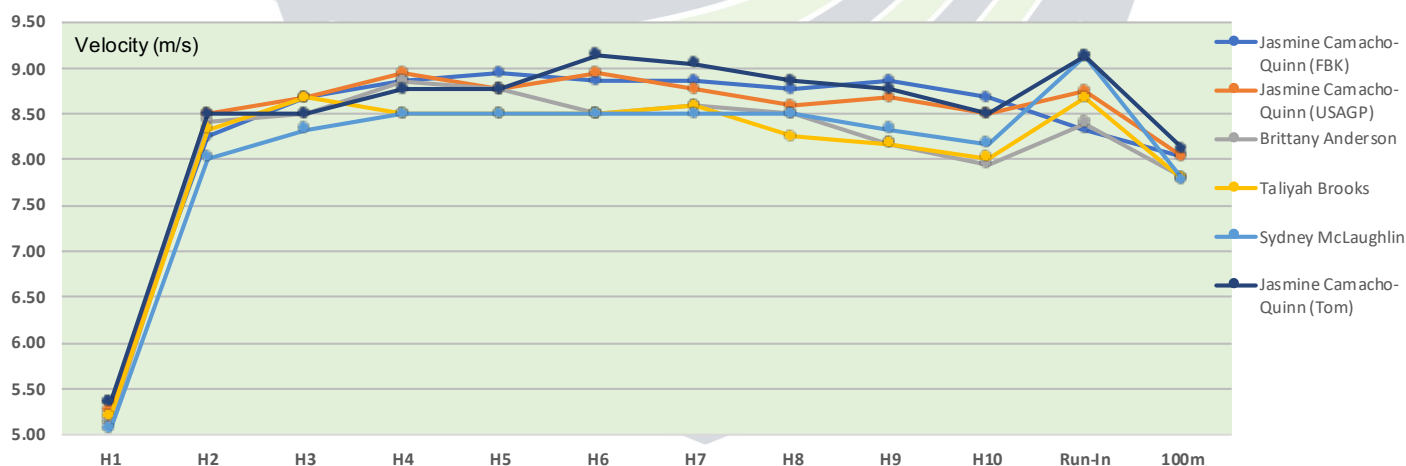
		Date: 2021.06.06		Wind: 0.5 m/s												FINAL			
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place		H1-H4	H4-H7	H7-H10	
Camacho-Quinn, Jasmine (PUR) (199)	time	2.43	3.46	4.44	5.40	6.35	7.31	8.27	9.24	10.20	11.18		12.44	5 / 1					
	reaction time																		
	interval		1.03	0.98	0.96	0.95	0.96	0.97	0.97	0.96	0.98	1.26				2.97	2.87	2.91	
	velocity	5.35	8.25	8.67	8.85	8.95	8.85	8.85	8.76	8.85	8.67	8.33	8.04			8.59	8.89	8.76	

2021 USATF Grand Prix (Eugene, OR) (TV Analysis)

		Date: 2021.04.24		Wind: -0.3 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	2.47	3.47	4.45	5.40	6.37	7.32	8.29	9.28	10.26	11.26		12.46	5 / 1					
	reaction time																		
	interval		1.00	0.98	0.95	0.97	0.95	0.97	0.99	0.98	1.00	1.20				2.93	2.89	2.97	
	velocity	5.26	8.50	8.67	8.95	8.76	8.95	8.76	8.59	8.67	8.50	8.75	8.03			8.70	8.82	8.59	
Anderson, Brittany (JAM) (2001)	time	2.53	3.54	4.54	5.50	6.47	7.47	8.46	9.46	10.50	11.57		12.82	8 / 2					
	reaction time																		
	interval		1.01	1.00	0.96	0.97	1.00	0.99	1.00	1.04	1.07	1.25				2.97	2.96	3.11	
	velocity	5.14	8.42	8.50	8.85	8.76	8.50	8.59	8.50	8.17	7.94	8.40	7.80			8.59	8.61	8.20	
Brooks, Taliyah (USA) (1995)	time	2.50	3.52	4.50	5.50	6.50	7.50	8.49	9.52	10.56	11.62		12.83	6 / 3					
	reaction time																		
	interval		7 steps 1.02	0.98	1.00	1.00	1.00	0.99	1.03	1.04	1.06	1.21				3.00	2.99	3.13	
	velocity		8.33	8.67	8.50	8.50	8.50	8.59	8.25	8.17	8.02	8.68	7.79			8.50	8.53	8.15	
McLaughlin, Sydney (USA) (1999)	time	2.57	3.63	4.65	5.65	6.65	7.65	8.65	9.65	10.67	11.71		12.86	2 / 4					
	reaction time																		
	interval		7 steps 1.06	1.02	1.00	1.00	1.00	1.00	1.00	1.02	1.04	1.15	PB			3.08	3.00	3.06	
	velocity		8.02	8.33	8.50	8.50	8.50	8.50	8.50	8.33	8.17	9.13	7.78			8.28	8.50	8.33	

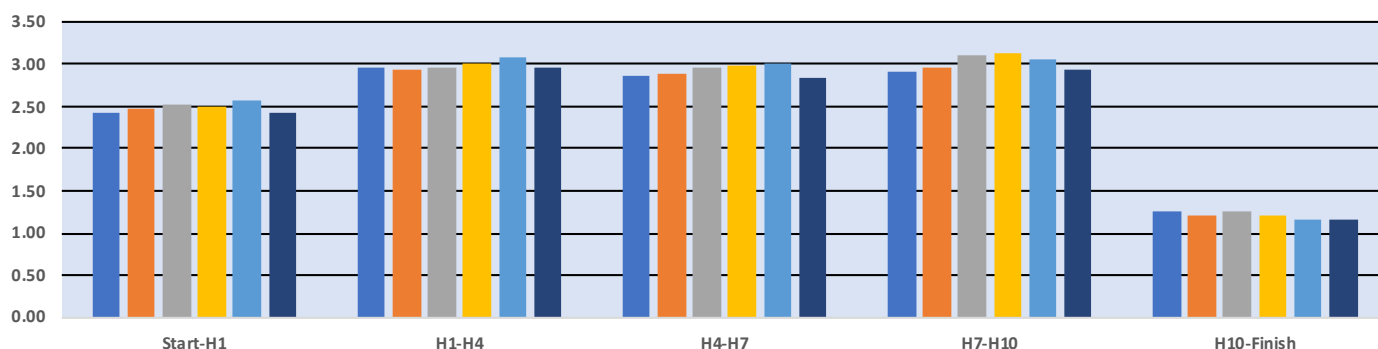
2021 Tom Jones Invitational (Gainesville, FL) (TV Analysis)

		Date: 2021.04.17		Wind: 1.7 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	2.43	3.43	4.43	5.40	6.37	7.30	8.24	9.20	10.17	11.17		12.32	6 / 1					
	reaction time																		
	interval		1.00	1.00	0.97	0.97	0.93	0.94	0.96	0.97	1.00	1.15	NR PB			2.97	2.84	2.93	
	velocity	5.35	8.50	8.50	8.76	8.76	9.14	9.04	8.85	8.76	8.50	9.13	8.12			8.59	8.98	8.70	



Time Intervals (s)

Hurdle Phases



Tom Jones Invitational

Evaluated with: ObjectusVideo
 Quality & Frame Rate: 60fps
 Timing From: Gun Flash
 Source: Coaches Video

Fanny Blankers Koen Games

Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 60fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=nM9HI2U5GWI>

USATF Grand Prix

Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 30fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=ZtemR0v6sw0>

Biomechanical Analysis

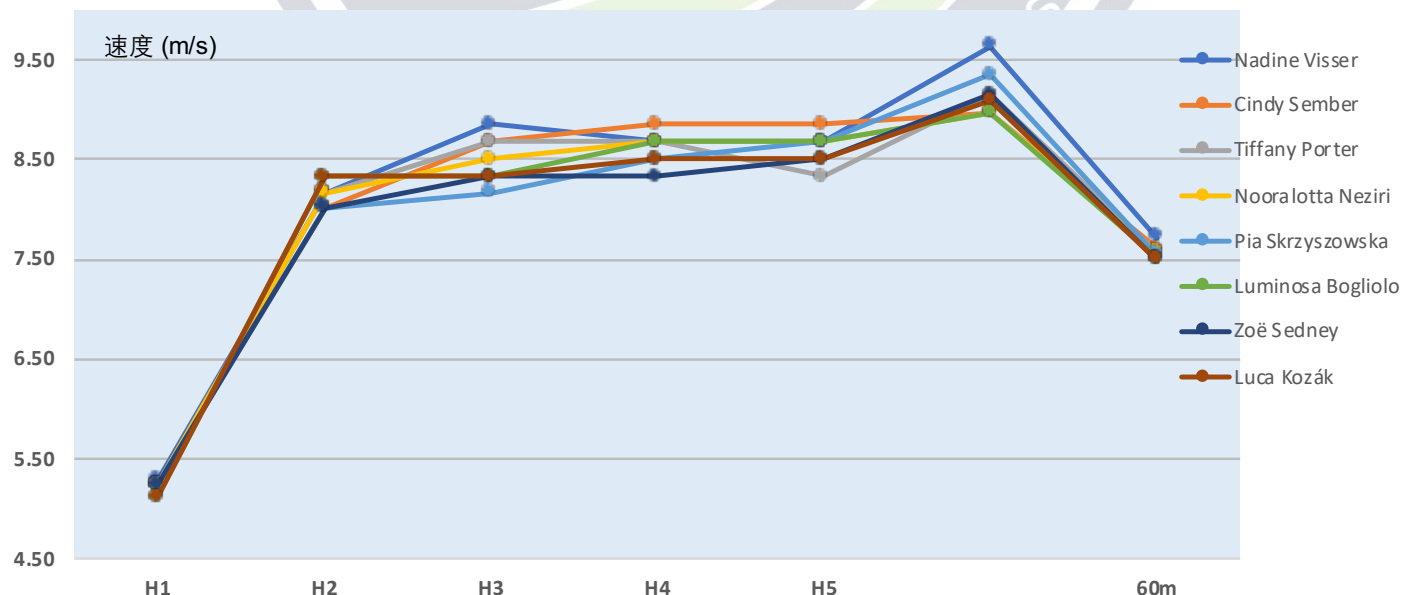
2021 European Indoor Championships (Toruń, POL) (TV Analysis)

Women's 60m Hurdles

Date: 2021.03.07

FINAL

		H1	H2	H3	H4	H5		60m	Lane / Place
Visser, Nadine (NED) (1995)	time	2.46	3.50	4.46	5.44	6.42		7.77	5 / 1
reaction time	0.135								
	interval		1.04	0.96	0.98	0.98	1.35	NR PB	
	velocity	5.28	8.17	8.85	8.67	8.67	9.63	7.72	
Sember, Cindy (GBR) (1994)	time	2.48	3.54	4.52	5.48	6.44		7.89	6 / 2
reaction time	0.165								
	interval		1.06	0.98	0.96	0.96	1.45	=PB	
	velocity	5.24	8.02	8.67	8.85	8.85	8.97	7.60	
Porter, Tiffany (GBR) (1987)	time	2.48	3.52	4.50	5.48	6.50		7.92	8 / 3
reaction time	0.156								
	interval		1.04	0.98	0.98	1.02	1.42		
	velocity	5.24	8.17	8.67	8.67	8.33	9.15	7.58	
Neziri, Nooralotta (FIN) (1992)	time	2.48	3.52	4.52	5.50	6.48		7.93	3 / 4
reaction time	0.133								
	interval		1.04	1.00	0.98	0.98	1.45		
	velocity	5.24	8.17	8.50	8.67	8.67	8.97	7.57	
Skrzyszowska, Pia (POL) (2001)	time	2.48	3.54	4.58	5.58	6.56		7.95	4 / 5
reaction time	0.147								
	interval		1.06	1.04	1.00	0.98	1.39		
	velocity	5.24	8.02	8.17	8.50	8.67	9.35	7.55	
Bogliolo, Luminosa (ITA) (1995)	time	2.54	3.56	4.58	5.56	6.54		7.99	7 / 6
reaction time	0.160								
	interval		1.02	1.02	0.98	0.98	1.45	=PB	
	velocity	5.12	8.33	8.33	8.67	8.67	8.97	7.51	
Sedney, Zoë (NED) (2001)	time	2.48	3.54	4.56	5.58	6.58		8.00	2 / 7
reaction time	0.171								
	interval		1.06	1.02	1.02	1.00	1.42		
	velocity	5.24	8.02	8.33	8.33	8.50	9.15	7.50	
Kozák, Luca (HUN) (1996)	time	2.54	3.56	4.58	5.58	6.58		8.01	1 / 8
reaction time	0.195								
	interval		1.02	1.02	1.00	1.00	1.43		
	velocity	5.12	8.33	8.33	8.50	8.50	9.09	7.49	



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=HHmyK4wdJko>

Men's 400m Hurdles

Warholm, Karsten (NOR) (1996)

2021.09.11

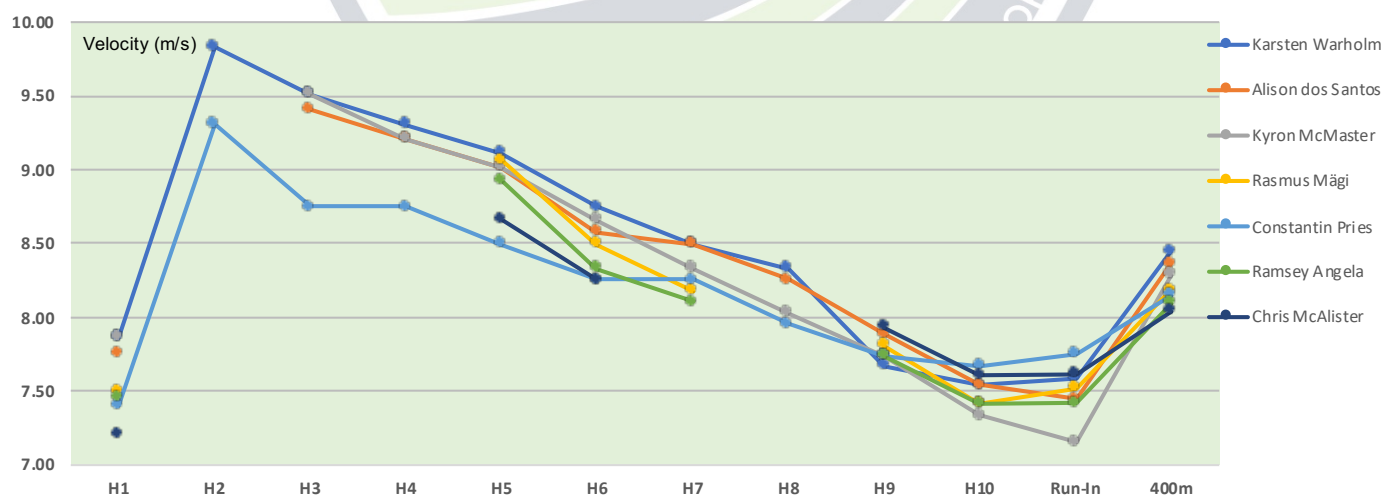
2021 Weltklasse (Zürich, SUI) (TV Analysis)

Men's 400m Hurdles

Date 2021.09.09

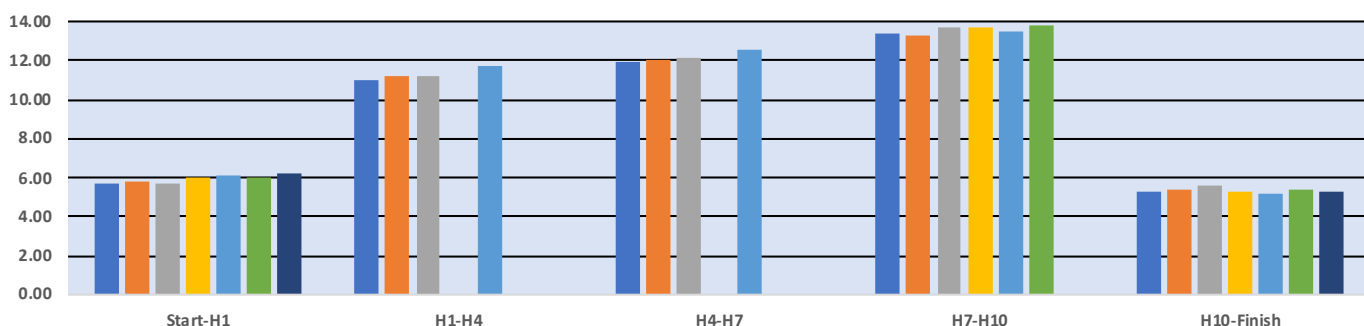
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Warholm, Karsten (NOR) (1996)	time		5.72	9.28	12.96	16.72	20.56	24.56	28.68	32.88	37.44	42.08		47.35	7 / 1			
	reaction time	0.150																
	interval			3.56	3.68	3.76	3.84	4.00	4.12	4.20	4.56	4.64	5.27			11.00	11.96	13.40
	velocity		7.87	9.83	9.51	9.31	9.11	8.75	8.50	8.33	7.68	7.54	7.59	8.45		9.55	8.78	7.84
dos Santos, Alison (BRA) (2000)	time		5.80		13.24	17.04	20.92	25.00	29.12	33.36	37.80	42.44		47.81	6 / 2			
	reaction time	0.181																
	interval				7.44	3.80	3.88	4.08	4.12	4.24	4.44	4.64	5.37			11.24	12.08	13.32
	velocity		7.76		9.41	9.02	8.58	8.50	8.25	7.88	7.54	7.45	8.37			9.34	8.69	7.88
McMaster, Kyrion (IVB) (1997)	time		5.72		13.08	16.88	20.76	24.80	29.00	33.36	37.88	42.65		48.24	5 / 3			
	reaction time	0.160																
	interval				7.36	3.80	3.88	4.04	4.20	4.36	4.52	4.77	5.59			11.16	12.12	13.65
	velocity		7.87		9.51	9.21	9.02	8.66	8.33	8.03	7.74	7.34	7.16	8.29		9.41	8.66	7.69
Mägi, Rasmus (EST) (1992)	time		6.00				21.44	25.56	29.84		38.80	43.52		48.84	3 / 4			
	reaction time	0.158																
	interval						15.44	4.12	4.28		8.96	4.72	5.32					13.68
	velocity		7.50				9.07	8.50	8.18		7.81	7.42	7.52	8.19				7.68
Preis, Constantin (GER) (1998)	time		6.08	9.84	13.84	17.84	21.96	26.20	30.44	34.84	39.36	43.92		49.08	8 / 5			
	reaction time	0.259																
	interval			3.76	4.00	4.00	4.12	4.24	4.24	4.40	4.52	4.56	5.16			11.76	12.60	13.48
	velocity		7.40	9.31	8.75	8.75	8.50	8.25	8.25	7.95	7.74	7.68	7.75	8.15		8.93	8.33	7.79
Angela, Ramsey (NED) (1999)	time		6.04				21.72	25.92	30.24		39.28	44.00		49.39	2 / 6			
	reaction time	0.167																
	interval						15.68	4.20	4.32		9.04	4.72	5.39					13.76
	velocity		7.45				8.93	8.33	8.10		7.74	7.42	7.42	8.10				7.63
McAlister, Chris (GBR) (1995)	time		6.24				22.40	26.64			39.88	44.48		49.73	1 / 7			
	reaction time	0.168																
	interval						16.16	4.24			13.24	4.60	5.25					
	velocity		7.21				8.66	8.25			7.93	7.61	7.62	8.04				
	time																	
	reaction time																	
	interval																	
	velocity																	



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

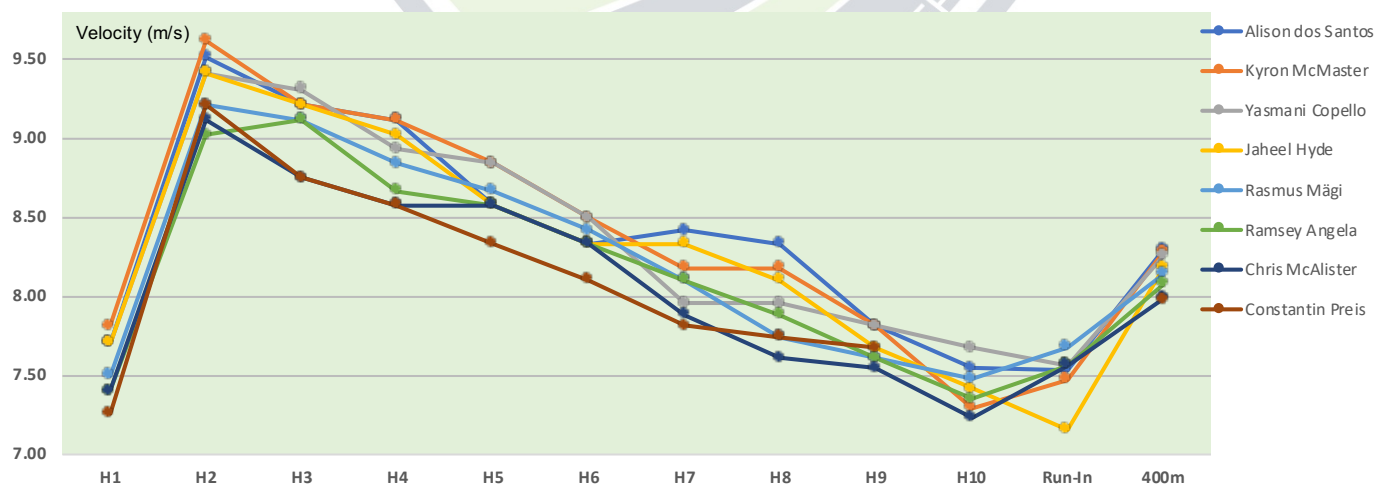
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Men's 400m Hurdles

Date 2021.09.03

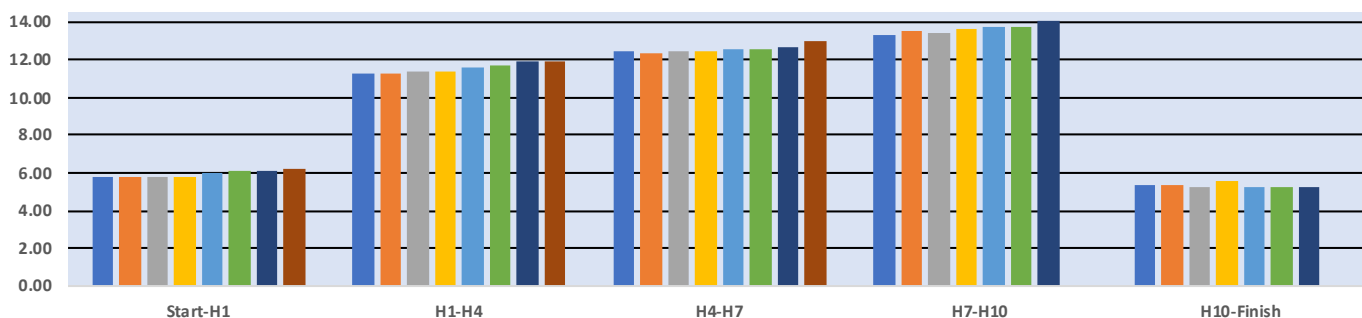
FINAL

Men 5-60m Hurdles				Date: 02-10-2023										Track		Lane / Place			H1-H4			H4-H7			H7-H10		
dos Santos, Alison (BRA) (2000)				time	5.84	9.52	13.32	17.16	21.24	25.44	29.60	33.80	38.28	42.92		48.23		6 / 1									
reaction time				0.181	interval	3.68	3.80	3.84	4.08	4.20	4.16	4.20	4.48	4.64	5.31					11.32	12.44	13.32					
					velocity	7.71	9.51	9.21	9.11	8.58	8.33	8.41	8.33	7.81	7.54	7.53	8.29			9.28	8.44	7.88					
H1 lead leg				L	strides	20	13	13	12	12	13	13	13	13	13	16.5	151.5										
McMaster, Kyrone (IVB) (1997)				time	5.76	9.40	13.20	17.04	21.00	25.12	29.40	33.68	38.16	42.96		48.31		5 / 2									
reaction time				0.176	interval	3.64	3.80	3.84	3.96	4.12	4.28	4.28	4.48	4.80	5.35					11.28	12.36	13.56					
					velocity	7.81	9.62	9.21	9.11	8.84	8.50	8.18	7.81	7.29	7.48	8.28				9.31	8.50	7.74					
H1 lead leg				R	strides	20	13	13	13	13	13	14	14	14	15	17.5	159.5										
Copello, Yasmani (TUR) (1987)				time	5.84	9.56	13.32	17.24	21.20	25.32	29.72	34.12	38.60	43.16		48.45		4 / 3									
reaction time				0.149	interval	3.72	3.76	3.92	3.96	4.12	4.40	4.40	4.48	4.56	5.29					11.40	12.48	13.44					
					velocity	7.71	9.41	9.31	8.93	8.84	8.50	7.95	7.81	7.68	7.56	8.26				9.21	8.41	7.81					
H1 lead leg				R	strides	20	13	13	13	13	13	14	14	14	14	17.7	158.7										
Hyde, Jaheel (JAM) (1997)				time	5.84	9.56	13.36	17.24	21.32	25.52	29.72	34.04	38.60	43.32		48.91		7 / 4									
reaction time				0.166	interval	3.72	3.80	3.88	4.08	4.20	4.20	4.32	4.56	4.72	5.59					11.40	12.48	13.60					
					velocity	7.71	9.41	9.21	9.02	8.58	8.33	8.33	8.10	7.68	7.42	7.16	8.18			9.21	8.41	7.72					
H1 lead leg				L	strides	22	13	13	13	13	14	14	14	15	15	18	164										
Mägi, Rasmus (EST) (1992)				time	6.00	9.80	13.64	17.60	21.64	25.80	30.12	34.64	39.24	43.92		49.13		3 / 5									
reaction time				0.178	interval	3.80	3.84	3.96	4.04	4.16	4.32	4.52	4.60	4.68	5.21					11.60	12.52	13.80					
					velocity	7.50	9.21	9.11	8.84	8.66	8.41	8.10	7.74	7.61	7.48	7.68	8.14			9.05	8.39	7.61					
H1 lead leg				R	strides	20	13	13	13	13	13	14	14	14	14	17	158										
Angela, Ramsey (NED) (1999)				time	6.08	9.96	13.80	17.84	21.92	26.12	30.44	34.88	39.48	44.24		49.53		2 / 6									
reaction time				0.197	interval	3.88	3.84	4.04	4.08	4.20	4.32	4.44	4.60	4.76	5.29					11.76	12.60	13.80					
					velocity	7.40	9.02	9.11	8.66	8.58	8.33	8.10	7.88	7.61	7.35	7.56	8.08			8.93	8.33	7.61					
H1 lead leg				R	strides	22	14	14	14	14	15	15	15	15	15	18	171										
McAlister, Chris (GBR) (1995)				time	6.08	9.92	13.92	18.00	22.08	26.28	30.72	35.32	39.96	44.80		50.09		1 / 7									
reaction time				0.144	interval	3.84	4.00	4.08	4.08	4.20	4.44	4.60	4.64	4.84	5.29					11.92	12.72	14.08					
					velocity	7.40	9.11	8.75	8.58	8.58	8.33	7.88	7.61	7.54	7.23	7.56	7.99			8.81	8.25	7.46					
H1 lead leg				R	strides	22	14	14	14	14	14	15	15	15	15	137											
Preis, Constantin (GER) (1998)				time	6.20	10.00	14.00	18.08	22.28	26.60	31.08	35.60	40.16		50.12		8 / 8										
reaction time				0.303	interval	3.80	4.00	4.08	4.20	4.32	4.48	4.52	4.56							11.88	13.00						
					velocity	7.26	9.21	8.75	8.58	8.33	8.10	7.81	7.74	7.68					7.98	8.84	8.08						
H1 lead leg				L	strides	21	13	14	14	14	15	15	15	15					136								



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=9w3lku7JrNo>

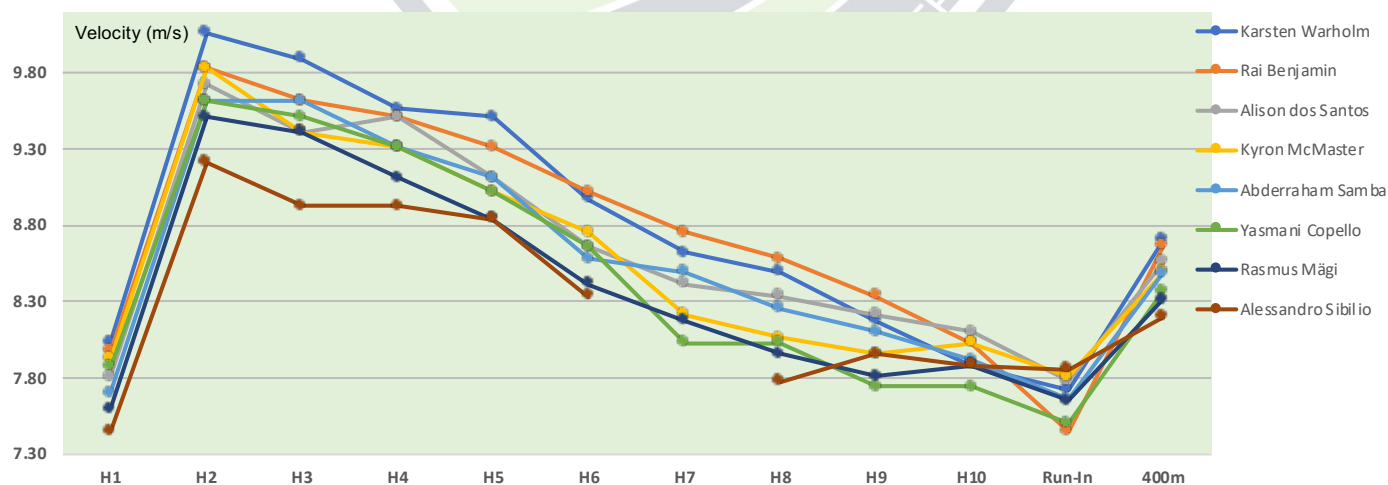
2020 Olympic Games (Tokyo, JPN) (TV Analysis)

Men's 400m Hurdles

Date 2021.08.03

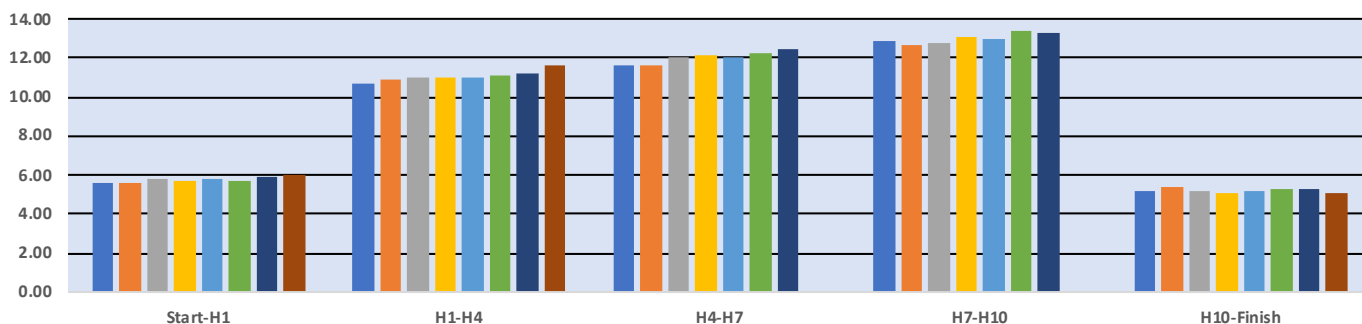
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Warholm, Karsten (NOR) (1996)	time		5.60	9.08	12.62	16.28	19.96	23.86	27.92	32.04	36.32	40.76		45.94	6 / 1			
	reaction time	0.145																
	interval			3.48	3.54	3.66	3.68	3.90	4.06	4.12	4.28	4.44	5.18	WR		10.68	11.64	12.84
	velocity		8.04	10.06	9.89	9.56	9.51	8.97	8.62	8.50	8.18	7.88	7.72	8.71		9.83	9.02	8.18
Benjamin, Rai (USA) (1997)	time		5.64	9.20	12.84	16.52	20.28	24.16	28.16	32.24	36.44	40.80		46.17	5 / 2			
	reaction time	0.168																
	interval			3.56	3.64	3.68	3.76	3.88	4.00	4.08	4.20	4.36	5.37	AR		10.88	11.64	12.64
	velocity		7.98	9.83	9.62	9.51	9.31	9.02	8.75	8.58	8.33	8.03	7.45	8.66		9.65	9.02	8.31
dos Santos, Alison (BRA) (2000)	time		5.76	9.36	13.08	16.76	20.60	24.64	28.80	33.00	37.26	41.58		46.72	7 / 3			
	reaction time	0.156																
	interval			3.60	3.72	3.68	3.84	4.04	4.16	4.20	4.26	4.32	5.14	AR		11.00	12.04	12.78
	velocity		7.81	9.72	9.41	9.51	9.11	8.66	8.41	8.33	8.22	8.10	7.78	8.56		9.55	8.72	8.22
McMaster, Kyron (IVB) (1997)	time		5.68	9.24	12.96	16.72	20.60	24.60	28.86	33.20	37.60	41.96		47.08	4 / 4			
	reaction time	0.157																
	interval			3.56	3.72	3.76	3.88	4.00	4.26	4.34	4.40	4.36	5.12	NR PB		11.04	12.14	13.10
	velocity		7.92	9.83	9.41	9.31	9.02	8.75	8.22	8.06	7.95	8.03	7.81	8.50		9.51	8.65	8.02
Samba, Abderrahman (QAT) (1995)	time		5.84	9.48	13.12	16.88	20.72	24.80	28.92	33.16	37.48	41.90		47.12	8 / 5			
	reaction time	0.186																
	interval			3.64	3.64	3.76	3.88	4.04	4.12	4.24	4.32	4.42	5.22			11.04	12.04	12.98
	velocity		7.71	9.62	9.62	9.31	9.11	8.58	8.50	8.25	8.10	7.92	7.66	8.49		9.51	8.72	8.09
Copello, Yasmani (TUR) (1987)	time		5.72	9.36	13.04	16.80	20.68	24.72	29.08	33.44	37.96	42.48		47.81	3 / 6			
	reaction time	0.166																
	interval			3.64	3.68	3.76	3.88	4.04	4.36	4.36	4.52	4.52	5.33	NR = PB		11.08	12.28	13.40
	velocity		7.87	9.62	9.51	9.31	9.02	8.66	8.03	8.03	7.74	7.74	7.50	8.37		9.48	8.55	7.84
Mägi, Rasmus (EST) (1992)	time		5.92	9.60	13.32	17.16	21.12	25.28	29.56	33.96	38.44	42.88		48.11	9 / 7			
	reaction time	0.167																
	interval			3.68	3.72	3.84	3.96	4.16	4.28	4.40	4.48	4.44	5.23	NR PB		11.24	12.40	13.32
	velocity		7.60	9.51	9.41	9.11	8.84	8.41	8.18	7.95	7.81	7.88	7.65	8.31		9.34	8.47	7.88
Sibilio, Alessandro (ITA) (1999)	time		6.04	9.84	13.76	17.68	21.64	25.84		34.84	39.24	43.68		48.77	2 / 8			
	reaction time	0.144																
	interval			3.80	3.92	3.92	3.96	4.20		9.00	4.40	4.44	5.09			11.64		
	velocity		7.45	9.21	8.93	8.93	8.84	8.33		7.78	7.95	7.88	7.86	8.20		9.02		
	H1 lead leg	R	21	13	13	13	13	13	14		15	15		130				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

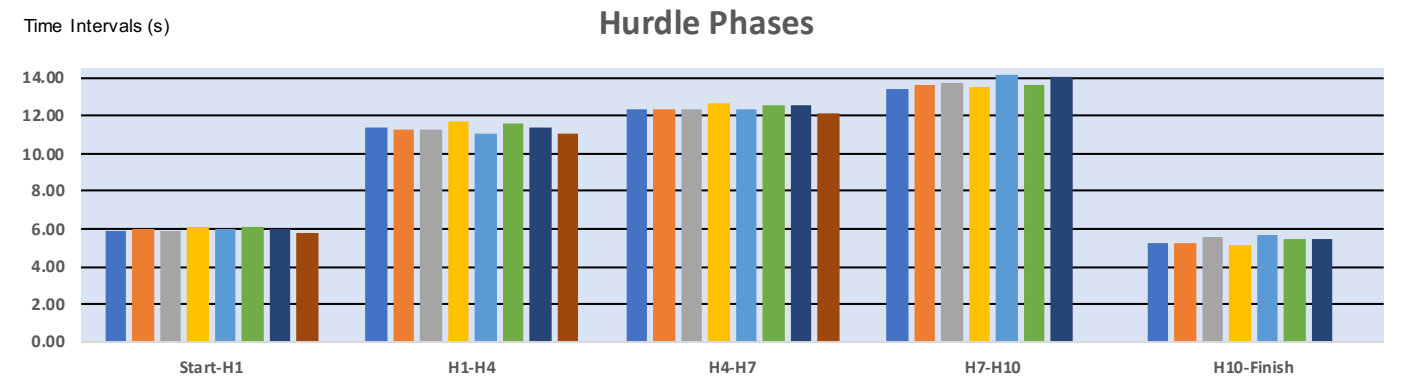
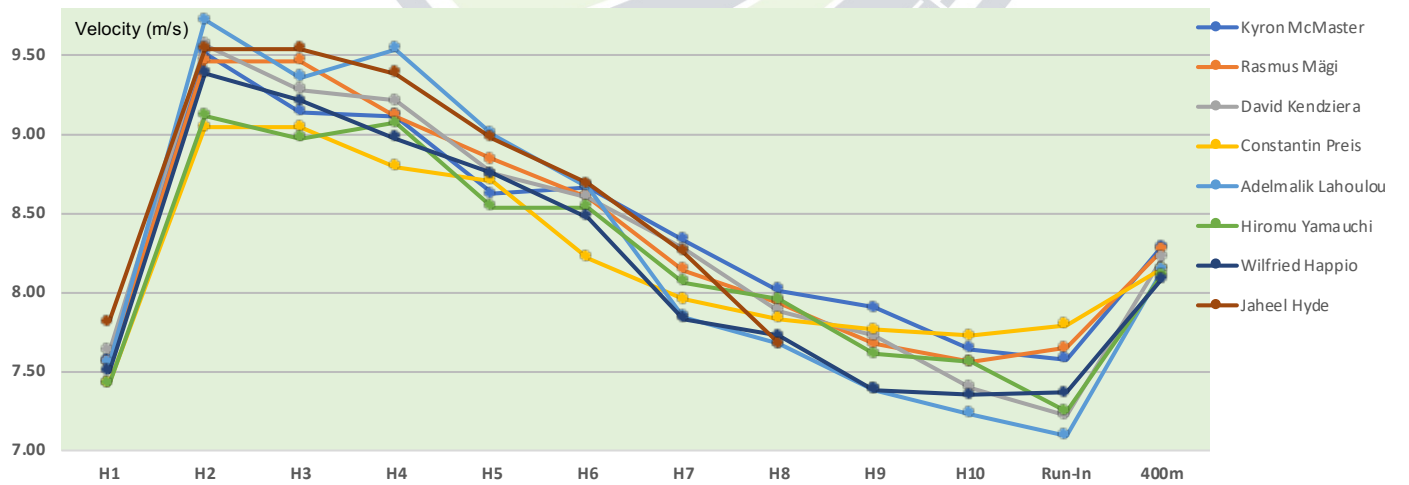
Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

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

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

Men's 400m Hurdles															Date 2021.08.01		Semi-Final 3				
			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		5.95	9.63	13.46	17.30	21.36	25.40	29.60	33.97	38.40	42.98		48.26	7 / 1						
	reaction time	0.179	interval		3.68	3.83	3.84	4.06	4.04	4.20	4.37	4.43	4.58	5.28			11.35	12.30	13.38		
	H1 lead leg	L	velocity	7.56	9.51	9.14	9.11	8.62	8.66	8.33	8.01	7.90	7.64	7.58		8.29	9.25	8.54	7.85		
			21	13	13	13	13	13	13	14	14	14	14	17	159						
Mägi, Rasmus (EST) (1992)	time		5.96	9.66	13.36	17.20	21.16	25.23	29.53	33.94	38.50	43.13		48.36	6 / 2						
	reaction time	0.156	interval		3.70	3.70	3.84	3.96	4.07	4.30	4.41	4.56	4.63	5.23		NR PB		11.24	12.33	13.60	
	H1 lead leg	R	velocity	7.55	9.46	9.46	9.11	8.84	8.60	8.14	7.94	7.68	7.56	7.65		8.27	9.34	8.52	7.72		
			20	13	13	13	13	13	13	14	14	14	14	17	157						
Kendziera, David (USA) (1994)	time		5.90	9.56	13.33	17.13	21.13	25.20	29.43	33.87	38.40	43.13		48.67	9 / 3						
	reaction time	0.190	interval		3.66	3.77	3.80	4.00	4.07	4.23	4.44	4.53	4.73	5.54			11.23	12.30	13.70		
	H1 lead leg	R	velocity	7.63	9.56	9.28	9.21	8.75	8.60	8.27	7.88	7.73	7.40	7.22		8.22	9.35	8.54	7.66		
			20	13	13	13	13	13	13	14	14	15	15	18.2	159.2						
Preis, Constantin (GER) (1998)	time		6.06	9.93	13.80	17.78	21.80	26.06	30.46	34.93	39.44	43.97		49.10	2 / 4						
	reaction time	0.186	interval		3.87	3.87	3.98	4.02	4.26	4.40	4.47	4.51	4.53	5.13			11.72	12.68	13.51		
	H1 lead leg	L	velocity	7.43	9.04	9.04	8.79	8.71	8.22	7.95	7.83	7.76	7.73	7.80		8.15	8.96	8.28	7.77		
			22	14	14	14	14	15	15	15	15	15	15	18.2	171.2						
Lahoulou, Adelmalik (ALG) (1992)	time		5.96	9.56	13.30	16.97	20.86	24.90	29.36	33.92	38.66	43.50		49.14	5 / 5						
	reaction time	0.125	interval		3.60	3.74	3.67	3.89	4.04	4.46	4.56	4.74	4.84	5.64			11.01	12.39	14.14		
	H1 lead leg	L	velocity	7.55	9.72	9.36	9.54	9.00	8.66	7.85	7.68	7.38	7.23	7.09		8.14	9.54	8.47	7.43		
			22	13	13	13	13	13	14	14	15	15	15	17.7	162.7						
Yamauchi, Hiromu (JPN) (1999)	time		6.06	9.90	13.80	17.66	21.76	25.86	30.20	34.60	39.20	43.83		49.35	8 / 6						
	reaction time	0.192	interval		3.84	3.90	3.86	4.10	4.10	4.34	4.40	4.60	4.63	5.52			11.60	12.54	13.63		
	H1 lead leg	L	velocity	7.43	9.11	8.97	9.07	8.54	8.54	8.06	7.95	7.61	7.56	7.25		8.11	9.05	8.37	7.70		
			21	14	14	14	14	14	14	15	15	15	15	19	169						
Happio, Wilfried (FRA) (1998)	time		6.00	9.73	13.53	17.43	21.43	25.56	30.03	34.56	39.30	44.06		49.49	3 / 7						
	reaction time	0.130	interval		3.73	3.80	3.90	4.00	4.13	4.47	4.53	4.74	4.76	5.43			11.43	12.60	14.03		
	H1 lead leg	L	velocity	7.50	9.38	9.21	8.97	8.75	8.47	7.83	7.73	7.38	7.35	7.37		8.08	9.19	8.33	7.48		
			20	13	13	13	13	13	14	14	15	15	15	18	161						
Hyde, Jaheel (JAM) (1997)	time		5.76	9.43	13.10	16.83	20.73	24.76	29.00	33.56				87.38	4 / 8						
	reaction time	0.159	interval		3.67	3.67	3.73	3.90	4.03	4.24	4.56						11.07	12.17			
	H1 lead leg	L	velocity	7.81	9.54	9.54	9.38	8.97	8.68	8.25	7.68			4.58			9.49	8.63			
			22	13	13	13	13	14	14	15				117							



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-9-evening-session-athletics-tokyo-2020-replays>

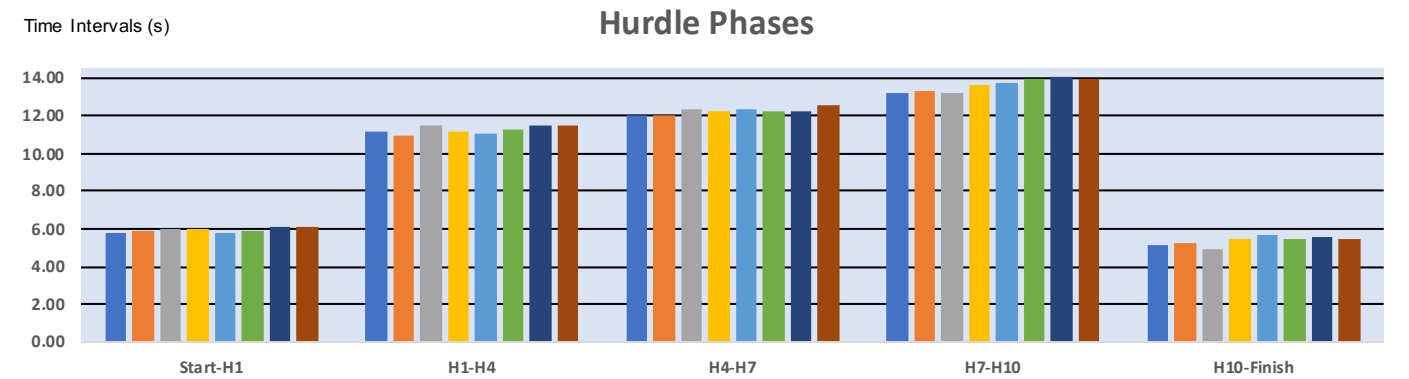
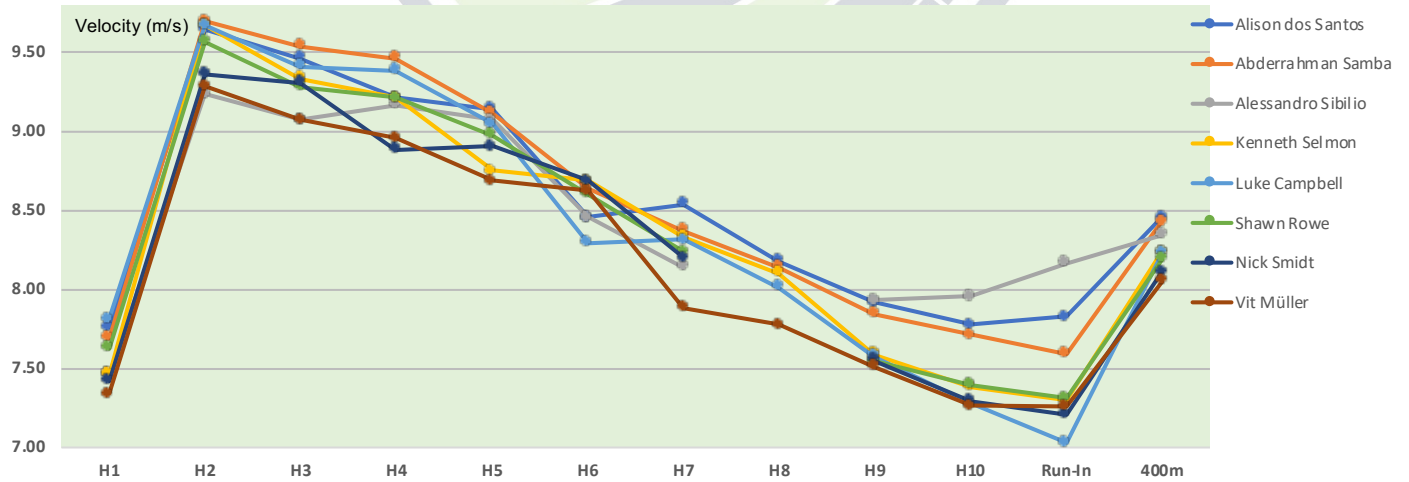
2020 Olympic Games (Tokyo, JPN) (TV Analysis)

Men's 400m Hurdles

Date 2021.08.01

Semi-Final 2

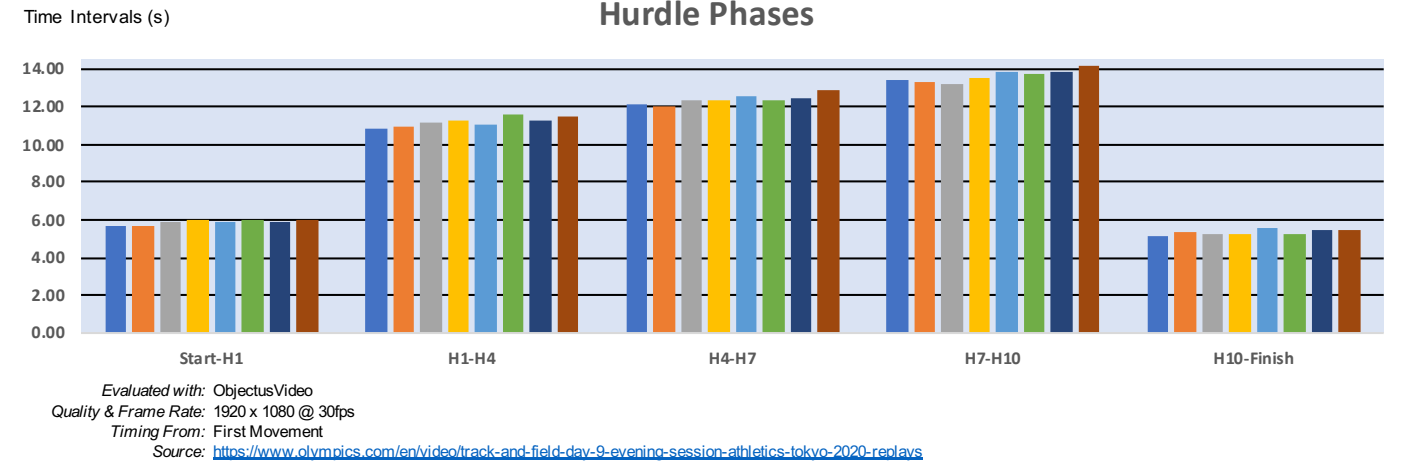
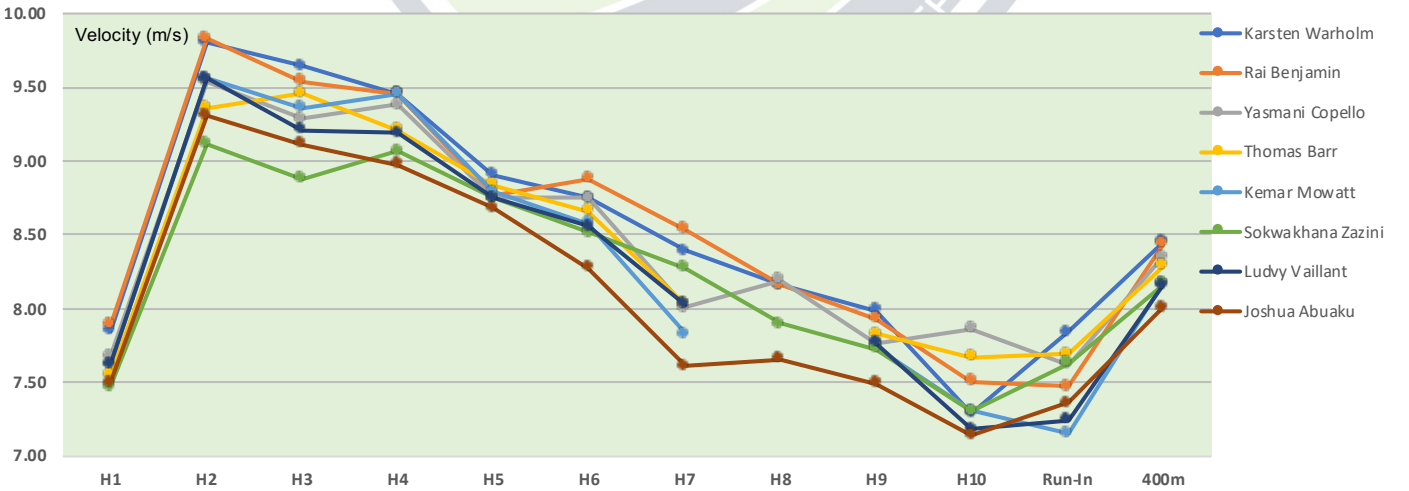
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
dos Santos, Alison (BRA) (2000)	time		5.80	9.43	13.13	16.93	20.76	24.90	29.00	33.28	37.70	42.20		47.31	7 / 1			
	reaction time	0.171																
	interval			3.63	3.70	3.80	3.83	4.14	4.10	4.28	4.42	4.50	5.11	AR PB		11.13	12.07	13.20
	velocity		7.76	9.64	9.46	9.21	9.14	8.45	8.54	8.18	7.92	7.78	7.83	8.45		9.43	8.70	7.95
Samba, Abderrahman (QAT) (1995)	time		5.85	9.46	13.13	16.83	20.67	24.72	28.90	33.20	37.66	42.20		47.47	5 / 2			
	reaction time	0.188																
	interval			3.61	3.67	3.70	3.84	4.05	4.18	4.30	4.46	4.54	5.27			10.98	12.07	13.30
	velocity		7.69	9.70	9.54	9.46	9.11	8.64	8.37	8.14	7.85	7.71	7.59	8.43		9.56	8.70	7.89
Sibilio, Alessandro (ITA) (1999)	time		6.03	9.82	13.68	17.50	21.36	25.50	29.80		38.63	43.03		47.93	4 / 3			
	reaction time	0.123																
	interval			3.79	3.86	3.82	3.86	4.14	4.30		8.83	4.40	4.90	PB		11.47	12.30	13.23
	velocity		7.46	9.23	9.07	9.16	9.07	8.45	8.14		7.93	7.95	8.16	8.35		9.15	8.54	7.94
Selmon, Kenneth (USA) (1996)	time		6.03	9.65	13.40	17.20	21.20	25.23	29.43	33.75	38.36	43.10		48.58	6 / 4			
	reaction time	0.255																
	interval			3.62	3.75	3.80	4.00	4.03	4.20	4.32	4.61	4.74	5.48			11.17	12.23	13.67
	velocity		7.46	9.67	9.33	9.21	8.75	8.68	8.33	8.10	7.59	7.38	7.30	8.23		9.40	8.59	7.68
Campbell, Luke (GER) (1994)	time		5.76	9.38	13.10	16.83	20.70	24.92	29.13	33.50	38.12	42.93		48.62	8 / 5			
	reaction time	0.153																
	interval			3.62	3.72	3.80	3.87	4.22	4.21	4.37	4.62	4.81	5.69	PB		11.07	12.30	13.80
	velocity		7.81	9.67	9.41	9.38	9.04	8.29	8.31	8.01	7.58	7.28	7.03	8.23		9.49	8.54	7.61
Rowe, Shawn (JAM) (1992)	time		5.90	9.56	13.33	17.13	21.03	25.10	29.35		38.63	43.36		48.83	9 / 6			
	reaction time	0.204																
	interval			3.66	3.77	3.80	3.90	4.07	4.25		9.28	4.73	5.47	PB		11.23	12.22	14.01
	velocity		7.63	9.56	9.28	9.21	8.97	8.60	8.24		7.54	7.40	7.31	8.19		9.35	8.59	7.49
Smidt, Nick (NED) (1997)	time		6.06	9.80	13.56	17.50	21.43	25.46	29.73		39.00	43.80		49.35	2 / 7			
	reaction time	0.164																
	interval			3.74	3.76	3.94	3.93	4.03	4.27		9.27	4.80	5.55			11.44	12.23	14.07
	velocity		7.43	9.36	9.31	8.88	8.91	8.68	8.20		7.55	7.29	7.21	8.11		9.18	8.59	7.46
Müller, Vit (CZE) (1996)	time		6.13	9.90	13.76	17.67	21.70	25.76	30.20	34.70	39.36	44.18		49.69	3 / 8			
	reaction time	0.145																
	interval			3.77	3.86	3.91	4.03	4.06	4.44	4.50	4.66	4.82	5.51			11.54	12.53	13.98
	velocity		7.34	9.28	9.07	8.95	8.68	8.62	7.88	7.78	7.51	7.26	7.26	8.05		9.10	8.38	7.51



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-9-evening-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

Men's 400m Hurdles															Semi-Final 1				
Date 2021.08.01																			
			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		5.73	9.30	12.93	16.63	20.56	24.56	28.73	33.02	37.40	42.20		47.30	7 / 1				
	reaction time	0.156	interval		3.57	3.63	3.70	3.93	4.00	4.17	4.29	4.38	4.80	5.10			10.90	12.10	13.47
			velocity	7.85	9.80	9.64	9.46	8.91	8.75	8.39	8.16	7.99	7.29	7.84		8.46	9.63	8.68	7.80
	H1 lead leg	L	strides	20	13	13	13	13	13	13	13	13	15	17.5		156.5			
Benjamin, Rai (USA) (1997)	time		5.70	9.26	12.93	16.63	20.62	24.56	28.66	32.95	37.36	42.02		47.37	5 / 2				
	reaction time	0.184	interval		3.56	3.67	3.70	3.99	3.94	4.10	4.29	4.41	4.66	5.35			10.93	12.03	13.36
			velocity	7.89	9.83	9.54	9.46	8.77	8.88	8.54	8.16	7.94	7.51	7.48		8.44	9.61	8.73	7.86
	H1 lead leg	R	strides	20	13	13	13	13	13	13	13	13	13	16.7		153.7			
Copello, Yasmani (TUR) (1987)	time		5.86	9.53	13.30	17.03	21.03	25.03	29.40	33.67	38.18	42.63		47.88	4 / 3				
	reaction time	0.183	interval		3.67	3.77	3.73	4.00	4.00	4.37	4.27	4.51	4.45	5.25			11.17	12.37	13.23
			velocity	7.68	9.54	9.28	9.38	8.75	8.75	8.01	8.20	7.76	7.87	7.62		8.35	9.40	8.49	7.94
	H1 lead leg	R	strides	20	13	13	13	13	13	14	14	14	14	17.2		158.2			
Barr, Thomas (IRL) (1992)	time		5.96	9.70	13.40	17.20	21.16	25.20	29.56		38.50	43.06		48.26	6 / 4				
	reaction time	0.151	interval		3.74	3.70	3.80	3.96	4.04	4.36		8.94	4.56	5.20			11.24	12.36	13.50
			velocity	7.55	9.36	9.46	9.21	8.84	8.66	8.03		7.83	7.68	7.69		8.29	9.34	8.50	7.78
	H1 lead leg	L	strides	20	13	13	13	13	13	14	14	14	14	18		159			
Mowatt, Kemar (JAM) (1995)	time		5.90	9.56	13.30	17.00	20.98	25.06	29.53		38.57	43.36		48.95	9 / 5				
	reaction time	0.166	interval		3.66	3.74	3.70	3.98	4.08	4.47		9.04	4.79	5.59			11.10	12.53	13.83
			velocity	7.63	9.56	9.36	9.46	8.79	8.58	7.83		7.74	7.31	7.16		8.17	9.46	8.38	7.59
	H1 lead leg	L	strides	21	13	13	13	13	13	14			15	18		133			
Zazini, Sokwakhana (RSA) (2000)	time		6.02	9.86	13.80	17.66	21.66	25.77	30.00	34.43	38.96	43.75		48.99	8 / 6				
	reaction time	0.150	interval		3.84	3.94	3.86	4.00	4.11	4.23	4.43	4.53	4.79	5.24			11.64	12.34	13.75
			velocity	7.48	9.11	8.88	9.07	8.75	8.52	8.27	7.90	7.73	7.31	7.63		8.16	9.02	8.51	7.64
	H1 lead leg	L	strides	22	15	15	15	15	15	15		16	16	20		164			
Vaillant, Ludvy (FRA) (1995)	time		5.90	9.56	13.36	17.17	21.17	25.26	29.62		38.63	43.50		49.02	3 / 7				
	reaction time	0.162	interval		3.66	3.80	3.81	4.00	4.09	4.36		9.01	4.87	5.52			11.27	12.45	13.88
			velocity	7.63	9.56	9.21	9.19	8.75	8.56	8.03		7.77	7.19	7.25		8.16	9.32	8.43	7.56
	H1 lead leg	R	strides	21	13	13	13	13	13	14		14	14	17.7		145.7			
Abuaku, Joshua (GER) (1996)	time		6.00	9.76	13.60	17.50	21.53	25.76	30.36	34.93	39.60	44.50		49.93	2 / 8				
	reaction time	0.179	interval		3.76	3.84	3.90	4.03	4.23	4.60	4.57	4.67	4.90	5.43			11.50	12.86	14.14
			velocity	7.50	9.31	9.11	8.97	8.68	8.27	7.61	7.66	7.49	7.14	7.37		8.01	9.13	8.16	7.43
	H1 lead leg	L	strides	20	13	13	13	13	13	14	14	15	15			143			



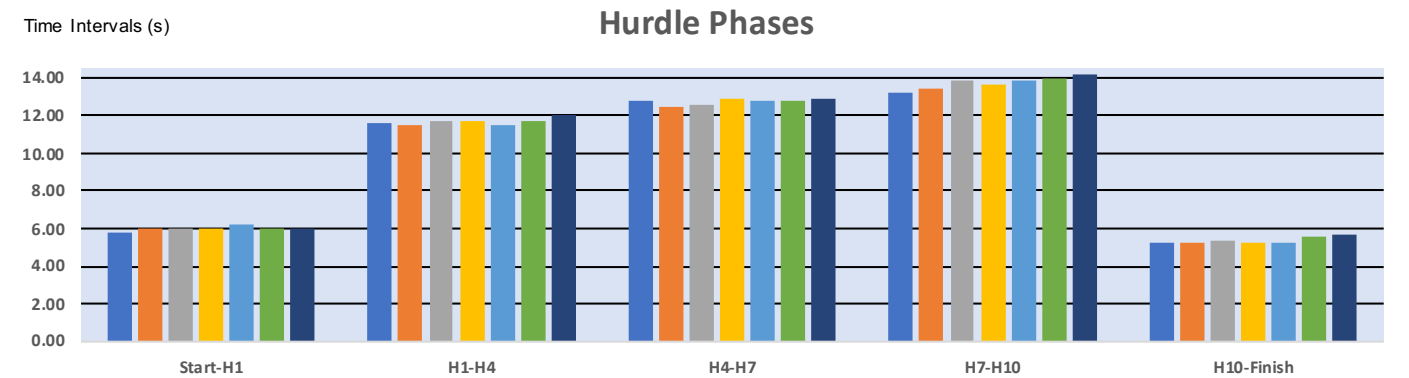
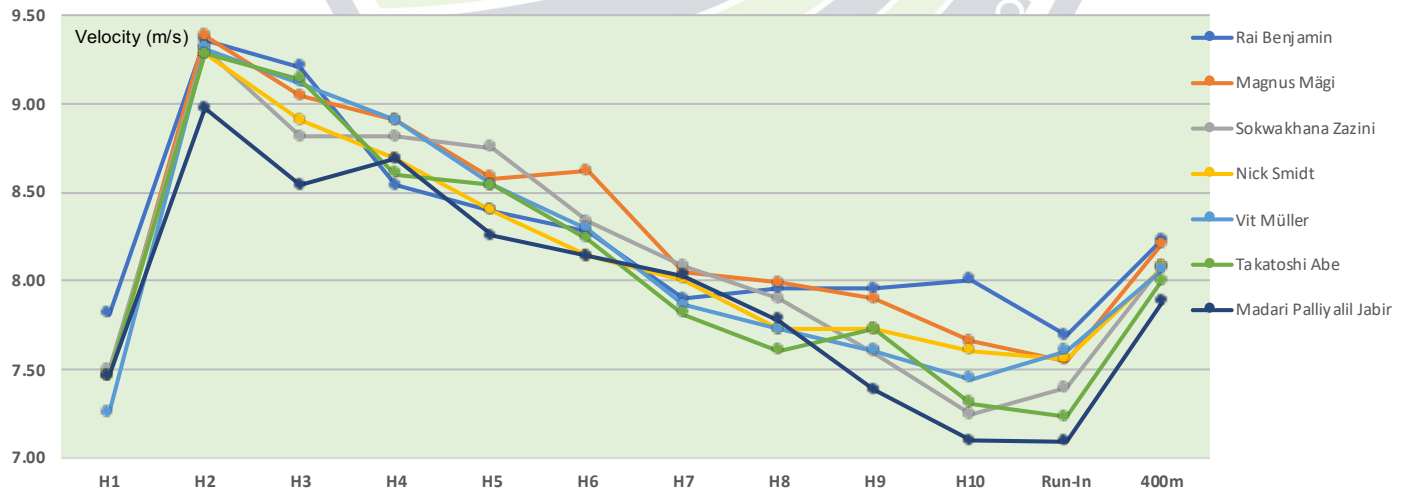
2020 Olympic Games (Tokyo, JPN) (TV Analysis)

Men's 400m Hurdles

Date 2021.07.30

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)	0.209	time		5.76	9.50	13.30	17.40	21.57	25.80	30.23	34.63	39.03	43.40		48.60	6 / 1	11.64	12.83	13.17
		interval		3.74	3.80	4.10	4.17	4.23	4.43	4.40	4.37	5.20							
	velocity		7.81	9.36	9.21	8.54	8.39	8.27	7.90	7.95	7.95	8.01	7.69	8.23	9.02	8.18	7.97		
	H1 lead leg	R	strides		20	13	13	13	13	13	13	13	13	16	153				
Mägi, Rasmus (EST) (1992)	0.160	time		6.03	9.76	13.63	17.56	21.64	25.70	30.05	34.43	38.86	43.43		48.73	4 / 2	11.53	12.49	13.38
		interval		3.73	3.87	3.93	4.08	4.06	4.35	4.38	4.43	4.57	5.30						
	velocity		7.46	9.38	9.04	8.91	8.58	8.62	8.05	7.99	7.90	7.66	7.55	8.21	9.11	8.41	7.85		
	H1 lead leg	R	strides		20	13	13	13	13	13	13	14	14	14	17	157			
Zazini, Sokwakhana (RSA) (2000)	0.147	time		6.00	9.76	13.73	17.70	21.70	25.90	30.23	34.66	39.27	44.10		49.51	2 / 3	11.70	12.53	13.87
		interval		3.76	3.97	3.97	4.00	4.20	4.33	4.43	4.61	4.83	5.41	5.41	7.39				
	velocity		7.50	9.31	8.82	8.82	8.75	8.33	8.08	7.90	7.59	7.25	7.39	8.08	8.97	8.38	7.57		
	H1 lead leg	L	strides		23	15	15	15	15	15	15	15	16	16	20	180			
Smidt, Nick (NED) (1997)	0.181	time		6.03	9.80	13.73	17.76	21.93	26.23	30.60	35.13	39.66	44.26		49.55	7 / 4	11.73	12.84	13.66
		interval		3.77	3.93	4.03	4.17	4.30	4.37	4.53	4.53	4.60	5.29	5.29	8.07				
	velocity		7.46	9.28	8.91	8.68	8.39	8.14	8.01	7.73	7.73	7.61	7.56	8.07	8.95	8.18	7.69		
	H1 lead leg	L	strides		20	13	13	13	13	13	13	14	14	14	17.5	157.5			
Müller, Vit (CZE) (1996)	0.143	time		6.20	9.96	13.80	17.73	21.83	26.05	30.50	35.03	39.63	44.33		49.59	3 / 5	11.53	12.77	13.83
		interval		3.76	3.84	3.93	4.10	4.22	4.45	4.53	4.60	4.70	5.26	5.26	8.07				
	velocity		7.26	9.31	9.11	8.91	8.54	8.29	7.87	7.73	7.61	7.45	7.60	8.07	9.11	8.22	7.59		
	H1 lead leg	L	strides		21	13	13	13	13	13	14	14	15	15	18	162			
Abe, Takatoshi (JPN) (1991)	0.166	time		6.03	9.80	13.63	17.70	21.80	26.05	30.53	35.13	39.66	44.45		49.98	8 / 6	11.67	12.83	13.92
		interval		3.77	3.83	4.07	4.10	4.25	4.48	4.60	4.53	4.79	5.53	5.53	8.00				
	velocity		7.46	9.28	9.14	8.60	8.54	8.24	7.81	7.61	7.73	7.31	7.23	8.00	9.00	8.18	7.54		
	H1 lead leg	R	strides		21	13	13	13	13	13	14	14	15	15	17.7	161.7			
Jabir, Madari Palliyalil (IND) (1996)	0.167	time		6.03	9.93	14.03	18.06	22.30	26.60	30.96	35.46	40.20	45.13		50.77	5 / 7	12.03	12.90	14.17
		interval		3.90	4.10	4.03	4.24	4.30	4.36	4.50	4.74	4.93	5.64	5.64	7.09				
	velocity		7.46	8.97	8.54	8.68	8.25	8.14	8.03	7.78	7.38	7.10	7.09	7.88	8.73	8.14	7.41		
	H1 lead leg	L	strides		22	15	15	15	15	15	15	16	16	16		160			



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field/day-7-morning-session-athletics-tokyo-2020-replays>

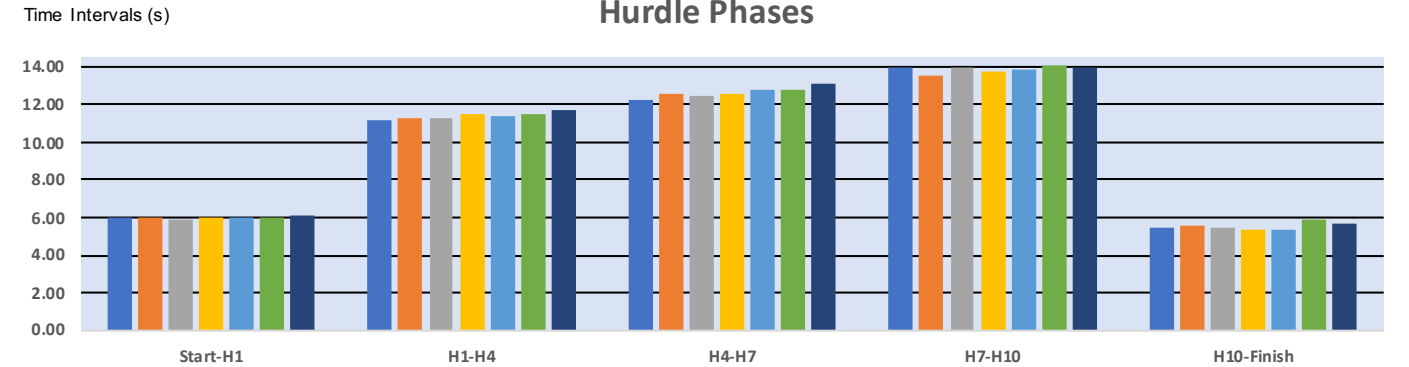
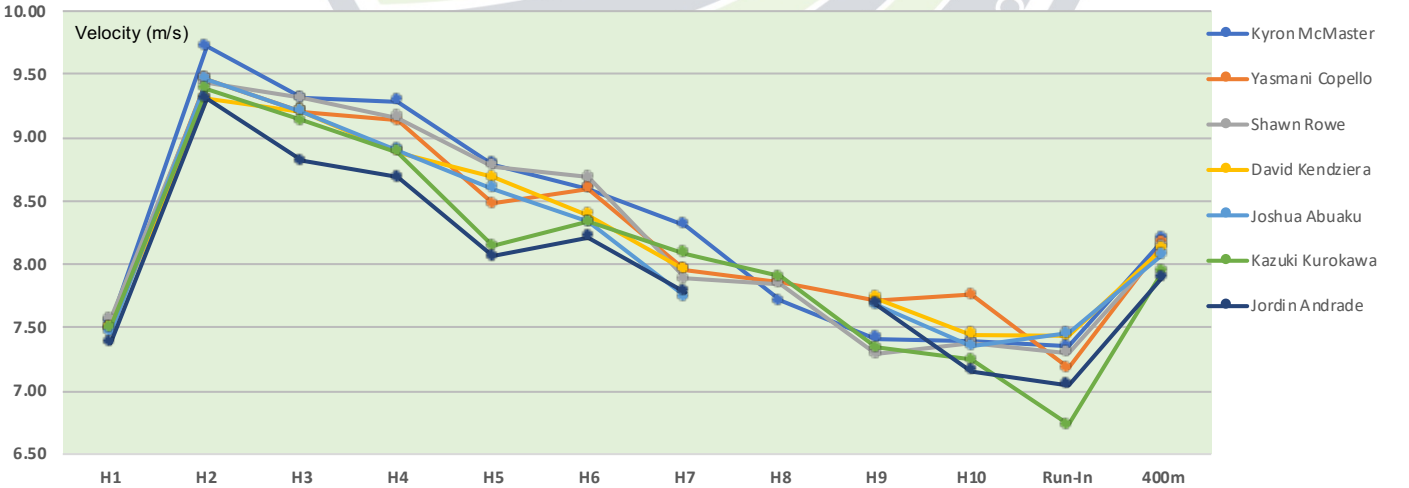
2020 Olympic Games (Tokyo, JPN) (TV Analysis)

Men's 400m Hurdles

Date 2021.07.30

Heat 4

			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		5.97	9.57	13.33	17.10	21.08	25.15	29.36	33.90	38.62	43.35		48.79	2 / 1			
	reaction time	0.184														11.13	12.26	13.99
	interval		7.54	3.60	3.76	3.77	3.98	4.07	4.21	4.54	4.72	4.73	5.44			9.43	8.56	7.51
	velocity																	
Copello, Yasmani (TUR) (1987)	time		6.00	9.70	13.50	17.33	21.46	25.53	29.93	34.38	38.92	43.43		49.00	5 / 2			
	reaction time	0.188														11.33	12.60	13.50
	interval		7.50	3.70	3.80	3.83	4.13	4.07	4.40	4.45	4.54	4.51	5.57			9.27	8.33	7.78
	velocity																	
Rowe, Shawn (JAM) (1992)	time		5.95	9.66	13.42	17.24	21.23	25.26	29.70	34.16	38.96	43.70		49.18	4 / 3			
	reaction time	0.157														11.29	12.46	14.00
	interval		7.56	3.71	3.76	3.82	3.99	4.03	4.44	4.46	4.80	4.74	5.48			9.30	8.43	7.50
	velocity																	
Kendziera, David (USA) (1994)	time		6.00	9.76	13.56	17.50	21.53	25.70	30.10		39.15	43.85		49.23	6 / 4			
	reaction time	0.192														11.50	12.60	13.75
	interval		7.50	3.76	3.80	3.94	4.03	4.17	4.40		9.05	4.70	5.38			9.13	8.33	7.64
	velocity																	
Abuaku, Joshua (GER) (1996)	time		6.03	9.73	13.53	17.46	21.53	25.73	30.25		39.37	44.13		49.50	8 / 5			
	reaction time	0.169														11.43	12.79	13.88
	interval		7.46	3.70	3.80	3.93	4.07	4.20	4.52		9.12	4.76	5.37			9.19	8.21	7.56
	velocity																	
Kurokawa, Kazuki (JPN) (2001)	time		6.00	9.73	13.56	17.50	21.80	26.00	30.33	34.76	39.53	44.36		50.30	3 / 6			
	reaction time	0.154														11.50	12.83	14.03
	interval		7.50	3.73	3.83	3.94	4.30	4.20	4.33	4.43	4.77	4.83	5.94			9.13	8.18	7.48
	velocity																	
Andrade, Jordin (CPV) (1992)	time		6.10	9.86	13.83	17.86	22.20	26.46	30.96		40.07	44.96		50.64	7 / 7			
	reaction time	0.202														11.76	13.10	14.00
	interval		7.38	3.76	3.97	4.03	4.34	4.26	4.50		9.11	4.89	5.68			8.93	8.02	7.50
	velocity																	



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field/day-7-morning-session-athletics-tokyo-2020-replays>

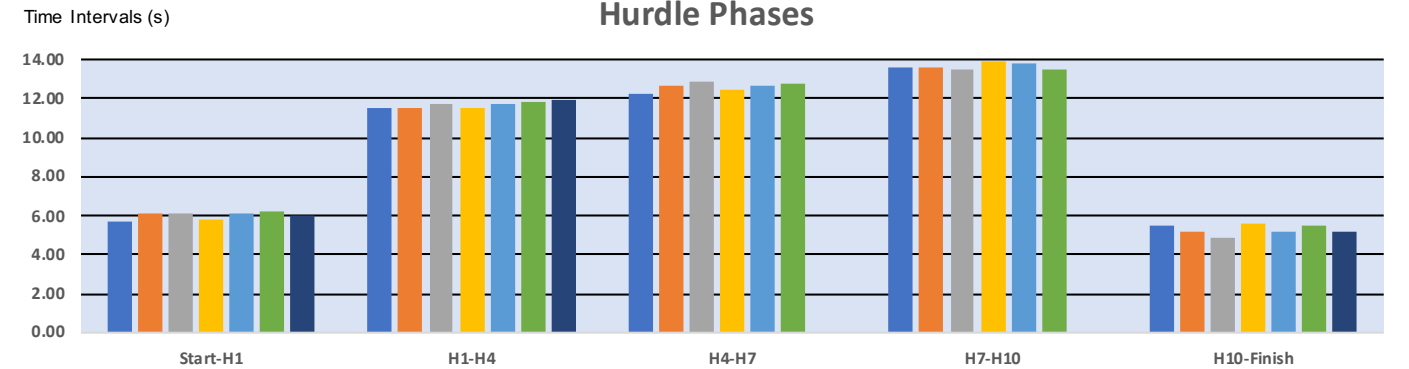
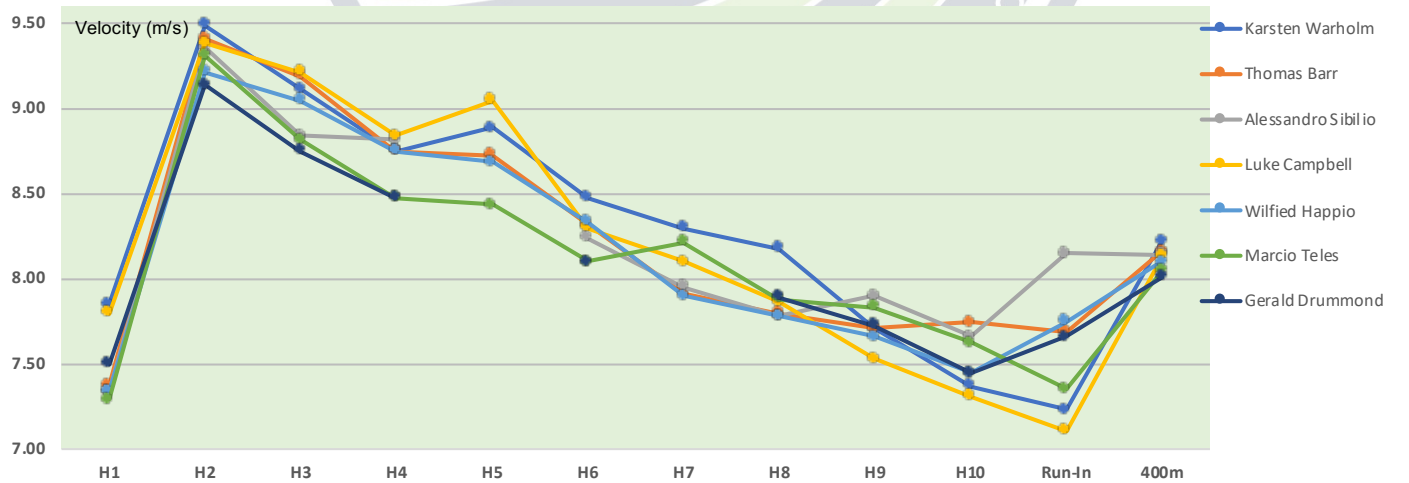
2020 Olympic Games (Tokyo, JPN) (TV Analysis)

Men's 400m Hurdles

Date 2021.07.30

Heat 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	5.73	9.42	13.26	17.26	21.20	25.33	29.55	33.83	38.37	43.12		48.65	8 / 1			
	reaction time	0.157															
	interval		3.69	3.84	4.00	3.94	4.13	4.22	4.28	4.54	4.75	5.53			11.53	12.29	13.57
	velocity		7.85	9.49	9.11	8.75	8.88	8.47	8.29	8.18	7.71	7.37	7.23		9.11	8.54	7.74
Barr, Thomas (IRL) (1992)	time	6.10	9.82	13.63	17.63	21.64	25.85	30.27	34.76	39.30	43.82		49.02	7 / 2			
	reaction time	0.147															
	interval		3.72	3.81	4.00	4.01	4.21	4.42	4.49	4.54	4.52	5.20			11.53	12.64	13.55
	velocity		7.38	9.41	9.19	8.75	8.73	8.31	7.92	7.80	7.71	7.74	7.69		9.11	8.31	7.75
Sibilio, Alessandro (ITA) (1999)	time	6.13	9.87	13.83	17.80		26.30	30.70	35.20	39.63	44.20		49.11	3 / 3			
	reaction time	0.126															
	interval		3.74	3.96	3.97		8.50	4.40	4.50	4.43	4.57	4.91			11.67	12.90	13.50
	velocity		7.34	9.36	8.84	8.82	8.24	7.95	7.78	7.90	7.66	8.15	8.14		9.00	8.14	7.78
Campbell, Luke (GER) (1994)	time	5.77	9.50	13.30	17.26	21.13	25.35	29.67	34.12	38.77	43.56		49.19	4 / 4			
	reaction time	0.145															
	interval		3.73	3.80	3.96	3.87	4.22	4.32	4.45	4.65	4.79	5.63			11.49	12.41	13.89
	velocity		7.80	9.38	9.21	8.84	9.04	8.29	8.10	7.87	7.53	7.31	7.10		9.14	8.46	7.56
Happio, Wilfried (FRA) (1998)	time	6.13	9.93	13.80	17.80	21.83	26.03	30.46	34.96	39.53	44.23		49.39	5 / 5			
	reaction time	0.152															
	interval		3.80	3.87	4.00	4.03	4.32	4.26	4.44	4.47	4.59	5.16			11.67	12.66	13.77
	velocity		7.34	9.21	9.04	8.75	8.68	8.33	7.90	7.78	7.66	7.45	7.75		9.00	8.29	7.63
Teles, Marcio (BRA) (1994)	time	6.17	9.93	13.90	18.03	22.18	26.50	30.76	35.20	39.67	44.26		49.70	6 / 6			
	reaction time	0.154															
	interval		3.76	3.97	4.13	4.15	4.32	4.26	4.44	4.47	4.59	5.44			11.86	12.73	13.50
	velocity		7.29	9.31	8.82	8.47	8.43	8.10	8.22	7.88	7.83	7.63	7.35		8.85	8.25	7.78
Drummond, Gerald (CRC) (1994)	time	6.00	9.83	13.83	17.96		26.60		35.47	40.00	44.70		49.92	2 / 7			
	reaction time	0.183															
	interval		3.83	4.00	4.13		8.64		8.87	4.53	4.70	5.22			11.96	-17.96	44.70
	velocity		7.50	9.14	8.75	8.47	8.10		7.89	7.73	7.45	7.66	8.01		8.78	-5.85	2.35
	time																
	reaction time																
	interval																
	velocity																
H1 lead leg	L																



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field/day-7-morning-session-athletics-tokyo-2020-replays>

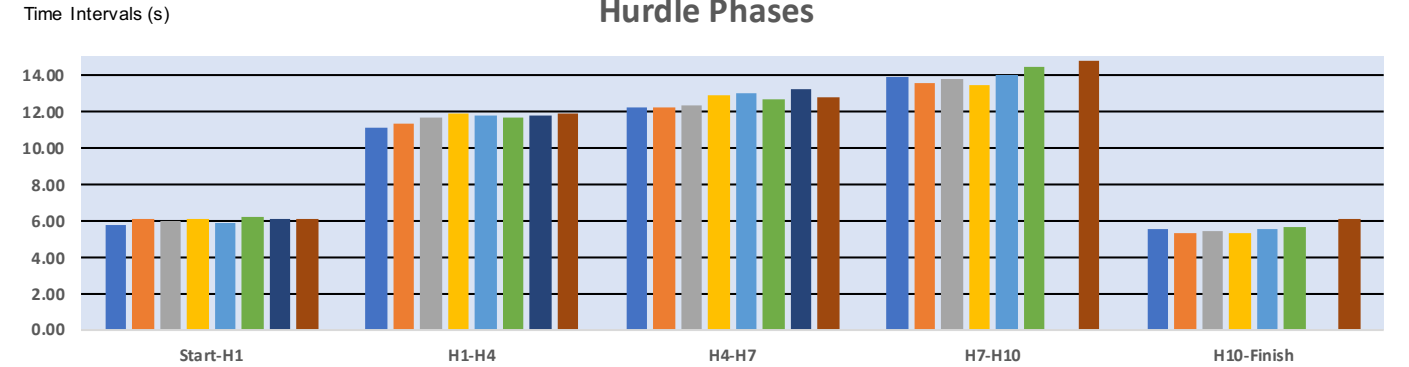
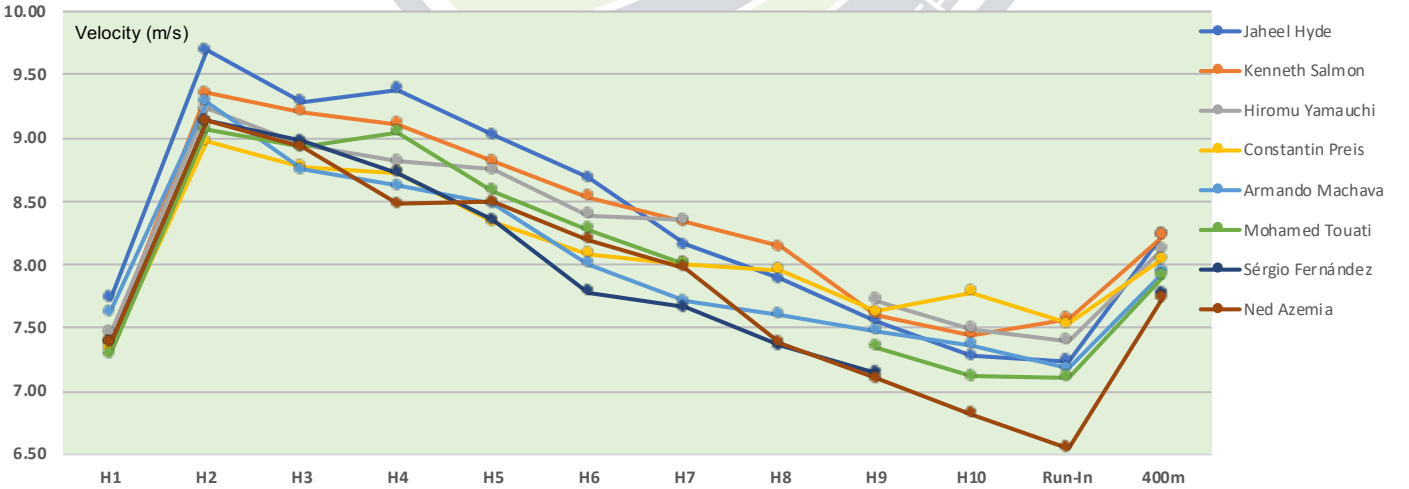
2020 Olympic Games (Tokyo, JPN) (TV Analysis)

Men's 400m Hurdles

Date 2021.07.30

Heat 2

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Hyde, Jaheel (JAM) (1997)	time	5.82	9.43	13.20	16.93	20.81	24.84	29.13	33.57	38.20	43.01		48.54	4 / 1			
	reaction time	0.184															
	interval		3.61	3.77	3.73	3.88	4.03	4.29	4.44	4.63	4.81	5.53			11.11	12.20	13.88
	velocity		7.73	9.70	9.28	9.38	9.02	8.68	8.16	7.88	7.56	7.28	8.24		9.45	8.61	7.56
Selmon, Kenneth (USA) (1996)	time	6.08	9.82	13.62	17.46	21.43	25.53	29.73	34.03	38.63	43.33		48.61	7 / 2			
	reaction time	0.185															
	interval		3.74	3.80	3.84	3.97	4.10	4.20	4.30	4.60	4.70	5.28			11.38	12.27	13.60
	velocity		7.40	9.36	9.21	9.11	8.82	8.54	8.33	8.14	7.61	7.45	8.23		9.23	8.56	7.72
Yamauchi, Hiromu (JPN) (1999)	time	6.03	9.82	13.73	17.70	21.70	25.87	30.06		39.13	43.80		49.21	8 / 3			
	reaction time	0.184															
	interval		3.79	3.91	3.97	4.00	4.17	4.19		9.07	4.67	5.41			11.67	12.36	13.74
	velocity		7.46	9.23	8.95	8.82	8.75	8.39	8.35	7.72	7.49	7.39	8.13		9.00	8.50	7.64
Preis, Constantin (GER) (1998)	time	6.13	10.03	14.02	18.03	22.23	26.56	30.93	35.33	39.92	44.42		49.73	9 / 4			
	reaction time	0.215															
	interval		3.90	3.99	4.01	4.20	4.33	4.37	4.40	4.59	4.50	5.31			11.90	12.90	13.49
	velocity		7.34	8.97	8.77	8.73	8.33	8.08	8.01	7.95	7.63	7.78	8.04		8.82	8.14	7.78
Machava, Armando (MOZ) (1996)	time	5.90	9.67	13.67	17.73	21.86	26.23	30.77	35.37	40.05	44.80		50.37	6 / 5			
	reaction time	0.159															
	interval		3.77	4.00	4.06	4.13	4.37	4.54	4.60	4.68	4.75	5.57			11.83	13.04	14.03
	velocity		7.63	9.28	8.75	8.62	8.47	8.01	7.71	7.61	7.48	7.37	7.18		8.88	8.05	7.48
Touati, Mohamed (TUN) (1998)	time	6.17	10.03	13.95	17.82	21.90	26.13	30.50		40.03	44.95		50.58	2 / 6			
	reaction time	0.152															
	interval		3.86	3.92	3.87	4.08	4.23	4.37		9.53	4.92	5.63			11.65	12.68	14.45
	velocity		7.29	9.07	8.93	9.04	8.58	8.27	8.01	7.35	7.11	7.10	7.91		9.01	8.28	7.27
Fernández, Sérgio (ESP) (1993)	time	6.10	9.93	13.83	17.84	22.03	26.53	31.10	35.86	40.76			51.51	5 / 7			
	reaction time	0.152															
	interval		3.83	3.90	4.01	4.19	4.50	4.57	4.76	4.90					11.74	13.26	-31.10
	velocity		7.38	9.14	8.97	8.73	8.35	7.78	7.66	7.14					8.94	7.92	-3.38
Azemia, Ned (SEY) (1997)	time	6.10	9.93	13.85	17.98	22.10	26.37	30.76	35.50	40.43	45.56		51.67	3 / 8			
	reaction time	0.151															
	interval		3.83	3.92	4.13	4.12	4.27	4.39	4.74	4.93	5.13	6.11			11.88	12.78	14.80
	velocity		7.38	9.14	8.93	8.47	8.50	8.20	7.97	7.38	7.10	6.82	7.74		8.84	8.22	7.09



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field/day-7-morning-session-athletics-tokyo-2020-replays>

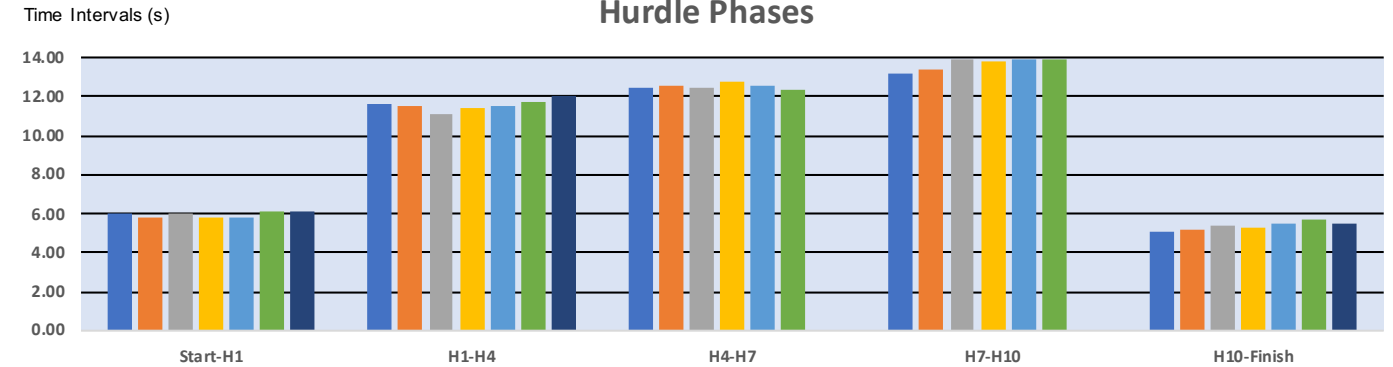
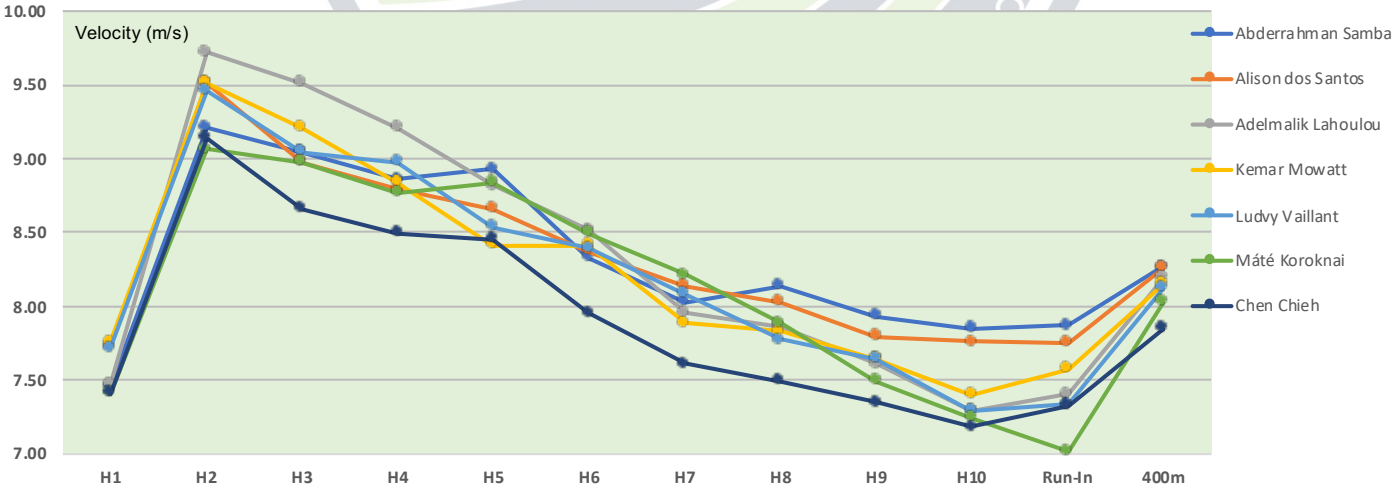
2020 Olympic Games (Tokyo, JPN) (TV Analysis)

Men's 400m Hurdles

Date 2021.07.30

Heat 1

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Samba, Abderrahman (QAT) (1995)	time		6.03	9.83	13.70	17.65	21.57	25.77	30.13	34.43	38.84	43.30		48.38	2 / 1			
	reaction time	0.200																
	interval			3.80	3.87	3.95	3.92	4.20	4.36	4.30	4.41	4.46	5.08			11.62	12.48	13.17
	velocity		7.46	9.21	9.04	8.86	8.93	8.33	8.03	8.14	7.94	7.85	7.87	8.27		9.04	8.41	7.97
dos Santos, Alison (BRA) (2000)	time		5.82	9.50	13.40	17.38	21.42	25.60	29.90	34.26	38.75	43.26		48.42	6 / 2			
	reaction time	0.152																
	interval			3.68	3.90	3.98	4.04	4.18	4.30	4.36	4.49	4.51	5.16			11.56	12.52	13.36
	velocity		7.73	9.51	8.97	8.79	8.66	8.37	8.14	8.03	7.80	7.76	7.75	8.26		9.08	8.39	7.86
Lahoulou, Adelmalik (ALG) (1992)	time		6.02	9.62	13.30	17.10	21.07	25.18	29.58	34.03	38.63	43.43		48.83	8 / 3			
	reaction time	0.149																
	interval			3.60	3.68	3.80	3.97	4.11	4.40	4.45	4.60	4.80	5.40			11.08	12.48	13.85
	velocity		7.48	9.72	9.51	9.21	8.82	8.52	7.95	7.87	7.61	7.29	7.41	8.19		9.48	8.41	7.58
Mowatt, Kemar (JAM) (1995)	time		5.80	9.48	13.28	17.24	21.40	25.56	30.00	34.47	39.05	43.78		49.06	4 / 4			
	reaction time	0.139																
	interval			3.68	3.80	3.96	4.16	4.16	4.44	4.47	4.58	4.73	5.28			11.44	12.76	13.78
	velocity		7.76	9.51	9.21	8.84	8.41	8.41	7.88	7.83	7.64	7.40	7.58	8.15		9.18	8.23	7.62
Vaillant, Ludvy (FRA) (1995)	time		5.83	9.53	13.40	17.30	21.40	25.57	29.90	34.40	38.98	43.78		49.23	5 / 5			
	reaction time	0.152																
	interval			3.70	3.87	3.90	4.10	4.17	4.33	4.50	4.58	4.80	5.45			11.47	12.60	13.88
	velocity		7.72	9.46	9.04	8.97	8.54	8.39	8.08	7.78	7.64	7.29	7.34	8.13		9.15	8.33	7.56
Koroknai, Máté (HUN) (1993)	time		6.07	9.93	13.83	17.82	21.78	25.90	30.16	34.60	39.27	44.10		49.80	7 / 6			
	reaction time	0.151																
	interval			3.86	3.90	3.99	3.96	4.12	4.26	4.44	4.67	4.83	5.70			11.75	12.34	13.94
	velocity		7.41	9.07	8.97	8.77	8.84	8.50	8.22	7.88	7.49	7.25	7.02	8.03		8.94	8.51	7.53
Chen Chieh (TPE) (1992)	time		6.07	9.90	13.94	18.06	22.20	26.60	31.20	35.87	40.63	45.50		50.96	3 / 7			
	reaction time	0.158																
	interval			3.83	4.04	4.12	4.14	4.40	4.60	4.67	4.76	4.87	5.46			11.99	13.14	14.30
	velocity		7.41	9.14	8.66	8.50	8.45	7.95	7.61	7.49	7.35	7.19	7.33	7.85		8.76	7.99	7.34



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field/day-7-morning-session-athletics-tokyo-2020-replays>

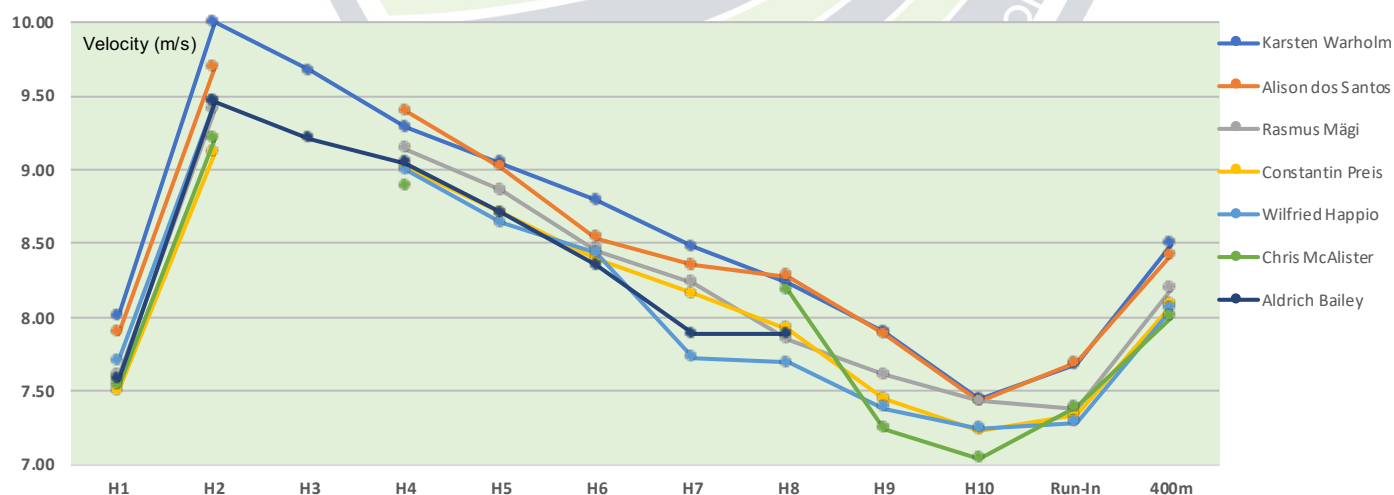
2021 Herculis Meeting International d'Athletisme (Monaco, MON) (TV Analysis)

Men's 400m Hurdles

Date 2021.07.09

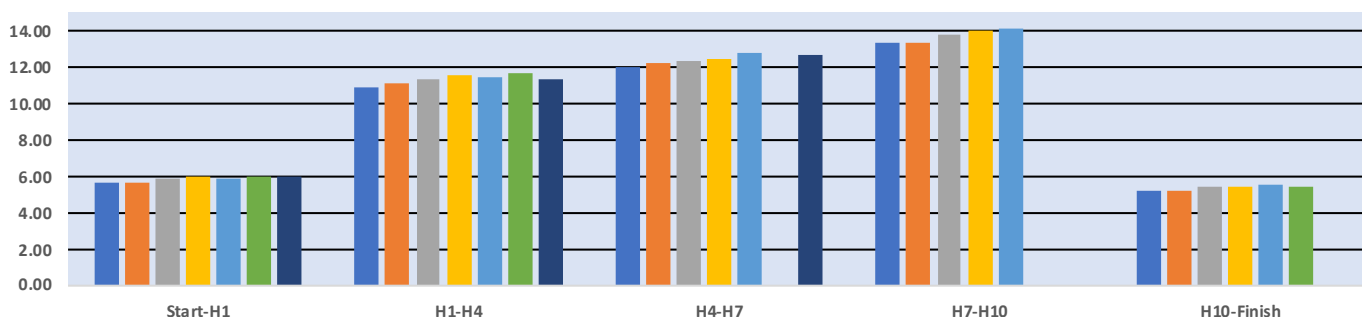
FINAL

			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		5.62	9.12	12.74	16.51	20.38	24.36	28.49	32.74	37.17	41.87		47.08	7 / 1			
	reaction time	0.150																
	interval		8.01	3.50	3.62	3.77	3.87	3.98	4.13	4.25	4.43	4.70	5.21			10.89	11.98	13.38
	velocity		8.01	10.00	9.67	9.28	9.04	8.79	8.47	8.24	7.90	7.45	7.68	8.50		9.64	8.76	7.85
dos Santos, Alison (BRA) (2000)	H1 lead leg	L	20	13	13	13	13	13	13	13	13	15	18	157				
	time		5.70	9.31		16.76	20.64	24.74	28.93	33.16	37.60	42.31		47.51	6 / 2			
	reaction time	0.177																
	interval			3.61		7.45	3.88	4.10	4.19	4.23	4.44	4.71	5.20			11.06	12.17	13.38
Mägi, Rasmus (EST) (1992)	velocity		7.89	9.70		9.40	9.02	8.54	8.35	8.27	7.88	7.43	7.69	8.42		9.49	8.63	7.85
	H1 lead leg	L	20	13	13		12	13	14		15	15	16.5	131.5				
	time		5.92	9.64		17.30	21.25	25.39	29.64	34.10	38.70	43.41		48.83	5 / 3			
	reaction time	0.152																
Preis, Constantin (GER) (1998)	interval			3.72		7.66	3.95	4.14	4.25	4.46	4.60	4.71	5.42			11.38	12.34	13.77
	velocity		7.60	9.41		9.14	8.86	8.45	8.24	7.85	7.61	7.43	7.38	8.19		9.23	8.51	7.63
	H1 lead leg	R	20	13			13	13	13	14	14	14		114				
	strides																	
Happio, Wilfried (FRA) (1998)	time		6.00	9.84		17.60	21.62	25.79	30.08	34.50	39.20	44.04		49.49	4 / 4			
	reaction time	0.231																
	interval			3.84		7.76	4.02	4.17	4.29	4.42	4.70	4.84	5.45			11.60	12.48	13.96
	velocity		7.50	9.11		9.02	8.71	8.39	8.16	7.92	7.45	7.23	7.34	8.08		9.05	8.41	7.52
Happio, Wilfried (FRA) (1998)	H1 lead leg	L	22	14			14	15	15		16	16		112				
	time		5.84	9.54		17.32	21.37	25.52	30.05	34.60	39.34	44.17		49.66	3 / 5			
	reaction time	0.123																
	interval			3.70		7.78	4.05	4.15	4.53	4.55	4.74	4.83	5.49			11.48	12.73	14.12
McAlister, Chris (GBR) (1995)	velocity		7.71	9.46		9.00	8.64	8.43	7.73	7.69	7.38	7.25	7.29	8.05		9.15	8.25	7.44
	H1 lead leg	L	20	13			13	13	14		15	15		103				
	time		5.97	9.77		17.65				34.77	39.60	44.57		49.98	2 / 6			
	reaction time	0.144																
Bailey, Aldrich (USA) (1994)	interval			3.80		7.88				17.12	4.83	4.97	5.41			11.68		
	velocity		7.54	9.21		8.88				8.18	7.25	7.04	7.39	8.00		8.99		
	H1 lead leg	R	22	14							16	16		68				
	strides																	
Bailey, Aldrich (USA) (1994)	time		5.94	9.64	13.44	17.31	21.33	25.52	29.96	34.40				dnf	8 / --			
	reaction time	0.225																
	interval			3.70	3.80	3.87	4.02	4.19	4.44	4.44								
	velocity		7.58	9.46	9.21	9.04	8.71	8.35	7.88	7.88						11.37	12.65	
Bailey, Aldrich (USA) (1994)	H1 lead leg	L	21	13	13	13	13	13	14	14				114		9.23	8.30	
	strides																	



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=pl5zgnzUj0o>

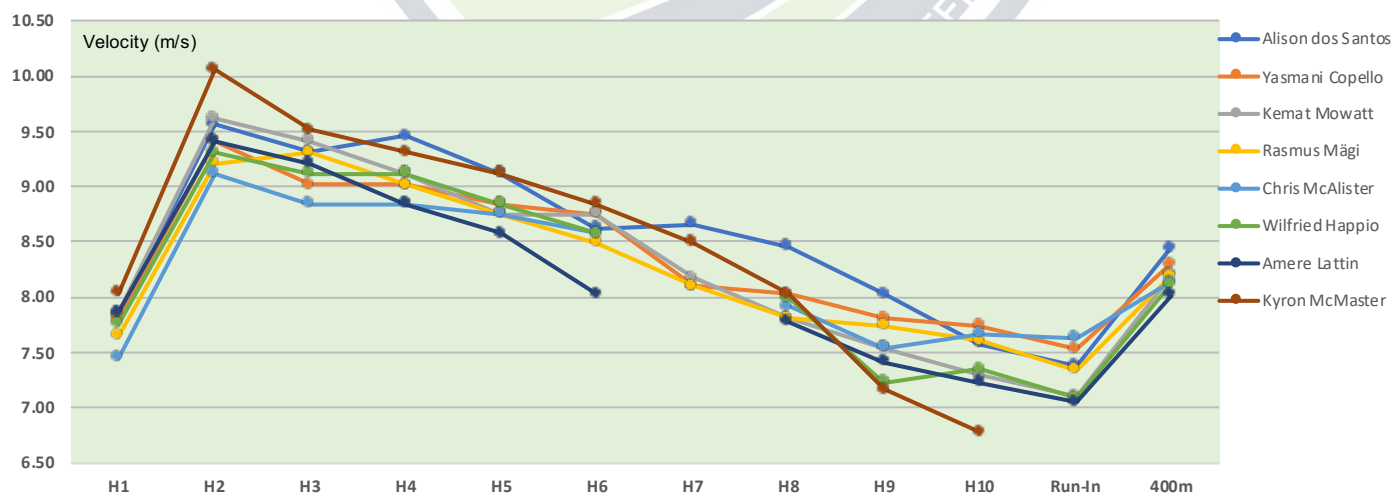
2021 Bauhaus Galan (Stockholm, SWE) (TV Analysis)

Men's 400m Hurdles

Date 2021.07.04

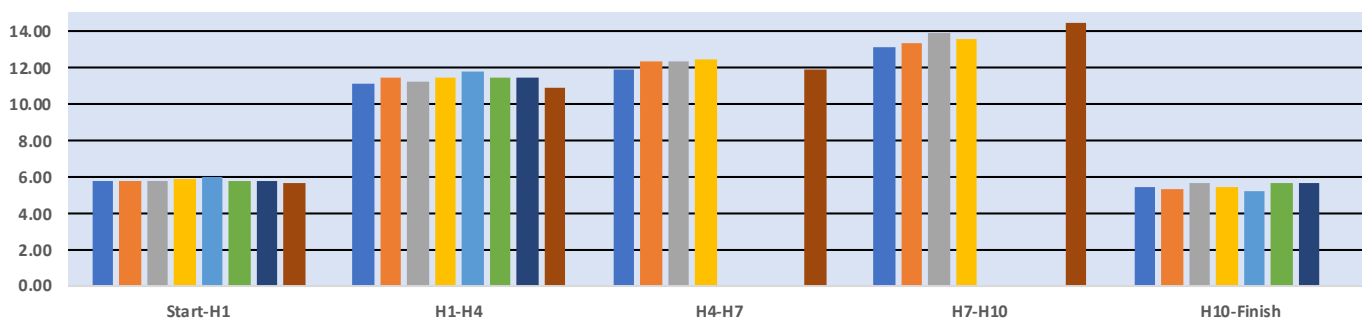
FINAL

			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		5.74	9.40	13.16	16.86	20.70	24.76	28.80	32.94	37.30	41.92		47.34	7 / 1			
	reaction time	0.160																
	interval			3.66	3.76	3.70	3.84	4.06	4.04	4.14	4.36	4.62	5.42	AR PB		11.12	11.94	13.12
	velocity		7.84	9.56	9.31	9.46	9.11	8.62	8.66	8.45	8.03	7.58	7.38	8.45		9.44	8.79	8.00
	H1 lead leg	L			13	13	12	12	13	13	13	13	17	132				
Copello, Yasmani (TUR) (1987)	time		5.76	9.48	13.36	17.24	21.20	25.20	29.52	33.88	38.36	42.88		48.19	4 / 2			
	reaction time	0.167																
	interval			3.72	3.88	3.88	3.96	4.00	4.32	4.36	4.48	4.52	5.31			11.48	12.28	13.36
	velocity		7.81	9.41	9.02	9.02	8.84	8.75	8.10	8.03	7.81	7.74	7.53	8.30		9.15	8.55	7.86
	H1 lead leg	R		20	13	13	13	13	14	14	14	14	17.7	158.7				
Mowatt, Kemat (JAM) (1995)	time		5.72	9.36	13.08	16.92	20.92	24.92	29.20	33.68	38.32	43.12		48.75	8 / 3			
	reaction time	0.156																
	interval			3.64	3.72	3.84	4.00	4.00	4.28	4.48	4.64	4.80	5.63			11.20	12.28	13.92
	velocity		7.87	9.62	9.41	9.11	8.75	8.75	8.18	7.81	7.54	7.29	7.10	8.21		9.38	8.55	7.54
	H1 lead leg	L			13	13	13	13	13	14	14	14	17.7	138.7				
Mägi, Rasmus (EST) (1992)	time		5.88	9.68	13.44	17.32	21.32	25.44	29.76	34.24	38.76	43.36		48.81	5 / 4			
	reaction time	0.128																
	interval			3.80	3.76	3.88	4.00	4.12	4.32	4.48	4.52	4.60	5.45			11.44	12.44	13.60
	velocity		7.65	9.21	9.31	9.02	8.75	8.50	8.10	7.81	7.74	7.61	7.34	8.20		9.18	8.44	7.72
	H1 lead leg	R			13	13	13	13	13	14	14	14	17.2	137.2				
McAlister, Chris (GBR) (1995)	time		6.04	9.88	13.84	17.80	21.80	25.88		34.72	39.36	43.92		49.16	1 / 5			
	reaction time	0.134																
	interval			3.84	3.96	3.84	4.00	4.08		8.84	4.64	4.56	5.24	PB		11.76		
	velocity		7.45	9.11	8.84	8.84	8.75	8.58		7.92	7.54	7.68	7.63	8.14		8.93		
	H1 lead leg	R			14	14	14	14			15	15	18.5	118.5				
Happio, Wilfried (FRA) (1998)	time		5.80	9.56	13.40	17.24	21.20	25.28		34.04	38.88	43.64		49.28	2 / 6			
	reaction time	0.136																
	interval			3.76	3.84	3.84	3.96	4.08		8.76	4.84	4.76	5.64			11.44		
	velocity		7.76	9.31	9.11	9.11	8.84	8.58		7.99	7.23	7.35	7.09	8.12		9.18		
	H1 lead leg	L			20	13	13	13	13		15	15	18	146				
Lattin, Amere (USA) (1997)	time		5.72	9.44	13.24	17.20	21.28	25.64		34.64	39.36	44.20		49.87	3 / 7			
	reaction time	0.140																
	interval			3.72	3.80	3.96	4.08	4.36		9.00	4.72	4.84	5.67			11.48		
	velocity		7.87	9.41	9.21	8.84	8.58	8.03		7.78	7.42	7.23	7.05	8.02		9.15		
	H1 lead leg	L			20	13	13	14			15	15	17	133				
McMaster, Kyron (IVB) (1997)	time		5.60	9.08	12.76	16.52	20.36	24.32	28.44	32.80	37.68	42.84		dnf	6 / --			
	reaction time	0.177																
	interval			3.48	3.68	3.76	3.84	3.96	4.12	4.36	4.88	5.16				10.92	11.92	14.40
	velocity		8.04	10.06	9.51	9.31	9.11	8.84	8.50	8.03	7.17	6.78				9.62	8.81	7.29
	H1 lead leg	L			13	13	13	13	13	14	15	15		122				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=FYXL6HSzYRc>

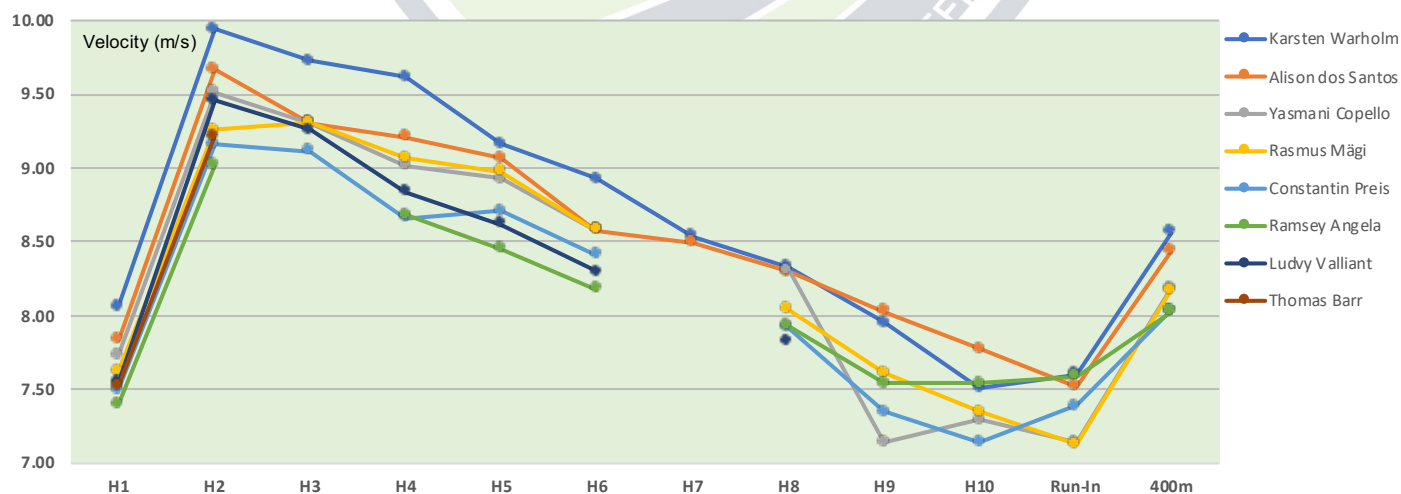
2021 Bislett Games (Oslo, NOR) (TV Analysis)

Men's 400m Hurdles

Date 2021.07.01

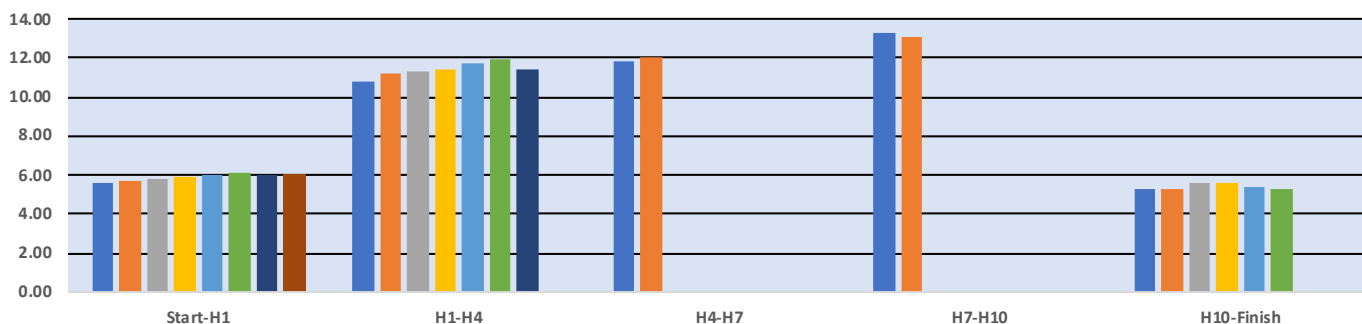
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Warholm, Karsten (NOR) (1996)	time		5.58	9.10	12.70	16.34	20.16	24.08	28.18	32.38	36.78	41.44		46.70	7 / 1			
	reaction time	0.163																
	interval			3.52	3.60	3.64	3.82	3.92	4.10	4.20	4.40	4.66	5.26	WR		10.76	11.84	13.26
	velocity		8.06	9.94	9.72	9.62	9.16	8.93	8.54	8.33	7.95	7.51	7.60	8.57		9.76	8.87	7.92
dos Santos, Alison (BRA) (2000)	time		5.74	9.36	13.12	16.92	20.78	24.86	28.98	33.20	37.56	42.06		47.38	6 / 2			
	reaction time	0.179																
	interval			3.62	3.76	3.80	3.86	4.08	4.12	4.22	4.36	4.50	5.32	AR PB		11.18	12.06	13.08
	velocity		7.84	9.67	9.31	9.21	9.07	8.58	8.50	8.29	8.03	7.78	7.52	8.44		9.39	8.71	8.03
Copello, Yasmani (TUR) (1987)	time		5.82	9.50	13.26	17.14	21.06	25.14		33.56	38.46	43.26		48.86	5 / 3			
	reaction time	0.198																
	interval			3.68	3.76	3.88	3.92	4.08		8.42	4.90	4.80	5.60			11.32		
	velocity		7.73	9.51	9.31	9.02	8.93	8.58		8.31	7.14	7.29	7.14	8.19		9.28		
Mägi, Rasmus (EST) (1992)	time		5.90	9.68	13.44	17.30	21.20	25.28		33.98	38.58	43.34		48.95	3 / 4			
	reaction time	0.161																
	interval			3.78	3.76	3.86	3.90	4.08		8.70	4.60	4.76	5.61			11.40		
	velocity		7.63	9.26	9.31	9.07	8.97	8.58		8.05	7.61	7.35	7.13	8.17		9.21		
Preis, Constantin (GER) (1998)	time		6.00	9.82	13.66	17.70	21.72	25.88		34.72	39.48	44.38		49.79	2 / 5			
	reaction time	0.246																
	interval			3.82	3.84	4.04	4.02	4.16		8.84	4.76	4.90	5.41			11.70		
	velocity		7.50	9.16	9.11	8.66	8.71	8.41		7.92	7.35	7.14	7.39	8.03		8.97		
Angela, Ramsey (NED) (1999)	time		6.08	9.96		18.02	22.16	26.44		35.26	39.90	44.54		49.81	1 / 6			
	reaction time	0.199																
	interval			3.88		8.06	4.14	4.28		8.82	4.64	4.64	5.27			11.94		
	velocity		7.40	9.02		8.68	8.45	8.18		7.94	7.54	7.54	7.59	8.03		8.79		
Vaillant, Ludvy (FRA) (1995)	time		5.96	9.66	13.44	17.40	21.46	25.68		34.62				dnf	8 / --			
	reaction time	0.245																
	interval			3.70	3.78	3.96	4.06	4.22		8.94						11.44		
	velocity		7.55	9.46	9.26	8.84	8.62	8.29		7.83						9.18		
Barr, Thomas (IRL) (1992)	time		5.98	9.78										dnf	4 / --			
	reaction time	0.147																
	interval			3.80														
	velocity		7.53	9.21														
H1 lead leg																		



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 50fps

Timing From: First Movement

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

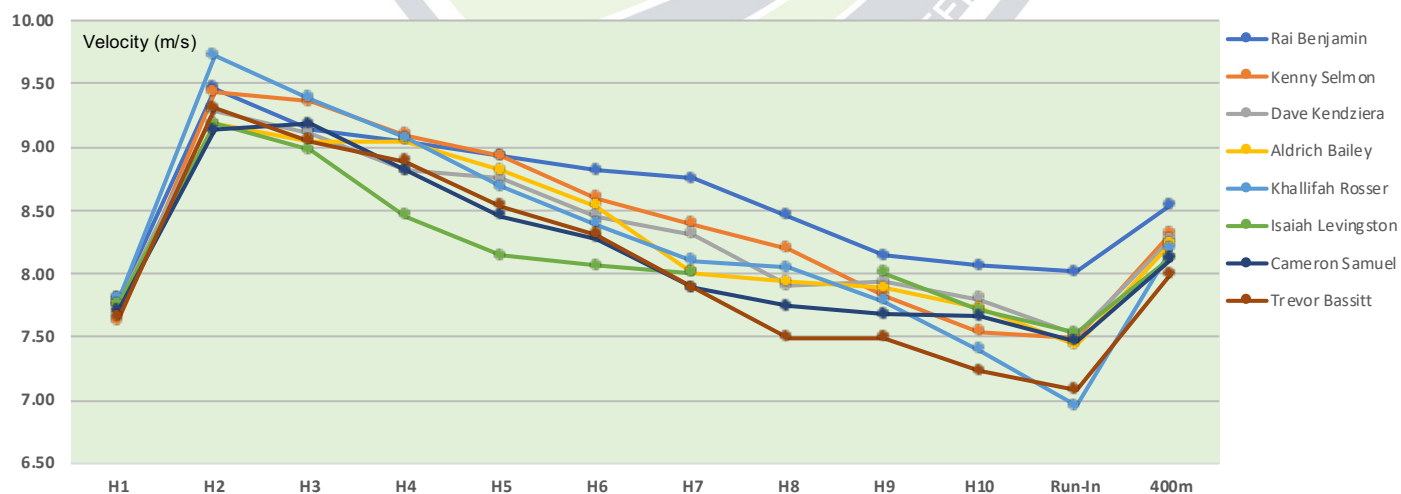
2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

Men's 400m Hurdles

Date 2021.06.26

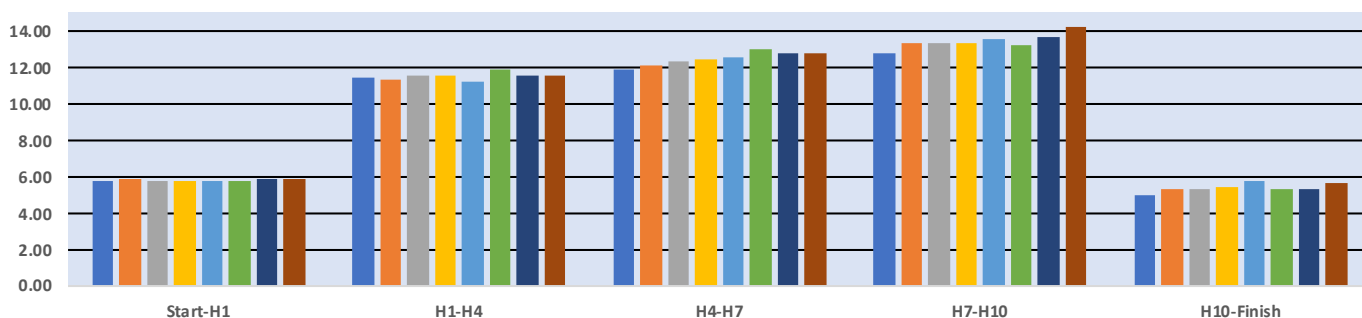
FINAL

			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		5.77	9.47	13.30	17.17	21.09	25.06	29.06	33.20	37.50	41.84		46.83	5 / 1			
	reaction time	0.235																
	interval		7.80	3.70	3.83	3.87	3.92	3.97	4.00	4.14	4.30	4.34	4.99	PB		11.40	11.89	12.78
	velocity		9.46	9.38	9.34	9.37	9.32	9.27	9.22	9.06	8.84	8.66	8.02	8.54		9.21	8.83	8.22
Selmon, Kenny (USA) (1996)	time		5.90	9.61	13.35	17.20	21.12	25.19	29.36	33.63	38.10	42.74		48.08	6 / 2			
	reaction time	0.212																
	interval		7.63	3.71	3.74	3.85	3.92	4.07	4.17	4.27	4.47	4.64	5.34	PB		11.30	12.16	13.38
	velocity		9.43	9.36	9.36	9.09	8.93	8.60	8.39	8.20	7.83	7.54	7.49	8.32		9.29	8.63	7.85
Kendziera, Dave (USA) (1994)	time		5.80	9.57	13.41	17.38	21.38	25.52	29.73	34.16	38.57	43.06		48.38	4 / 3			
	reaction time	0.172																
	interval		7.76	3.77	3.84	3.97	4.00	4.14	4.21	4.43	4.41	4.49	5.32	PB		11.58	12.35	13.33
	velocity		9.28	9.11	8.82	8.75	8.45	8.31	7.90	7.94	7.80	7.80	7.52	8.27		9.07	8.50	7.88
Bailey, Aldrich (USA) (1994)	time		5.80	9.61	13.48	17.35	21.32	25.42	29.79	34.20	38.64	43.17		48.55	3 / 4			
	reaction time	0.228																
	interval		7.76	3.81	3.87	3.87	3.97	4.10	4.37	4.41	4.44	4.53	5.38	PB		11.55	12.44	13.38
	velocity		9.19	9.04	9.04	8.82	8.54	8.01	7.94	7.88	7.73	7.43	7.43	8.24		9.09	8.44	7.85
Rosser, Khallifah (USA) (1995)	time		5.77	9.37	13.10	16.96	20.99	25.16	29.48	33.83	38.33	43.06		48.81	8 / 5			
	reaction time	0.279																
	interval		3.60	3.73	3.86	4.03	4.17	4.32	4.35	4.50	4.73	5.75				11.19	12.52	13.58
	velocity		7.80	9.72	9.38	9.07	8.68	8.39	8.10	8.05	7.78	7.40	6.96	8.20		9.38	8.39	7.73
Levingston, Isaiah (USA) (1998)	time		5.80	9.61	13.51	17.65	21.95	26.29	30.66		39.40	43.94		49.25	9 / 6			
	reaction time	0.231																
	interval		3.81	3.90	4.14	4.30	4.34	4.37			8.74	4.54	5.31			11.85	13.01	13.28
	velocity		7.76	9.19	8.97	8.45	8.14	8.06	8.01		8.01	7.71	7.53	8.12		8.86	8.07	7.91
Samuel, Cameron (USA) (1999)	time		5.84	9.67	13.48	17.45	21.59	25.82	30.26	34.78	39.34	43.91		49.27	7 / 7			
	reaction time	0.199																
	interval		3.83	3.81	3.97	4.14	4.23	4.44	4.52	4.56	4.57	5.36				11.61	12.81	13.65
	velocity		7.71	9.14	9.19	8.82	8.45	8.27	7.88	7.74	7.68	7.66	7.46	8.12		9.04	8.20	7.69
Bassitt, Trevor (USA) (1998)	time		5.88	9.64	13.51	17.45	21.55	25.76	30.20	34.87	39.54	44.38		50.03	2 / 8			
	reaction time	0.206																
	interval		7.65	3.76	3.87	3.94	4.10	4.21	4.44	4.67	4.67	4.84	5.65			11.57	12.75	14.18
	velocity		9.31	9.04	8.88	8.54	8.31	7.88	7.49	7.49	7.49	7.23	7.08	8.00		9.08	8.24	7.40



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=XA2nUFe-CDI>

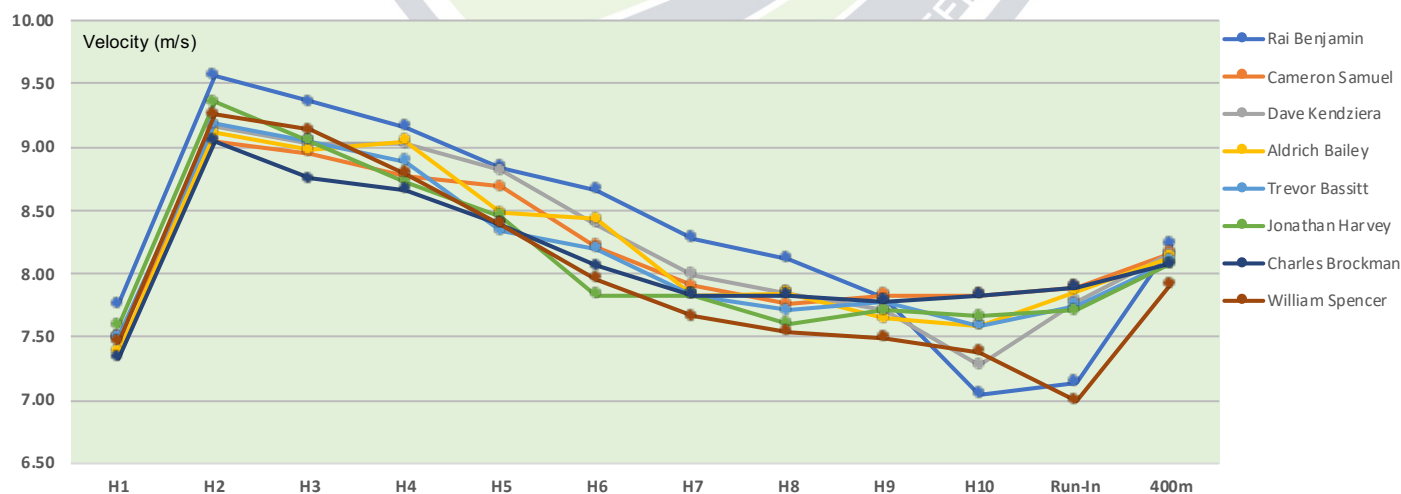
2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

Men's 400m Hurdles

Date 2021.06.25

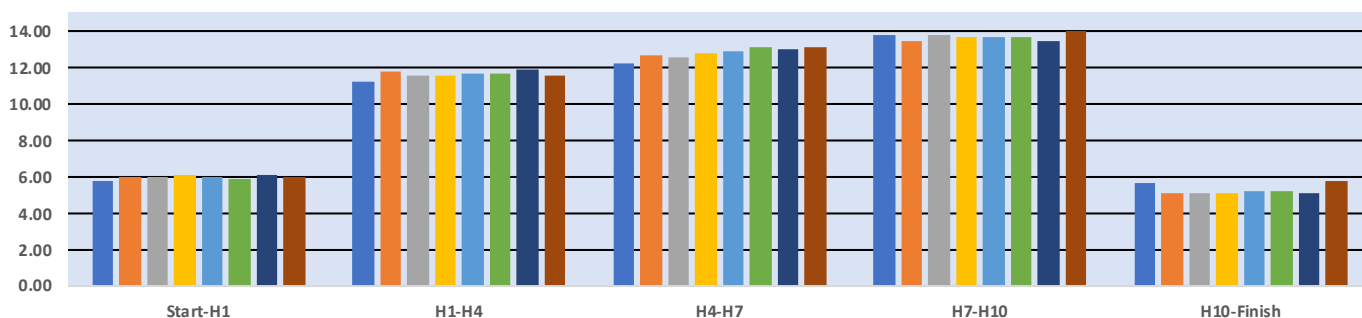
Semi-Final 2

			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		5.80	9.46	13.20	17.02	20.98	25.02	29.25	33.56	38.04	43.01		48.61	6 / 1			
	reaction time	0.197																
	interval		3.66	3.66	3.74	3.82	3.96	4.04	4.23	4.31	4.48	4.97	5.60			11.22	12.23	13.76
	velocity		7.76	9.56	9.36	9.16	8.84	8.66	8.27	8.12	7.81	7.04	7.14	8.23		9.36	8.59	7.63
Samuel, Cameron (USA) (1999)	time		6.00	9.87	13.78	17.77	21.80	26.06	30.49	35.00	39.47	43.94		49.01	5 / 2			
	reaction time	0.154																
	interval		3.87	3.91	3.99	4.03	4.26	4.43	4.51	4.47	4.47	4.47	5.07			11.77	12.72	13.45
	velocity		7.50	9.04	8.95	8.77	8.68	8.22	7.90	7.76	7.83	7.83	7.89	8.16		8.92	8.25	7.81
Kendziera, Dave (USA) (1994)	time		6.00	9.82	13.70	17.58	21.55	25.72	30.10	34.56	39.10	43.91		49.05	8 / 3			
	reaction time	0.190																
	interval		3.82	3.88	3.88	3.97	4.17	4.38	4.46	4.54	4.81	5.14				11.58	12.52	13.81
	velocity		7.50	9.16	9.02	8.82	8.39	7.99	7.85	7.71	7.28	7.78	8.15			9.07	8.39	7.60
Bailey, Aldrich (USA) (1994)	time		6.10	9.94	13.84	17.71	21.84	25.99	30.46	34.92	39.50	44.11		49.20	2 / 4			
	reaction time	0.188																
	interval		3.84	3.90	3.87	4.13	4.15	4.47	4.46	4.58	4.61	5.09				11.61	12.75	13.65
	velocity		7.38	9.11	8.97	9.04	8.47	8.43	7.83	7.85	7.64	7.59	7.86	8.13		9.04	8.24	7.69
Bassitt, Trevor (USA) (1998)	time		6.00	9.81	13.68	17.62	21.82	26.09	30.56	35.10	39.60	44.21		49.37	3 / 5			
	reaction time	0.176																
	interval		3.81	3.87	3.94	4.20	4.27	4.47	4.54	4.50	4.61	5.16				11.62	12.94	13.65
	velocity		7.50	9.19	9.04	8.88	8.33	8.20	7.83	7.71	7.78	7.59	7.75	8.10		9.04	8.11	7.69
Harvey, Jonathan (USA) (1997)	time		5.93	9.67	13.54	17.55	21.69	26.16	30.63	35.23	39.77	44.34		49.53	7 / 6			
	reaction time	0.140																
	interval		3.74	3.87	4.01	4.14	4.47	4.47	4.60	4.54	4.57	5.19				11.62	13.08	13.71
	velocity		7.59	9.36	9.04	8.73	8.45	7.83	7.83	7.61	7.71	7.66	7.71	8.08		9.04	8.03	7.66
Brockman, Charles (USA) (1999)	time		6.14	10.01	14.01	18.05	22.22	26.56	31.03	35.50	40.00	44.47		49.54	9 / 7			
	reaction time	0.241																
	interval		3.87	4.00	4.04	4.17	4.34	4.47	4.47	4.50	4.47	5.07				11.91	12.98	13.44
	velocity		7.33	9.04	8.75	8.66	8.39	8.06	7.83	7.83	7.78	7.83	7.89	8.07		8.82	8.09	7.81
Spencer, William (USA) (20010)	time		6.03	9.81	13.64	17.62	21.79	26.19	30.76	35.40	40.07	44.81		50.53	4 / 8			
	reaction time	0.174																
	interval		3.78	3.83	3.98	4.17	4.40	4.57	4.64	4.67	4.74	5.72				11.59	13.14	14.05
	velocity		7.46	9.26	9.14	8.79	8.39	7.95	7.66	7.54	7.49	7.38	6.99	7.92		9.06	7.99	7.47



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=Cm1GzHulwFg>

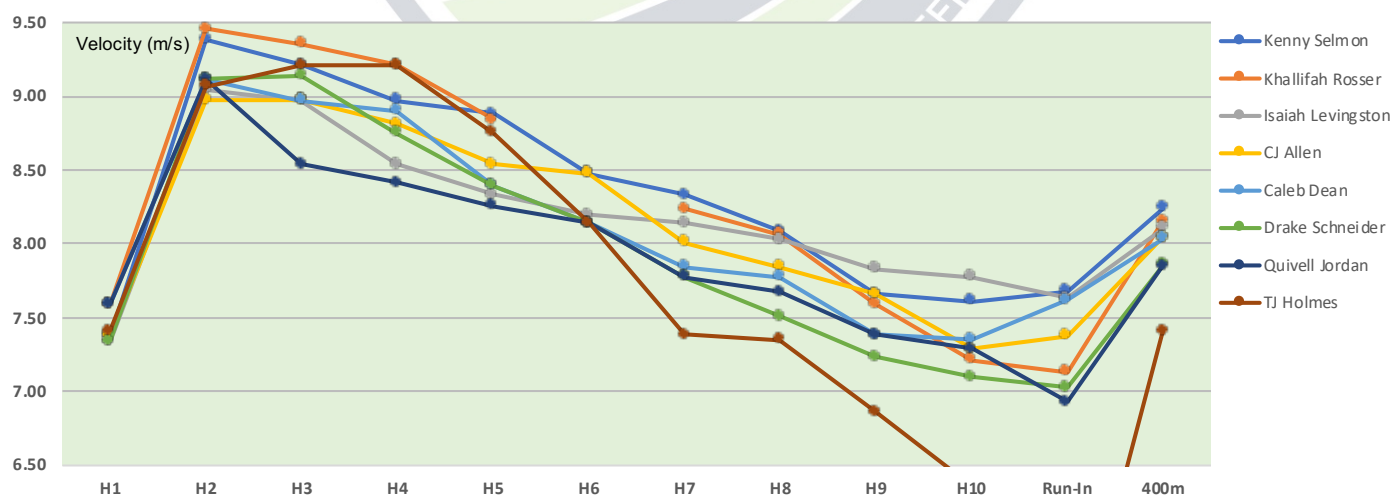
2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

Men's 400m Hurdles

Date 2021.06.25

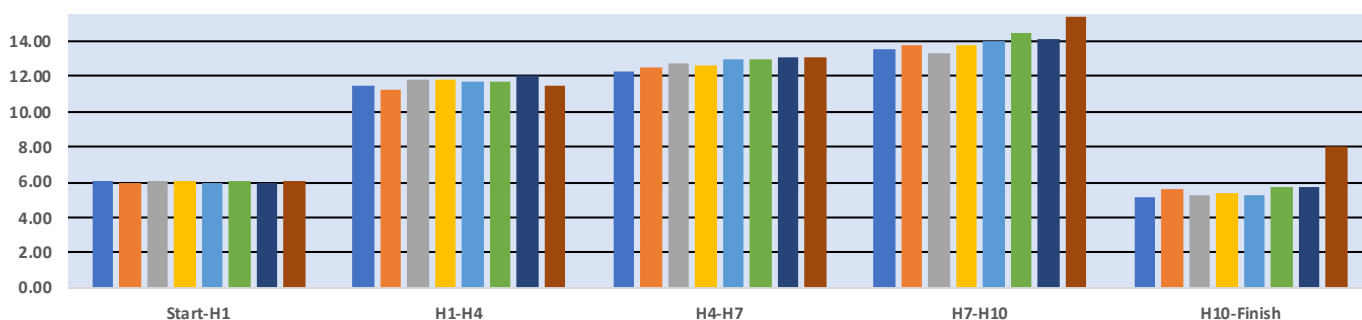
Semi-Final 1

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Selmon, Kenny (USA) (1996)	time		6.10	9.83	13.63	17.53	21.47	25.60	29.80	34.13	38.70	43.30		48.51	6 / 1			
	reaction time	0.242																
	interval			3.73	3.80	3.90	3.94	4.13	4.20	4.33	4.57	4.60	5.21			11.43	12.27	13.50
	velocity		7.38	9.38	9.21	8.97	8.88	8.47	8.33	8.08	7.66	7.61	7.68	8.25		9.19	8.56	7.78
Rosser, Khalifah (USA) (1995)	time		5.93	9.63	13.37	17.17	21.13		29.63	33.97	38.58	43.43		49.04	4 / 2			
	reaction time	0.209																
	interval			3.70	3.74	3.80	3.96		8.50	4.34	4.61	4.85	5.61			11.24	12.46	13.80
	velocity		7.59	9.46	9.36	9.21	8.84		8.24	8.06	7.59	7.22	7.13	8.16		9.34	8.43	7.61
Levingston, Isaiah (USA) (1998)	time		6.13	10.00	13.90	18.00	22.20	26.47	30.77	35.13	39.60	44.10		49.34	8 / 3			
	reaction time	0.247																
	interval			3.87	3.90	4.10	4.20	4.27	4.30	4.36	4.47	4.50	5.24			11.87	12.77	13.33
	velocity		7.34	9.04	8.97	8.54	8.33	8.20	8.14	8.03	7.83	7.78	7.63	8.11		8.85	8.22	7.88
Allen, CJ (USA) (1995)	time		6.10	10.00	13.90	17.87	21.97	26.10	30.47	34.93	39.50	44.30		49.72	3 / 4			
	reaction time	0.225																
	interval			3.90	3.90	3.97	4.10	4.13	4.37	4.46	4.57	4.80	5.42			11.77	12.60	13.83
	velocity		7.38	8.97	8.97	8.82	8.54	8.47	8.01	7.85	7.66	7.29	7.38	8.05		8.92	8.33	7.59
Dean, Caleb (USA) (2001)	time		5.93	9.77	13.67	17.60	21.77	26.07	30.53	35.03	39.77	44.53		49.78	7 / 5			
	reaction time	0.178																
	interval			3.84	3.90	3.93	4.17	4.30	4.46	4.50	4.74	4.76	5.25			11.67	12.93	14.00
	velocity		7.59	9.11	8.97	8.91	8.39	8.14	7.85	7.78	7.38	7.35	7.62	8.04		9.00	8.12	7.50
Schneider, Drake (USA) (1999)	time		6.13	9.97	13.80	17.80	21.97	26.27	30.77	35.43	40.27	45.20		50.89	9 / 6			
	reaction time	0.283																
	interval			3.84	3.83	4.00	4.17	4.30	4.46	4.64	4.84	4.93	5.69			11.67	12.97	14.43
	velocity		7.34	9.11	9.14	8.75	8.39	8.14	7.78	7.51	7.23	7.10	7.03	7.86		9.00	8.10	7.28
Jordan, Quivell (USA) (1999)	time		5.93	9.77	13.87	18.03	22.27	26.57	31.07	35.63	40.37	45.17		50.94	2 / 7			
	reaction time	0.178																
	interval			3.84	4.10	4.16	4.24	4.30	4.50	4.56	4.74	4.80	5.77			12.10	13.04	14.10
	velocity		7.59	9.11	8.54	8.41	8.25	8.14	7.78	7.68	7.38	7.29	6.93	7.85		8.68	8.05	7.45
Holmes, TJ (USA) (1995)	time		6.07	9.93	13.73	17.53	21.53	25.83	30.57	35.33	40.43	45.93		53.98	5 / 8			
	reaction time	0.189																
	interval			3.86	3.80	3.80	4.00	4.30	4.74	4.76	5.10	5.50	8.05			11.46	13.04	15.36
	velocity		7.41	9.07	9.21	9.21	8.75	8.14	7.38	7.35	6.86	6.36	4.97	7.41		9.16	8.05	6.84



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=QhAEK8AeHsk&t=95s>

2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

Men's 400m Hurdles

Date 2021.06.24

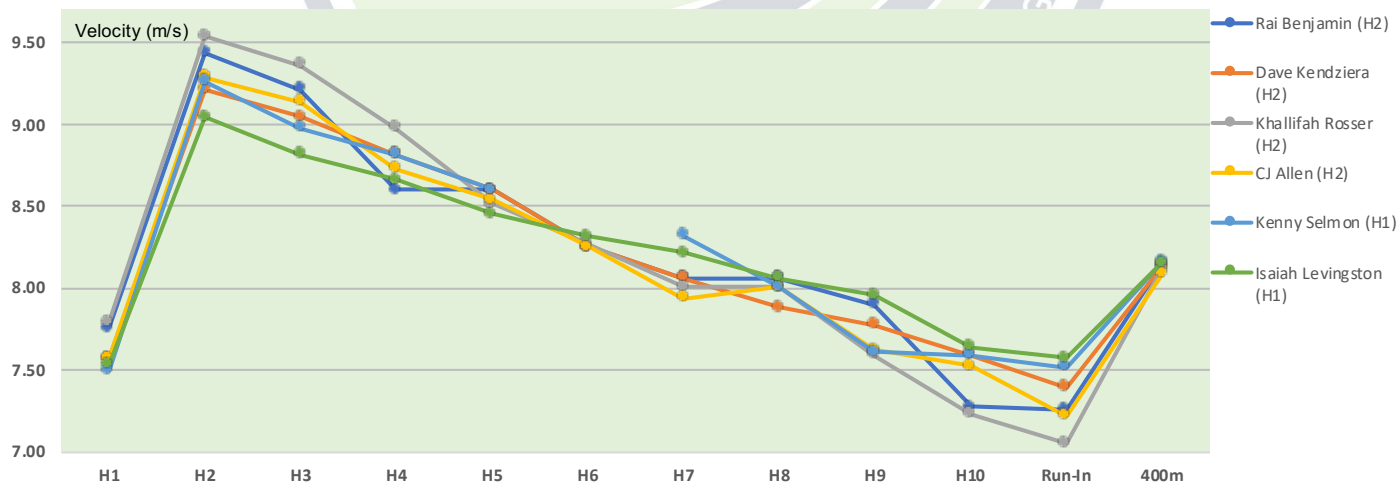
Heat 2

			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		5.80	9.51	13.31	17.38	21.45	25.69	30.03	34.37	38.80	43.61		49.12	6 / 1			
	reaction time	0.252																
	interval		3.71	3.80	4.07	4.07	4.24	4.34	4.34	4.43	4.43	4.81	5.51			11.58	12.65	13.58
	velocity		7.76	9.43	9.21	8.60	8.60	8.25	8.06	8.06	7.90	7.28	7.26	8.14		9.07	8.30	7.73
Kendziera, Dave (USA) (1994)	time		5.94	9.74	13.61	17.58	21.65	25.89	30.23	34.67	39.17	43.78		49.19	8 / 2			
	reaction time	0.250																
	interval		3.80	3.87	3.97	4.07	4.24	4.34	4.44	4.50	4.61	5.41				11.64	12.65	13.55
	velocity		7.58	9.21	9.04	8.82	8.60	8.25	8.06	7.88	7.78	7.59	7.39	8.13		9.02	8.30	7.75
Rosser, Khallifah (USA) (1995)	time		5.77	9.44	13.18	17.08	21.19	25.42	29.79	34.16	38.77	43.61		49.28	5 / 3			
	reaction time	0.246																
	interval		3.67	3.74	3.90	4.11	4.23	4.37	4.37	4.61	4.84	5.67				11.31	12.71	13.82
	velocity		7.80	9.54	9.36	8.97	8.52	8.27	8.01	8.01	7.59	7.23	7.05	8.12		9.28	8.26	7.60
Allen, CJ (USA) (1995)	time		5.94	9.71	13.54	17.55	21.65	25.89	30.30	34.67	39.26	43.91		49.45	4 / 4			
	reaction time	0.235																
	interval		3.77	3.83	4.01	4.10	4.24	4.41	4.37	4.59	4.65	5.54				11.61	12.75	13.61
	velocity		7.58	9.28	9.14	8.73	8.54	8.25	7.94	8.01	7.63	7.53	7.22	8.09		9.04	8.24	7.71

Date 2021.06.24

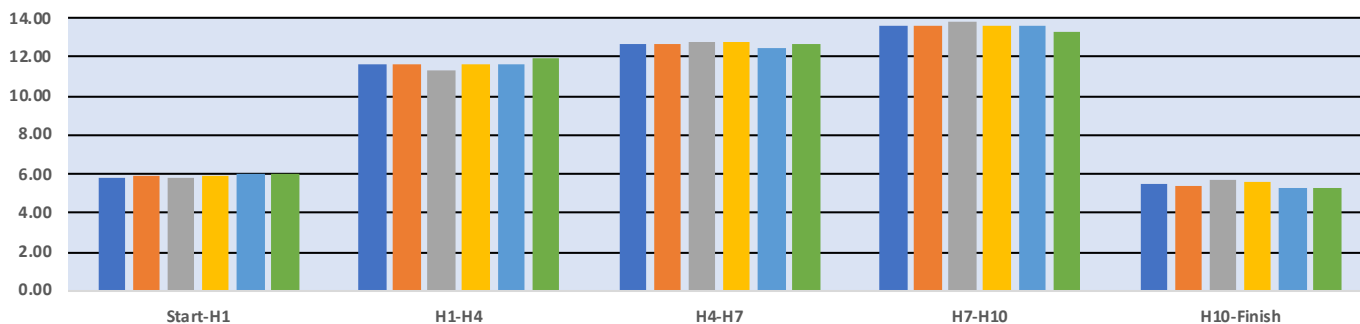
Heat 1

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Selmon, Kenny (USA) (1996)	time		6.00	9.78	13.68	17.65	21.72		30.13	34.50	39.10	43.71		49.03	3 / 1			
	reaction time	0.190							8.41	4.37	4.60	4.61	5.32			11.65	12.48	13.58
	interval		7.50	9.26	8.97	8.82	8.60		8.32	8.01	7.61	7.59	7.52	8.16		9.01	8.41	7.73
	velocity																	
Levingston, Isaiah (USA) (1998)	time		5.97	9.84	13.81	17.85	21.99	26.20	30.46	34.80	39.20	43.78		49.06	8 / 2			
	reaction time	0.192																
	interval		3.87	3.97	4.04	4.14	4.21	4.26	4.34	4.40	4.58	5.28				11.88	12.61	13.32
	velocity		7.54	9.04	8.82	8.66	8.45	8.31	8.22	8.06	7.95	7.64	7.58	8.15		8.84	8.33	7.88



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=ohCeUjH8lZY>

Biomechanical Analysis

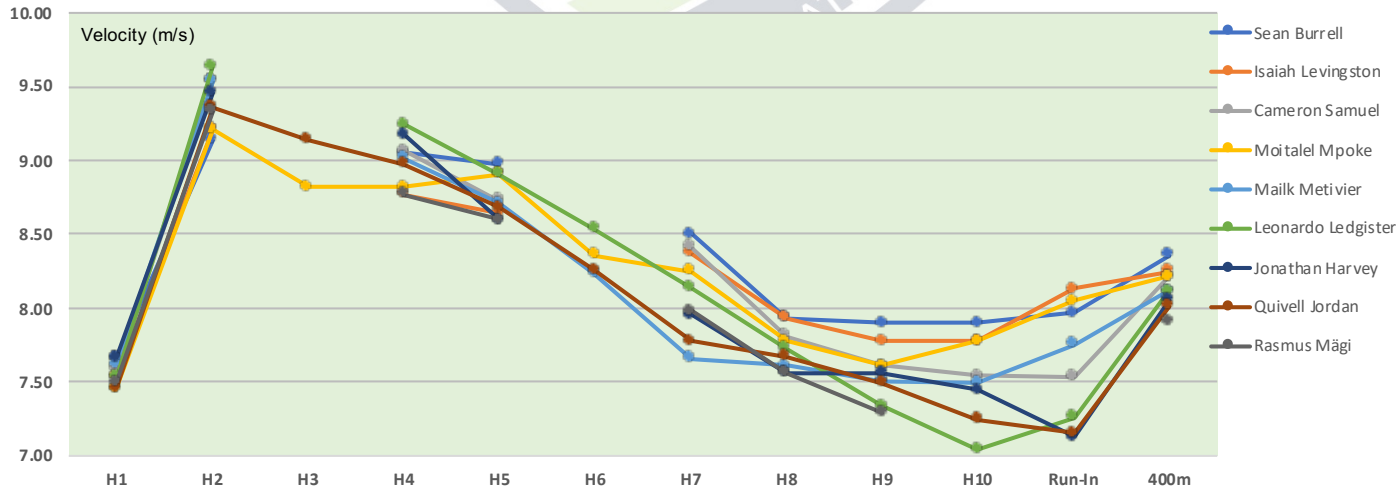
2021 NCAA Championships (Eugene, OR) (TV Analysis)

100m Hurdles

Date: 2021.06.11

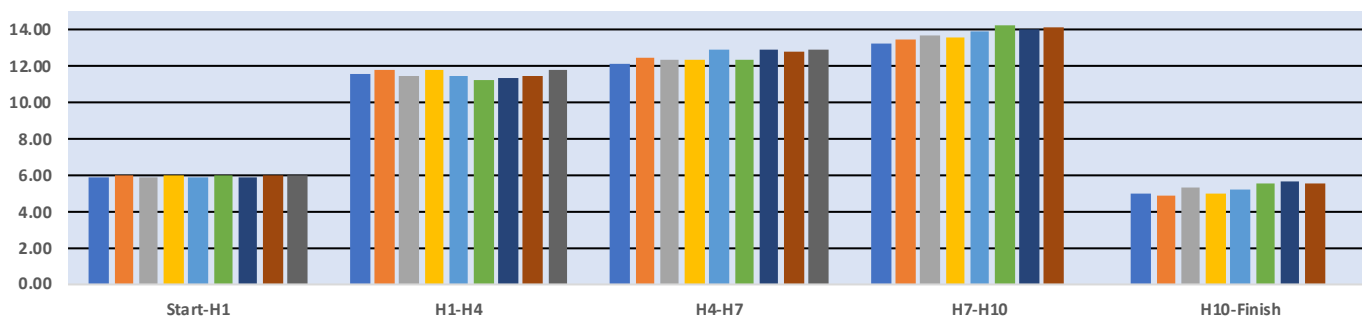
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Burrell, Sean (USA) (2002)	time		5.87	9.70		17.43	21.33		29.56	33.97	38.40	42.83		47.85	8 / 1			
	reaction time	0.194																
	interval			3.83		7.73	3.90		8.23	4.41	4.43	4.43	5.02	WJR		11.56	12.13	13.27
	velocity		7.67	9.14		9.06	8.97		8.51	7.94	7.90	7.90	7.97	8.36		9.08	8.66	7.91
Levingston, Isaiah (USA) (1998)	time		5.97	9.77		17.75	21.80		30.16	34.57	39.07	43.57		48.49	9 / 2			
	reaction time	0.233																
	interval			3.80		7.98	4.05		8.36	4.41	4.50	4.50	4.92	PB		11.78	12.41	13.41
	velocity		7.54	9.21		8.77	8.64		8.37	7.94	7.78	7.78	8.13	8.25		8.91	8.46	7.83
Samuel, Cameron (USA) (1999)	time		5.93	9.60		17.32	21.33		29.65	34.13	38.73	43.37		48.68	7 / 3			
	reaction time	0.201																
	interval			3.67		7.72	4.01		8.32	4.48	4.60	4.64	5.31	PB		11.39	12.33	13.72
	velocity		7.59	9.54		9.07	8.73		8.41	7.81	7.61	7.54	7.53	8.22		9.22	8.52	7.65
Mpoke, Moitalel (KEN) (2001)	time		6.03	9.83	13.80	17.77	21.70	25.89	30.13	34.63	39.23	43.73		48.70	6 / 4			
	reaction time	0.267																
	interval			3.80		3.97	3.93	4.19	4.24	4.50	4.60	4.50	4.97	PB		11.74	12.36	13.60
	velocity		7.46	9.21	8.82	8.82	8.91	8.36	8.25	7.78	7.61	7.78	8.05	8.21		8.94	8.50	7.72
Metivier, Malik (CAN) (1998)	time		5.90	9.57		17.33	21.35	25.60	30.17	34.77	39.43	44.10		49.26	4 / 5			
	reaction time	0.144																
	interval			3.67		7.76	4.02	4.25	4.57	4.60	4.66	4.67	5.16	PB		11.43	12.84	13.93
	velocity		7.63	9.54		9.02	8.71	8.24	7.66	7.61	7.51	7.49	7.75	8.12		9.19	8.18	7.54
Ledgister, Leonardo (JAM) (1999)	time		5.97	9.60		17.17	21.10	25.20	29.50	34.03	38.80	43.77		49.28	3 / 6			
	reaction time	0.228																
	interval			3.63		7.57	3.93	4.10	4.30	4.53	4.77	4.97	5.51			11.20	12.33	14.27
	velocity		7.54	9.64		9.25	8.91	8.54	8.14	7.73	7.34	7.04	7.26	8.12		9.38	8.52	7.36
Harvey, Jonathan (USA) (1997)	time		5.87	9.57		17.20	21.27		30.07	34.70	39.33	44.03		49.64	2 / 7			
	reaction time	0.149																
	interval			3.70		7.63	4.07		8.80	4.63	4.63	4.70	5.61	PB		11.33	12.87	13.96
	velocity		7.67	9.46		9.17	8.60		7.95	7.56	7.56	7.45	7.13	8.06		9.27	8.16	7.52
Brockman, Charles (USA) (1999)	time		6.03	9.77	13.60	17.50	21.53	25.77	30.27	34.83	39.50	44.33		49.92	5 / 8			
	reaction time	0.190																
	interval			3.74		3.83	3.90	4.03	4.24	4.50	4.56	4.67	4.83	5.59		11.47	12.77	14.06
	velocity		7.46	9.36	9.14	8.97	8.68	8.25	7.78	7.68	7.49	7.25	7.16	8.01		9.15	8.22	7.47
Jordan, Quivell (USA) (1999)	time		6.00	9.75		17.73	21.80		30.57	35.20	40.00			50.54	1 / 9			
	reaction time	0.166																
	interval			3.75		7.98	4.07		8.77	4.63	4.80					11.73	12.84	
	velocity		7.50	9.33		8.77	8.60		7.98	7.56	7.29			7.91		8.95	8.18	
	H1 lead leg	L	21	13			14			15	15			78				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: Gun Flash

Source: https://www.youtube.com/watch?v=bQDE6iL_Nmmg

Biomechanical Analysis

2021 Bislett Night of Highlights (Oslo, NOR) (TV Analysis) (300m Hurdles)

Men's 300m Hurdles				Date 2021.06.04											FINAL							
				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10			
Warholm, Karsten (NOR) (1996)				time	6.12	9.60	13.16	16.78	20.60	24.52	28.58					33.26	7 / 1					
				reaction time																		
				interval																		
				velocity	8.17	10.06	9.83	9.67	9.16	8.93	8.62				4.68	WB PB		10.66	11.80			
H1 lead leg L				strides	8.17	10.06	9.83	9.67	9.16	8.93	8.62				8.55	9.02		9.85	8.90			
					23	13	13	13	13	13	13				17	118						

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

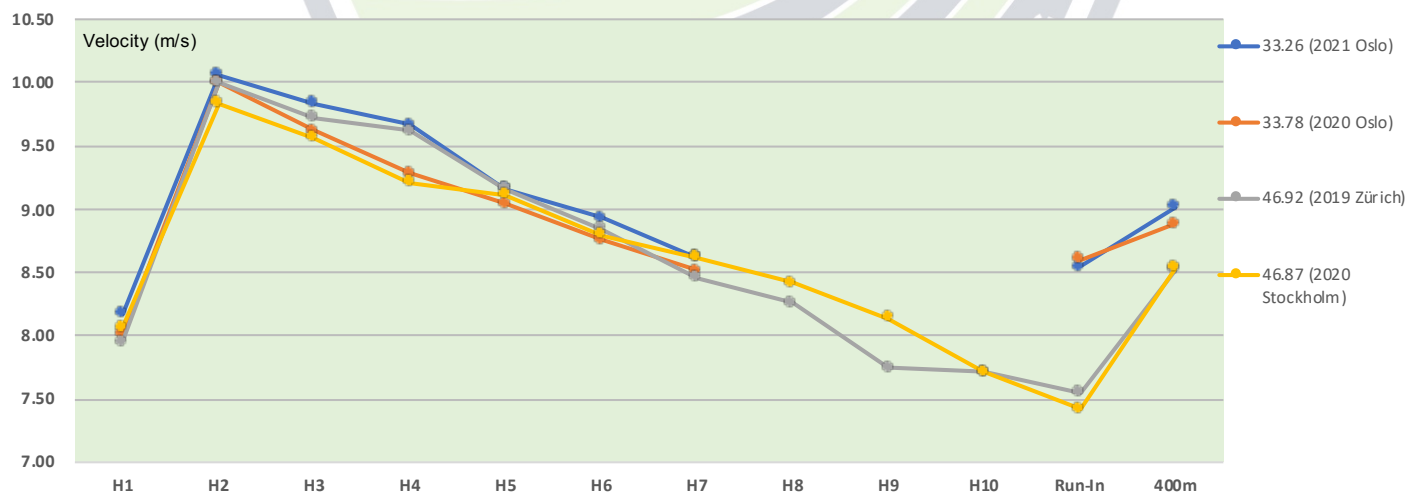
Men's 300m Hurdles		Date 2020.06.11											FINAL					
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10	
Warholm, Karsten (NOR) (1996)	time	6.24	9.74	13.38	17.15	21.02	25.02	29.13	★	★			33.78	7 / 1				
	reaction time	0.182										4.65	WB PB		10.91	11.98		
	interval		3.50	3.64	3.77	3.87	4.00	4.11				8.60	8.88		9.62	8.76		
	velocity	8.01	10.00	9.62	9.28	9.04	8.75	8.52				16.5	114.5					
	H1 lead leg	L	20	13	13	13	13	13										
	strides																	

2019 Weltklasse (Zürich, SUI) (TV Analysis)

Men's 400m Hurdles		Date 2019.08.29											FINAL					
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10	
Warholm, Karsten (NOR) (1996)	time	5.66	9.16	12.76	16.40	20.22	24.18	28.32	32.56	37.08	41.62		46.92	7 / 1				
	reaction time	0.140										5.30	AR PB			10.74	11.92	13.30
	interval		3.50	3.60	3.64	3.82	3.96	4.14	4.24	4.52	4.54	7.55	8.53			9.78	8.81	7.89
	velocity	7.95	10.00	9.72	9.62	9.16	8.84	8.45	8.25	7.74	7.71	18.2	159.2					
	H1 lead leg	L	20	13	13	13	13	13	13	15	15							
	strides																	

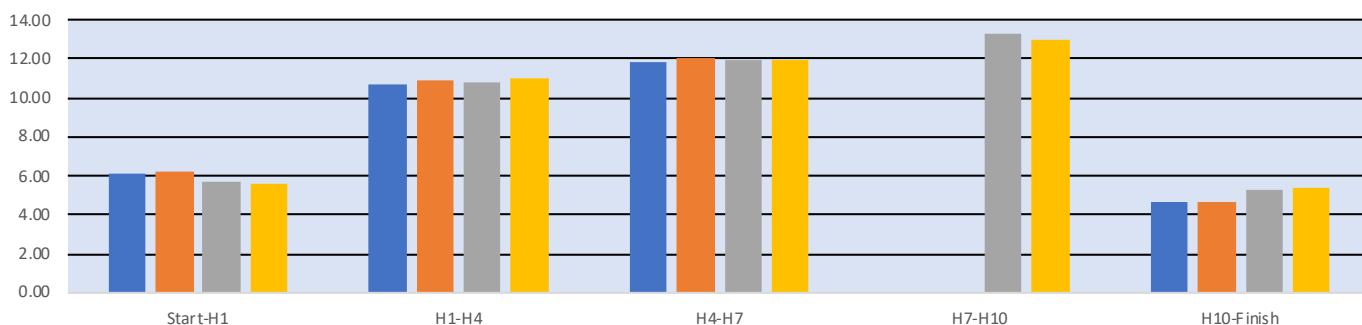
2020 Bauhaus Galan (Stockholm, SWE) (TV Analysis)

Men's 400m Hurdles		Date 2020.08.23											FINAL					
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10	
Warholm, Karsten (NOR) (1996)	time	5.58	9.14	12.80	16.60	20.44	24.42	28.48	32.64	36.94	41.48		46.87	8 / 1				
	reaction time	0.161										5.39	AR PB			11.02	11.88	13.00
	interval		3.56	3.66	3.80	3.84	3.98	4.06	4.16	4.30	4.54	7.42	8.53			9.53	8.84	8.08
	velocity	8.06	9.83	9.56	9.21	9.11	8.79	8.62	8.41	8.14	7.71	18	157					
H1 lead leg	L	20	13	13	13	13	13	13	13	13	15							
	strides																	



Time Intervals (s)

Hurdle Phases



2021 Bislett Night of Highlights (Oslo, NOR)

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=NivYikNOI0&t=2s>

2020 Bauhaus Galan (Stockholm, SWE)

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

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

2019 Weltklasse (Zürich, SUI)

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 50fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=JdYoaU0-HEc>

2020 Golden Gala Pietro Mennea (Rome, ITA)

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 50fps

Timing From: Gun Flash

Source: <https://www.youtube.com/watch?v=Sq4lpzQFIOE>

Biomechanical Analysis

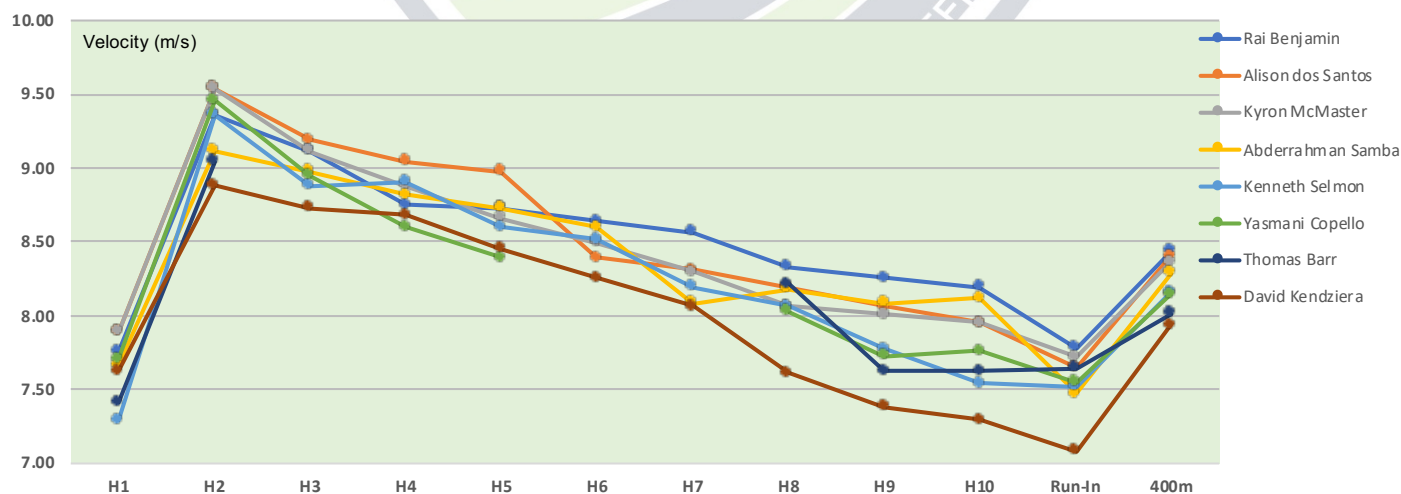
2021 Doha Diamond League (Doha, QAT) (TV Analysis)

Men's 400m Hurdles

Date 2021.05.28

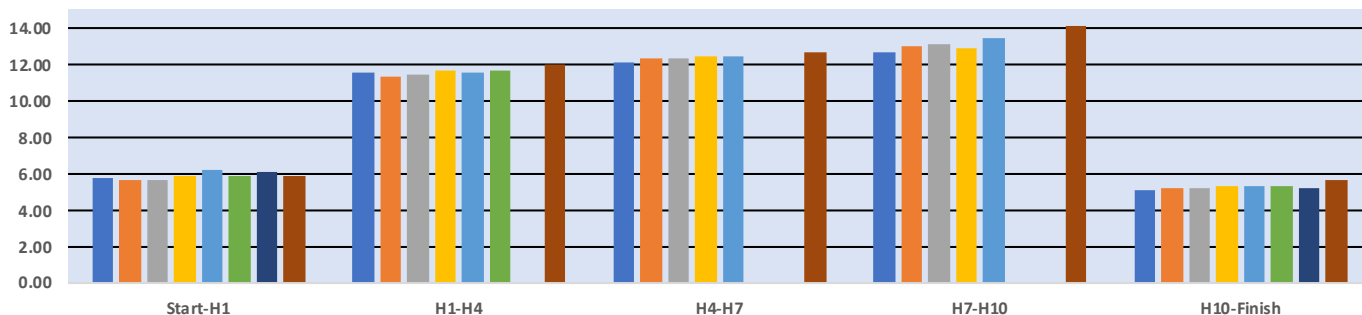
FINAL

				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			5.80	9.54	13.38	17.38	21.39	25.44	29.53	33.73	37.97	42.24		47.38	5 / 1			
	reaction time	0.203	interval		3.74	3.84	4.00	4.01	4.05	4.09	4.20	4.24	4.27	5.14			11.58	12.15	12.71
	H1 lead leg	R	velocity	7.76	9.36	9.11	8.75	8.73	8.64	8.56	8.33	8.25	8.20	7.78	8.44		9.07	8.64	8.26
			strides	20	13	13	13		13	13	13	13	13	16.2	140.2				
dos Santos, Alison (BRA) (2000)	time			5.70	9.37	13.18	17.05	20.95	25.12	29.33	33.60	37.94	42.34		47.57	6 / 2			
	reaction time	0.187	interval		3.67	3.81	3.87	3.90	4.17	4.21	4.27	4.34	4.40	5.23	AR PB		11.35	12.28	13.01
	H1 lead leg	L	velocity	7.89	9.54	9.19	9.04	8.97	8.39	8.31	8.20	8.06	7.95	7.65	8.41		9.25	8.55	8.07
			strides	20	13	13	12	12	13	13	13	13	13	16.2	151.2				
McMaster, Kyrone (IVB) (1997)	time			5.70	9.37	13.21	17.15	21.19	25.31	29.53	33.87	38.24	42.64		47.82	3 / 3			
	reaction time	0.199	interval		3.67	3.84	3.94	4.04	4.12	4.22	4.34	4.37	4.40	5.18			11.45	12.38	13.11
	H1 lead leg	R	velocity	7.89	9.54	9.11	8.88	8.66	8.50	8.29	8.06	8.01	7.95	7.72	8.36		9.17	8.48	8.01
			strides	20	13	13	13		13	13	14	14	14	17	144				
Samba, Abderrahman (QAT) (1995)	time			5.87	9.71	13.61	17.58	21.59	25.66	29.99	34.27	38.60	42.91		48.26	4 / 4			
	reaction time	0.153	interval		3.84	3.90	3.97	4.01	4.07	4.33	4.28	4.33	4.31	5.35			11.71	12.41	12.92
	H1 lead leg	R	velocity	7.67	9.11	8.97	8.82	8.73	8.60	8.08	8.18	8.08	8.12	7.48	8.29		8.97	8.46	8.13
			strides	21	13	13	13		13	13	13	14	14	17	144				
Selmon, Kenneth (USA) (1996)	time			6.17	9.91	13.85	17.78	21.85	25.96	30.23	34.57	39.07	43.71		49.03	7 / 5			
	reaction time	0.314	interval		3.74	3.94	3.93	4.07	4.11	4.27	4.34	4.50	4.64	5.32			11.61	12.45	13.48
	H1 lead leg	R	velocity	7.29	9.36	8.88	8.91	8.60	8.52	8.20	8.06	7.78	7.54	7.52	8.16		9.04	8.43	7.79
			strides	21	13	13	13		13	13	13	14	14	127					
Copello, Yasmani (TUR) (1987)	time			5.84	9.54	13.45	17.52	21.69			34.77	39.30	43.81		49.11	2 / 6			
	reaction time	0.203	interval		3.70	3.91	4.07	4.17			13.08	4.53	4.51	5.30			11.68		
	H1 lead leg	R	velocity	7.71	9.46	8.95	8.60	8.39			8.03	7.73	7.76	7.55	8.14		8.99		
			strides	20	13	13	13					14	14	17.5	104.5				
Barr, Thomas (IRL) (1992)	time			6.07	9.94						35.50	40.09	44.68		49.91	1 / 7			
	reaction time	0.204	interval		3.87						25.56	4.59	4.59	5.23					
	H1 lead leg	L	velocity	7.41	9.04						8.22	7.63	7.63	7.65	8.01				
			strides	20	13							14	14	61					
Kendziera, David (USA) (1994)	time			5.90	9.84	13.85	17.88	22.02	26.26	30.60	35.20	39.94	44.74		50.39	8 / 8			
	reaction time	0.197	interval		3.94	4.01	4.03	4.14	4.24	4.34	4.60	4.74	4.80	5.65			11.98	12.72	14.14
	H1 lead leg	R	velocity	7.63	8.88	8.73	8.68	8.45	8.25	8.06	7.61	7.38	7.29	7.08	7.94		8.76	8.25	7.43
			strides	20	13	13	13	13	13	13	14	14	14	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=SqvYbwH11HA>

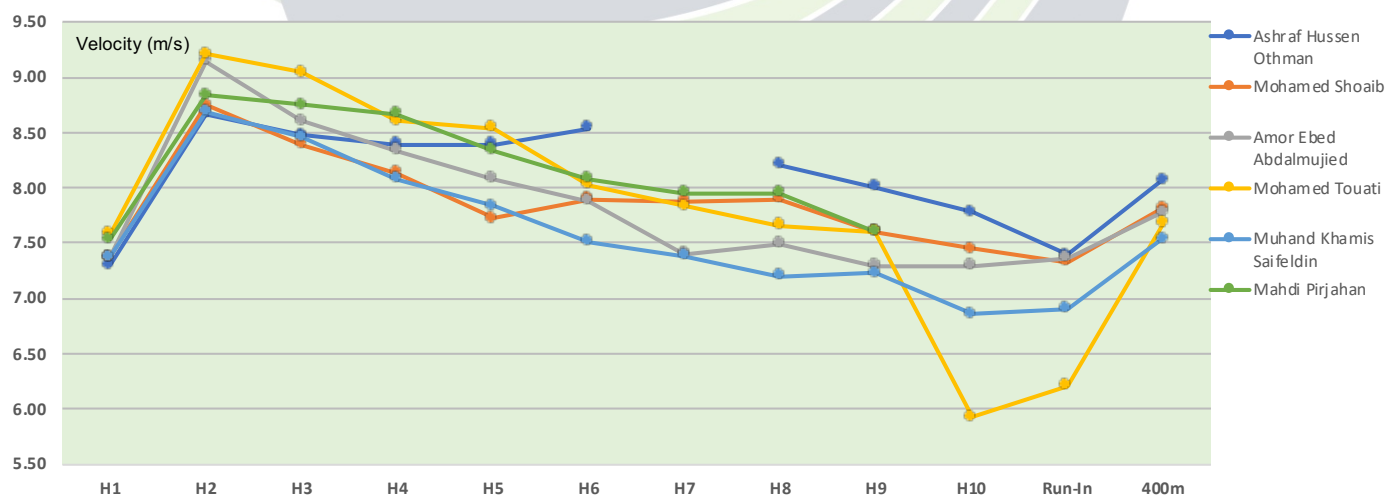
2021 Doha Diamond League (Doha, QAT) (TV Analysis)

Men's 400m Hurdles

Date 2021.05.28

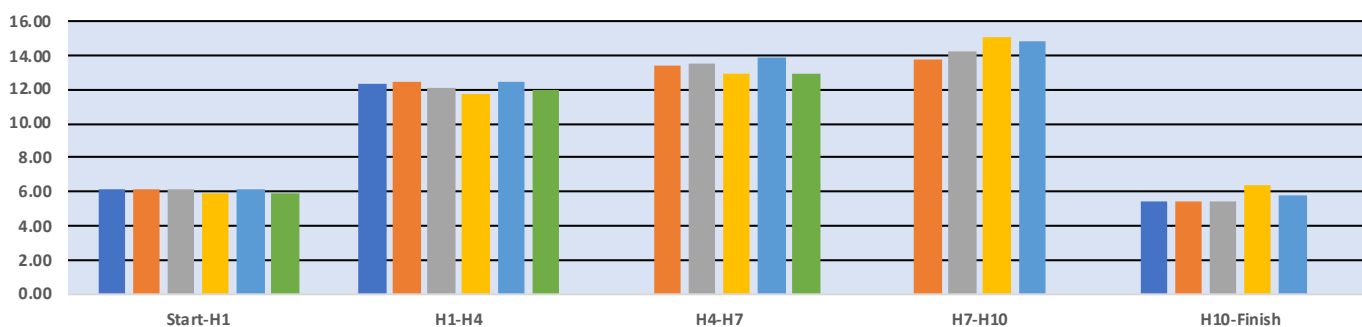
B FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Othman, Ashraf Hussen (QAT) (2001)	time		6.16	10.20	14.33	18.50	22.67	26.77		35.30	39.67	44.17		49.58	5 / 1			
	reaction time	0.171								8.53	4.37	4.50	5.41	PB		12.34		
	interval velocity		7.31	8.66	8.47	8.39	8.39	8.54		8.21	8.01	7.78	7.39	8.07		8.51		
	H1 lead leg	R	22	14	14	14	14	14			15	15	18	140				
Shoaib, Mohamed (SUD) (1995)	time		6.10	10.10	14.27	18.57	23.10	27.53	31.97	36.40	41.00	45.70		51.16	8 / 2			
	reaction time	0.191								4.43	4.43	4.60	5.46			12.47	13.40	13.73
	interval velocity		7.38	8.75	8.39	8.14	7.73	7.90	7.88	7.90	7.61	7.45	7.33	7.82		8.42	7.84	7.65
	H1 lead leg	R	21	13	13	14	14	14		14	14	14	17.2	148.2				
Abdalmujied, Amor Ebed (QAT) (2001)	time		6.10	9.93	14.00	18.20	22.53	26.97	31.70	36.37	41.17	45.97		51.40	3 / 3			
	reaction time	0.168								4.67	4.80	4.80	5.43	PB		12.10	13.50	14.27
	interval velocity		7.38	8.94	8.60	8.33	8.08	7.88	7.40	7.49	7.29	7.29	7.37	7.78		8.68	7.78	7.36
	H1 lead leg	L	22	14	14	14	14	14		15	15	15	18.7	155.7				
Touati, Mohamed (TUN) (1998)	time		5.93	9.73	13.60	17.67	21.77	26.13	30.60	35.17	39.77	45.67		52.11	6 / 4			
	reaction time	0.155								4.57	4.60	5.90	6.44			11.74	12.93	15.07
	interval velocity		7.59	9.21	9.04	8.60	8.54	8.03	7.83	7.66	7.61	5.93	6.21	7.68		8.94	8.12	6.97
	H1 lead leg	L	21	14	13	14	14	14	14	14	14	16	18	166				
Saifeldin, Muhand Khamis (QAT) (1998)	time		6.10	10.13	14.27	18.60	23.07	27.73	32.47	37.33	42.17	47.27		53.06	4 / 5			
	reaction time	0.127								4.86	4.84	5.10	5.79			12.50	13.87	14.80
	interval velocity		7.38	8.68	8.45	8.08	7.83	7.51	7.38	7.20	7.23	6.86	6.91	7.54		8.40	7.57	7.09
	H1 lead leg	L	22	14	14	14	14	14		14	14	15	135					
Pirjahan, Mahdi (IRI) (1999)	time		5.97	9.93	13.93	17.97	22.17	26.50	30.90	35.30	39.90			dnf	7 / --			
	reaction time	0.138								4.40	4.40	4.60				12.00	12.93	
	interval velocity		7.54	8.84	8.75	8.66	8.33	8.08	7.95	7.95	7.61					8.75	8.12	
	H1 lead leg	L	20	14	13	13	13	13	13	13	13			125				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 854 x 480 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=0VpqrIub14A>

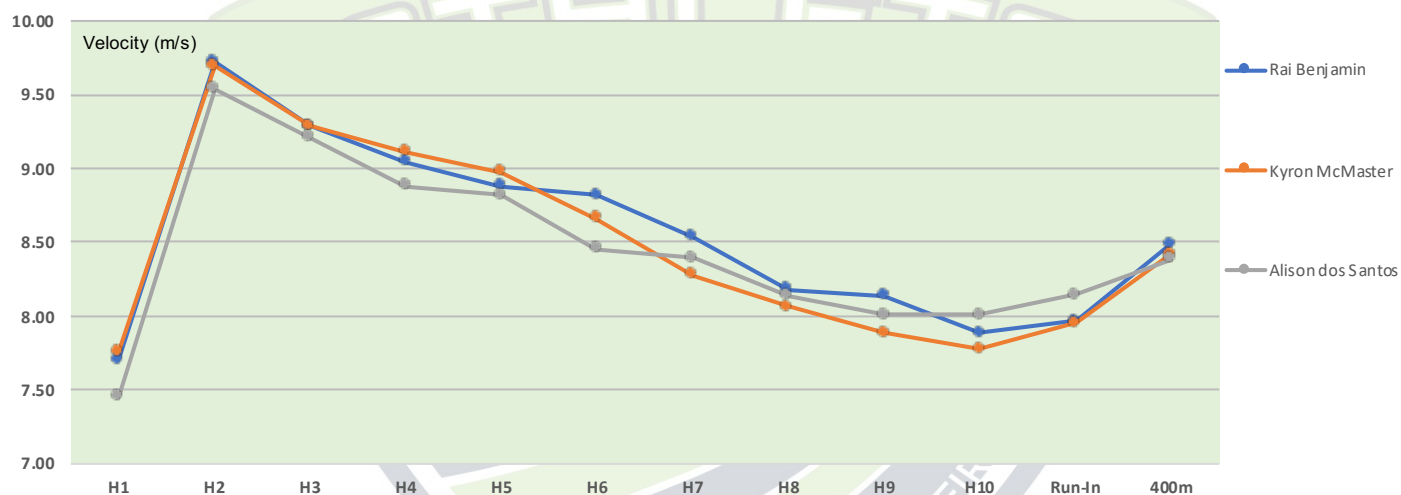
2021 USATF Golden Games (Walnut, CA) (TV Analysis)

Men's 400m Hurdles

Date 2021.05.09

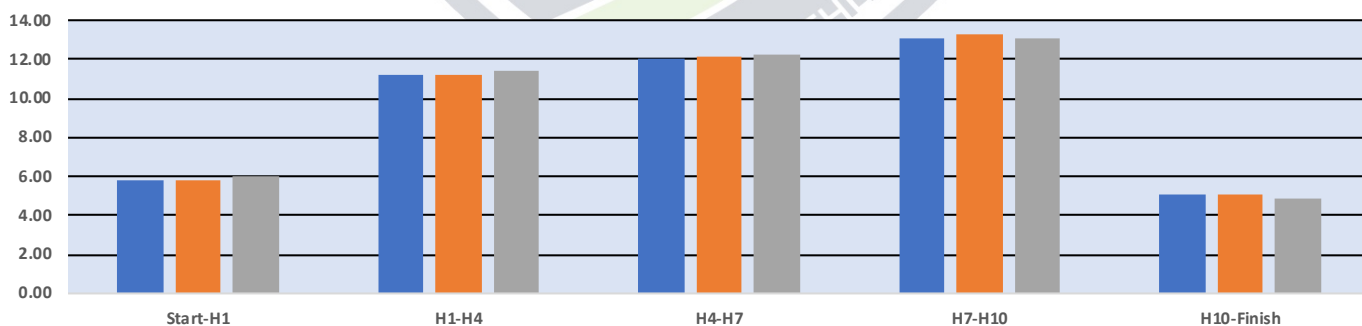
FINAL

			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		5.84	9.44	13.21	17.08	21.02	24.99	29.09	33.37	37.67	42.11		47.13	5 / 1			
	reaction time																	
	interval			3.60	3.77	3.87	3.94	3.97	4.10	4.28	4.30	4.44	5.02			11.24	12.01	13.02
	velocity		7.71	9.72	9.28	9.04	8.88	8.82	8.54	8.18	8.14	7.88	7.97	8.49		9.34	8.74	8.06
McMaster, Kyron (IVB) (1997)	H1 lead leg	R	20	13	13	13	13	13	13	13	13	13	16	153				
	time		5.80	9.41	13.18	17.02	20.92	24.96	29.19	33.53	37.97	42.47		47.50	6 / 2			
	reaction time																	
	interval			3.61	3.77	3.84	3.90	4.04	4.23	4.34	4.44	4.50	5.03	NR PB		11.22	12.17	13.28
dos Santos, Alison (BRA) (2000)	velocity		7.76	9.70	9.28	9.11	8.97	8.66	8.27	8.06	7.88	7.78	7.95	8.42		9.36	8.63	7.91
	H1 lead leg	R	20	13	13	13	13	13	13	14	14	14	16.7	156.7				
	time		6.04	9.71	13.51	17.45	21.42	25.56	29.73	34.03	38.40	42.77		47.68	4 / 3			
	reaction time																	
	interval			3.67	3.80	3.94	3.97	4.14	4.17	4.30	4.37	4.37	4.91	AR PB		11.41	12.28	13.04
	velocity		7.45	9.54	9.21	8.88	8.82	8.45	8.39	8.14	8.01	8.01	8.15	8.39		9.20	8.55	8.05
	H1 lead leg	L	20	13	13	12	12	13	13	13	13	13	16.2	151.2				
	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=AwvkXF0nHR8>

Women's 400m Hurdles

McLaughlin, Sydney (USA) (1999)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 Olympic Games (Tokyo, JPN) (TV Analysis)				Henson (2021) - Athlete First: 2021 year end hurdle report															
date	4-Aug	time		6.16	10.16	14.24	18.36	22.64	27.00	31.56	36.32	41.20	46.04		51.46	4 / 1			
reaction time	0.163	interval			4.00	4.08	4.12	4.28	4.36	4.56	4.76	4.88	4.84	5.42	WR		12.20	13.20	14.48
		velocity		7.31	8.75	8.58	8.50	8.18	8.03	7.68	7.35	7.17	7.23	7.38	7.77		8.61	7.95	7.25
H1 lead leg	R	strides		22	14	14	14	14	14	14	15	16	15	18.5	170.5				
Muhammad, Dalilah (USA) (1990)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 Olympic Games (Tokyo, JPN) (TV Analysis)				Henson (2021) - Athlete First: 2021 year end hurdle report															
date	4-Aug	time		6.04	9.92	13.92	18.08	22.44	26.84	31.36	36.04	40.88	45.84		51.58	7 / 2			
reaction time	0.200	interval			3.88	4.00	4.16	4.36	4.40	4.52	4.68	4.84	4.96	5.74	PB		12.04	13.28	14.48
		velocity		7.45	9.02	8.75	8.41	8.03	7.95	7.74	7.48	7.23	7.06	6.97	7.75		8.72	7.91	7.25
H1 lead leg	R	strides		22	14	14	15	15	15	15	15	16	16	19	176				
McLaughlin, Sydney (USA) (1999)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 USA Olympic Trials (Eugene, OR) (TV Analysis)				Athlete Tracking (2021) - Women's 400mH - Unofficial Split Times															
date	27-Jun	time		6.11	10.14	14.36	18.60	23.04	27.59	32.24	36.91	41.64	46.46		51.90	6 / 1			
reaction time	0.194	interval			4.03	4.22	4.24	4.44	4.55	4.65	4.67	4.73	4.82	5.44	WR		12.49	13.64	14.22
		velocity		7.36	8.68	8.29	8.25	7.88	7.69	7.53	7.49	7.40	7.26	7.35	7.71		8.41	7.70	7.38
H1 lead leg	R	strides		22	14	14	14	14	15	15	15	15	15	18.2	171.2				
Boi, Femke (NED) (2000)				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2020 Olympic Games (Tokyo, JPN) (TV Analysis)				Henson (2021) - Athlete First: 2021 year end hurdle report															
date	4-Aug	time		6.28	10.26	14.28	18.36	22.56	26.96	31.60	36.28	41.16	46.16		52.03	5 / 3			
reaction time	0.165	interval			3.98	4.02	4.08	4.20	4.40	4.64	4.68	4.88	5.00	5.87	AR		12.08	13.24	14.56
		velocity		7.17	8.79	8.71	8.58	8.33	7.95	7.54	7.48	7.17	7.00	6.81	7.69		8.69	7.93	7.21
H1 lead leg	L	strides		22	15	15	15	15	15	15	15	15	15	19	176				
Boi, 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 - 2021 Bauhaus Galan (Stockholm, SWE) (TV Analysis)				Henson (2021) - Athlete First: 2021 year end hurdle report															
date	4-Jul	time		6.24	10.24	14.26	18.45	22.78	27.31	31.96	36.72	41.58	46.60		52.37	5 / 1			
reaction time	0.195	interval			4.00	4.02	4.19	4.33	4.53	4.65	4.76	4.86	5.02	5.77	NR PB		12.21	13.51	14.64
		velocity		7.21	8.75	8.71	8.35	8.08	7.73	7.53	7.35	7.20	6.97	6.93	7.64		8.60	7.77	7.17
H1 lead leg	L	strides			15	15	15	15	15	15	15	15	15	19	154				
Little, Shamier (USA) (19																			

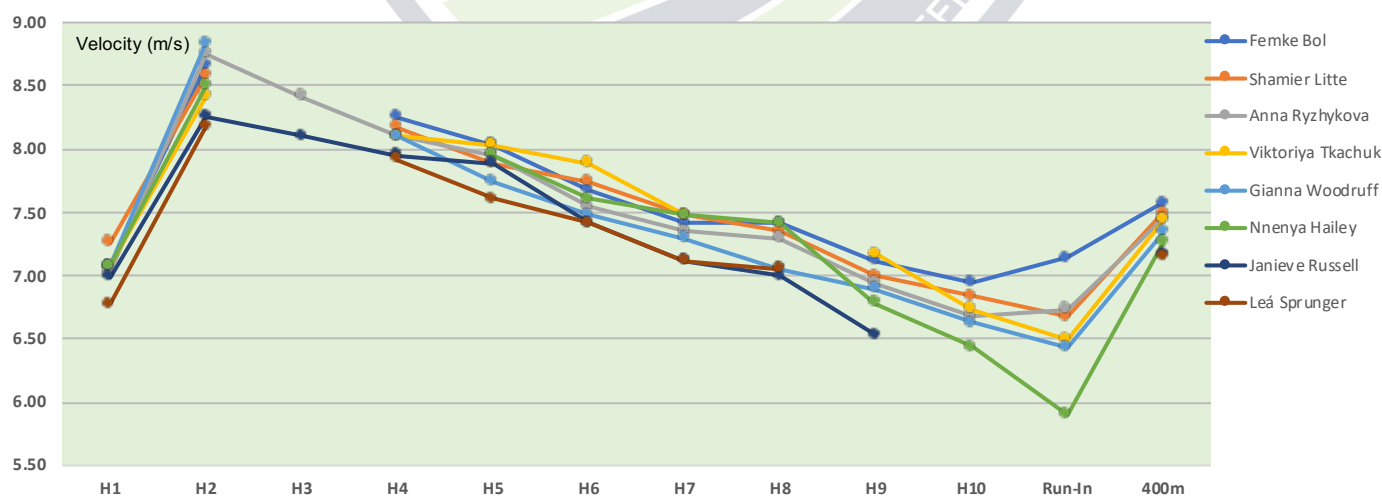
2021 Weltklasse (Zürich, SUI) (TV Analysis)

Women's 400m Hurdles

Date 2021.09.09

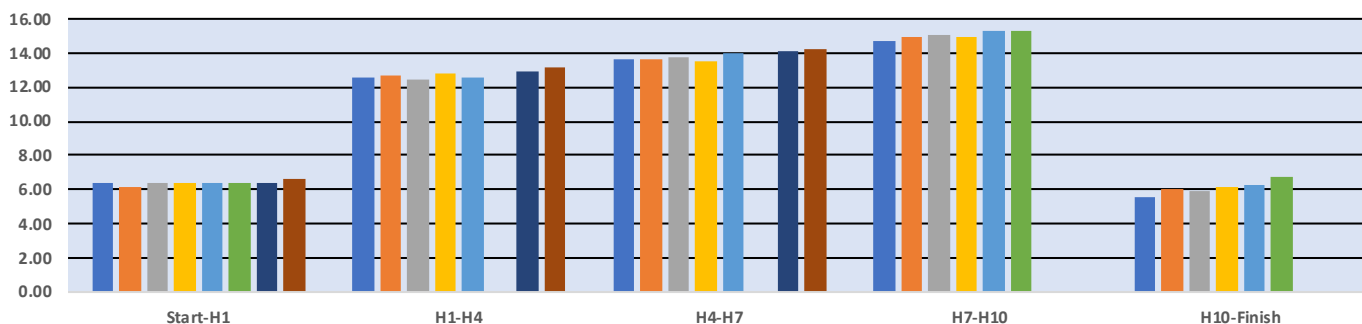
FINAL

			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	10.40		18.88	23.24	27.80	32.52	37.24	42.16	47.20		52.80	4 / 1			
reaction time	0.172	interval		4.04		8.48	4.36	4.56	4.72	4.72	4.92	5.04	5.60			12.52	13.64	14.68
		velocity	7.08	8.66		8.25	8.03	7.68	7.42	7.42	7.11	6.94	7.14	7.58		8.39	7.70	7.15
H1 lead leg	L	strides	22	15			15	15	15	15	15	15	18.7	145.7				
Little, Shamier (USA) (1995)	time		6.20	10.28		18.84	23.28	27.80	32.48	37.24	42.24	47.36		53.35	3 / 2			
reaction time	0.165	interval		4.08		8.56	4.44	4.52	4.68	4.76	5.00	5.12	5.99			12.64	13.64	14.88
		velocity	7.26	8.58		8.18	7.88	7.74	7.48	7.35	7.00	6.84	6.68	7.50		8.31	7.70	7.06
H1 lead leg	R	strides	22	15			15	15	15	16	16	16	20	150				
Ryzhykova, Anna (UKR) (1989)	time		6.40	10.40	14.56	18.88	23.28	27.92	32.68	37.48	42.52	47.76		53.70	5 / 3			
reaction time	0.160	interval		4.00	4.16	4.32	4.40	4.64	4.76	4.80	5.04	5.24	5.94			12.48	13.80	15.08
		velocity	7.03	8.75	8.41	8.10	7.95	7.54	7.35	7.29	6.94	6.68	6.73	7.45		8.41	7.61	6.96
H1 lead leg	R	strides	22	14	14	14	14	15	15	15	15	16	19.2	173.2				
Tkachuk, Viktoriya (UKR) (1994)	time		6.36	10.52		19.16	23.52	27.96	32.64		42.40	47.60		53.76	7 / 4			
reaction time	0.192	interval		4.16		8.64	4.36	4.44	4.68		9.76	5.20	6.16	PB		12.80	13.48	14.96
		velocity	7.08	8.41		8.10	8.03	7.88	7.48		7.17	6.73	6.49	7.44		8.20	7.79	7.02
H1 lead leg	L	strides	20	18			15	15	15		16	16	20	135				
Woodruff, Gianna (PAN) (1993)	time		6.36	10.32		18.96	23.48	28.16	32.96	37.92	43.00	48.28		54.50	2 / 5			
reaction time	0.192	interval		3.96		8.64	4.52	4.68	4.80	4.96	5.08	5.28	6.22			12.60	14.00	15.32
		velocity	7.08	8.84		8.10	7.74	7.48	7.29	7.06	6.89	6.63	6.43	7.34		8.33	7.50	6.85
H1 lead leg	L	strides	23	15			15	15	15		16	16	19.2	134.2				
Hailey, Nnenna (USA) (1994)	time		6.36	10.48		23.68	28.28	32.96	37.68	42.84	48.28		55.06	1 / 6				
reaction time	0.183	interval		4.12		13.20	4.60	4.68	4.72	5.16	5.44	6.78						15.32
		velocity	7.08	8.50		7.95	7.61	7.48	7.42	6.78	6.43	5.90	7.26					6.85
H1 lead leg	L	strides	23	16			17	17		18	18	23	132					
Russell, Janieve (JAM) (1993)	time		6.44	10.68	15.00	19.40	23.84	28.56	33.48	38.48	43.84		55.74	6 / 7				
reaction time	0.145	interval		4.24	4.32	4.40	4.44	4.72	4.92	5.00	5.36					12.96	14.08	
		velocity	6.99	8.25	8.10	7.95	7.88	7.42	7.11	7.00	6.53		7.18			8.10	7.46	
H1 lead leg	R	strides	23	15	15	15	15	16	16	16	17		148					
Sprunger, Leá (SUI) (1990)	time		6.64	10.92		19.76	24.36	29.08	34.00	38.96			55.87	8 / 8				
reaction time	0.155	interval		4.28		8.84	4.60	4.72	4.92	4.96						13.12	14.24	
		velocity	6.78	8.18		7.92	7.61	7.42	7.11	7.06			7.16			8.00	7.37	
H1 lead leg	R	strides	23	15			15	15	15		15		98					



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=CWE1Rq7998Y>

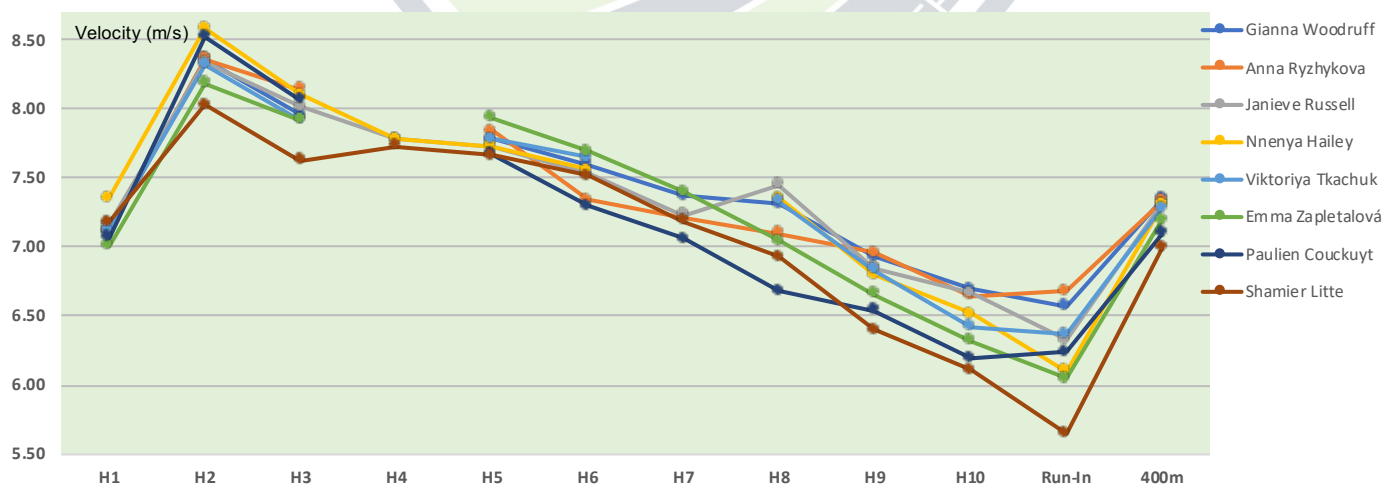
2021 Meeting de Paris (Paris, FRA) (TV Analysis)

Women's 400m Hurdles

Date 2021.08.28

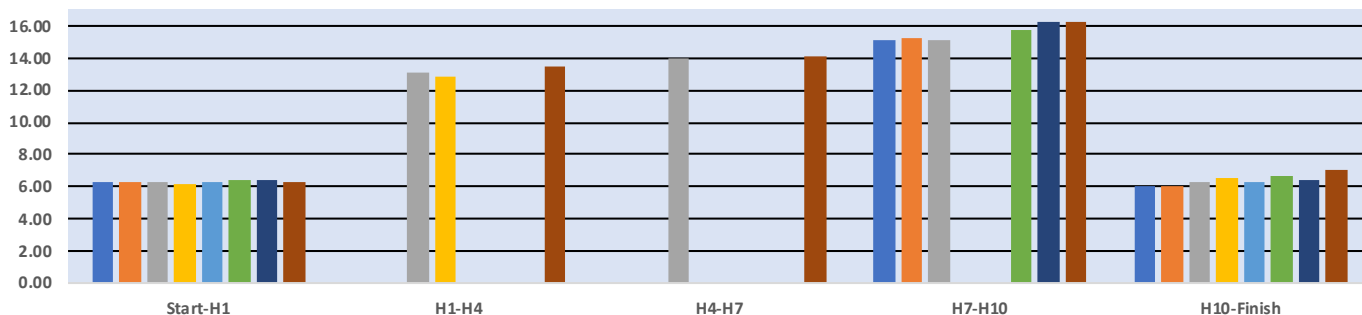
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Woodruff, Gianna (PAN) (1993)	time		6.33	10.52	14.92		23.92	28.53	33.28	38.07	43.12	48.35		54.44	7 / 1			
	reaction time	0.206					9.00	4.61	4.75	4.79	5.05	5.23	6.09					15.07
	interval			4.19	4.40		7.78	7.59	7.37	7.31	6.93	6.69	6.57	7.35				6.97
	velocity		7.11	8.35	7.95													
Ryzhykova, Anna (UKR) (1989)	time		6.33	10.52	14.82		23.75	28.52	33.37	38.30	43.33	48.60		54.59	6 / 2			
	reaction time	0.175					8.93	4.77	4.85	4.93	5.03	5.27	5.99					15.23
	interval			4.19	4.30		7.84	7.34	7.22	7.10	6.96	6.64	6.68	7.33				6.89
	velocity		7.11	8.35	8.14													
Russell, Janieve (JAM) (1993)	time		6.28	10.48	14.85	19.35	23.88	28.53	33.37	38.07	43.18	48.43		54.75	4 / 3			
	reaction time	0.162					4.53	4.65	4.84	4.70	5.11	5.25	6.32			13.07	14.02	15.06
	interval			4.20	4.37	4.50	7.73	7.53	7.23	7.45	6.85	6.67	6.33	7.31		8.03	7.49	6.97
	velocity		7.17	8.33	8.01	7.78	7.73	7.53	7.23	7.45	6.85	6.67	6.33	7.31				
Hailey, Nnenna (USA) (1994)	time		6.12	10.20	14.52	19.02	23.55	28.18		37.70	42.85	48.22		54.78	1 / 4			
	reaction time	0.187					4.53	4.63		9.52	5.15	5.37	6.56			12.90		
	interval			4.08	4.32	4.50	7.73	7.56		7.35	6.80	6.52	6.10	7.30		8.14		
	velocity		7.35	8.58	8.10	7.78	7.73	7.56		7.35	6.80	6.52	6.10	7.30				
Tkachuk, Viktoriya (UKR) (1994)	time		6.32	10.53	14.95		23.95	28.53		38.08	43.20	48.65		54.93	3 / 5			
	reaction time	0.228					9.00	4.58		9.55	5.12	5.45	6.28					
	interval			4.21	4.42		7.78	7.64		7.33	6.84	6.42	6.37	7.28				
	velocity		7.12	8.31	7.92		7.78	7.64		7.33	6.84	6.42	6.37	7.28				
Zapletalová, Emma (SVK) (2000)	time		6.42	10.70	15.12		23.95	28.50	33.23	38.20	43.46	49.00		55.61	8 / 6			
	reaction time	0.138					8.83	4.55	4.73	4.97	5.26	5.54	6.61					15.77
	interval			4.28	4.42		7.93	7.69	7.40	7.04	6.65	6.32	6.05	7.19				6.66
	velocity		7.01	8.18	7.92		7.93	7.69	7.40	7.04	6.65	6.32	6.05	7.19				
Couckuyt, Paulien (BEL) (1997)	time		6.37	10.48	14.82		23.95	28.75	33.71	38.95	44.30	49.95		56.36	2 / 7			
	reaction time	0.169					9.13	4.80	4.96	5.24	5.35	5.65	6.41					16.24
	interval			4.11	4.34		7.67	7.29	7.06	6.68	6.54	6.19	6.24	7.10				6.47
	velocity		7.06	8.52	8.06		7.67	7.29	7.06	6.68	6.54	6.19	6.24	7.10				
Little, Shamier (USA) (1995)	time		6.27	10.63	15.22	19.75	24.32	28.98	33.85	38.90	44.37	50.10		57.18	5 / 8			
	reaction time	0.222					4.57	4.66	4.87	5.05	5.47	5.73	7.08			13.48	14.10	16.25
	interval			4.36	4.59	4.53	7.66	7.51	7.19	6.93	6.40	6.11	5.65	7.00		7.79	7.45	6.46
	velocity		7.18	8.03	7.63	7.73	7.66	7.51	7.19	6.93	6.40	6.11	5.65	7.00				
H1 lead leg	time																	
	reaction time																	
	interval																	
	velocity																	



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 60fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=vs6t6DFk6QI>

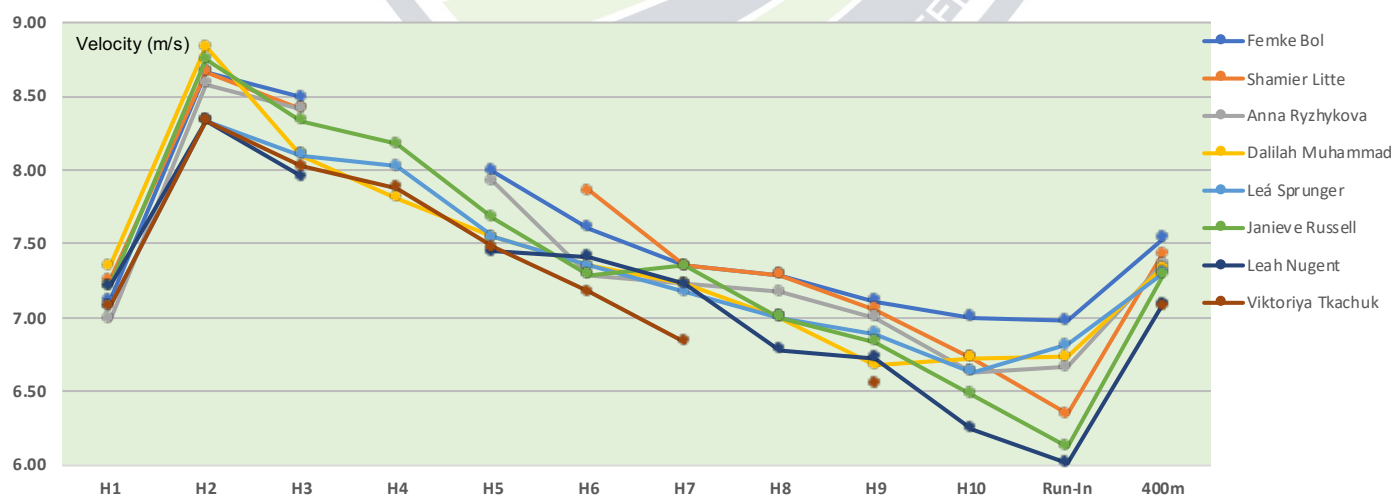
2021 Athletissima (Lausanne, SUI) (TV Analysis)

Women's 400m Hurdles

Date 2021.08.26

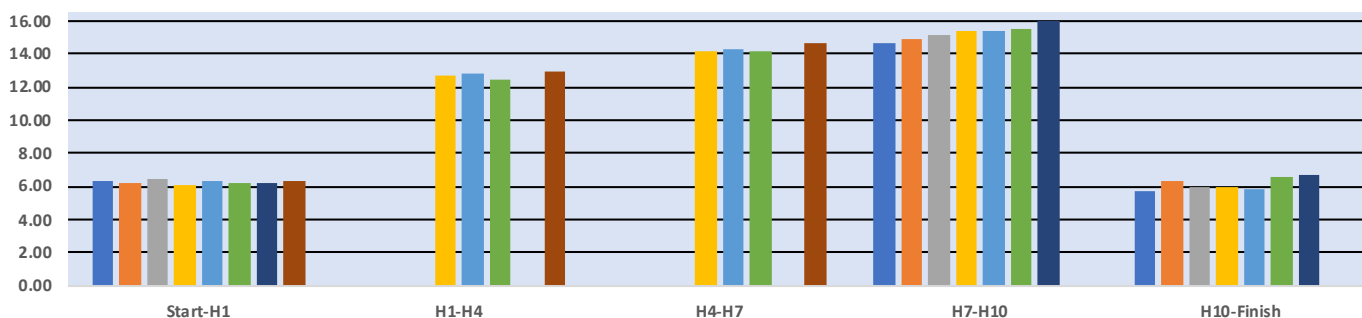
FINAL

			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		6.32	10.36	14.48		23.24	27.84	32.60	37.40	42.32	47.32		53.05	4 / 1			
	reaction time	0.186																
	interval			4.04	4.12		8.76	4.60	4.76	4.80	4.92	5.00	5.73					14.72
	velocity		7.12	8.66	8.50		7.99	7.61	7.35	7.29	7.11	7.00	6.98	7.54				7.13
	H1 lead leg	L						15	15	15	15	15	15	18.7	145.7			
Little, Shamier (USA) (1995)	time		6.20	10.24	14.40			27.76	32.52	37.32	42.28	47.48		53.78	3 / 2			
	reaction time	0.202																
	interval			4.04	4.16			13.36	4.76	4.80	4.96	5.20	6.30					14.96
	velocity		7.26	8.66	8.41			7.86	7.35	7.29	7.06	6.73	6.35	7.44				7.02
	H1 lead leg	R						16	16	16	16	17	20	138				
Ryzhykova, Anna (UKR) (1989)	time		6.44	10.52	14.68		23.52	28.32	33.16	38.04	43.04	48.32		54.32	2 / 3			
	reaction time	0.162																
	interval			4.08	4.16		8.84	4.80	4.84	4.88	5.00	5.28	6.00					15.16
	velocity		6.99	8.58	8.41		7.92	7.29	7.23	7.17	7.00	6.63	6.67	7.36				6.93
	H1 lead leg	R						15	15	15	15	16	19	145				
Muhammad, Dalilah (USA) (1990)	time		6.12	10.08	14.40	18.88	23.52	28.28	33.12	38.12	43.36	48.56		54.50	5 / 4			
	reaction time	0.189																
	interval			3.96	4.32	4.48	4.64	4.76	4.84	5.00	5.24	5.20	5.94			12.76	14.24	15.44
	velocity		7.35	8.84	8.10	7.81	7.54	7.35	7.23	7.00	6.68	6.73	6.73	7.34		8.23	7.37	6.80
	H1 lead leg	R						15	15	15	16	16	19	178				
Sprunger, Leá (SUI) (1990)	time		6.36	10.56	14.88	19.24	23.88	28.64	33.52	38.52	43.60	48.88		54.75	7 / 5			
	reaction time	0.176																
	interval			4.20	4.32	4.36	4.64	4.76	4.88	5.00	5.08	5.28	5.87			12.88	14.28	15.36
	velocity		7.08	8.33	8.10	8.03	7.54	7.35	7.17	7.00	6.89	6.63	6.81	7.31		8.15	7.35	6.84
	H1 lead leg	R						15	15	15	15	15	18	170				
Russell, Janieve (JAM) (1993)	time		6.24	10.24	14.44	18.72	23.28	28.08	32.84	37.84	42.96	48.36		54.89	6 / 6			
	reaction time	0.136																
	interval			4.00	4.20	4.28	4.56	4.80	4.76	5.00	5.12	5.40	6.53			12.48	14.12	15.52
	velocity		7.21	8.75	8.33	8.18	7.68	7.29	7.35	7.00	6.84	6.48	6.13	7.29		8.41	7.44	6.77
	H1 lead leg	R						16	16	16	16	17	20	185				
Nugent, Leah (JAM) (1992)	time		6.24	10.44	14.84		24.24	28.96	33.80	38.96	44.16	49.76		56.41	1 / 7			
	reaction time	0.202																
	interval			4.20	4.40		9.40	4.72	4.84	5.16	5.20	5.60	6.65					15.96
	velocity		7.21	8.33	7.95		7.45	7.42	7.23	6.78	6.73	6.25	6.02	7.09				6.58
	H1 lead leg	R						15	15	15	15	16	19	147				
Tkachuk, Viktoriya (UKR) (1994)	time		6.36	10.56	14.92	19.36	24.04	28.92	34.04		44.72			56.53	8 / 8			
	reaction time	0.190																
	interval			4.20	4.36	4.44	4.68	4.88	5.12		10.68					13.00	14.68	
	velocity		7.08	8.33	8.03	7.88	7.48	7.17	6.84		6.55					8.08	7.15	
	H1 lead leg	L						16	16	16				130				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

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

Biomechanical Analysis

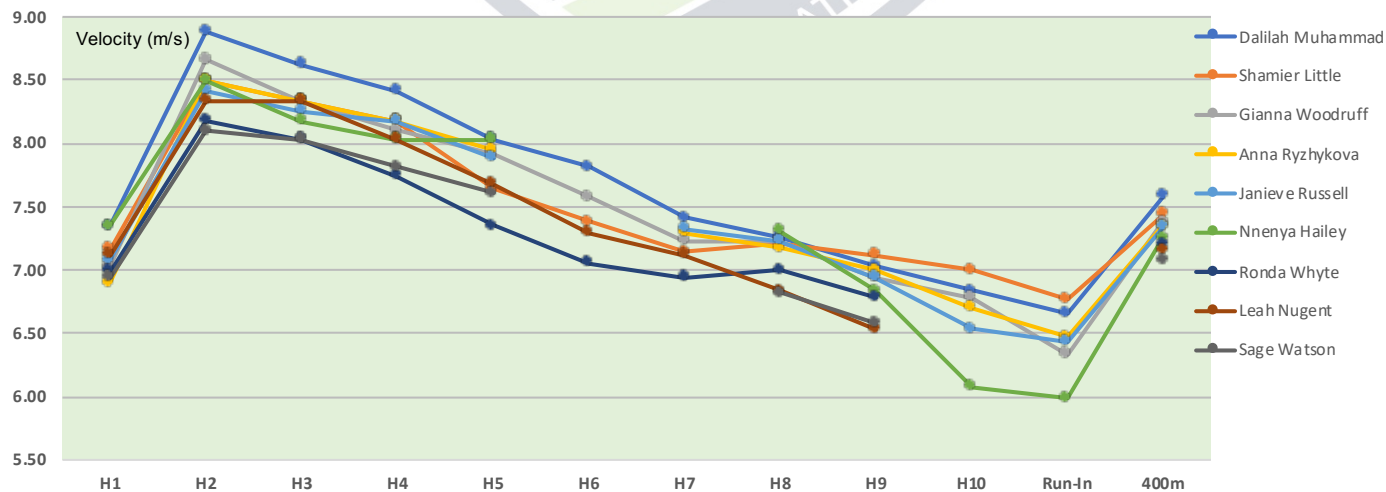
2021 Prefontaine Classic (Eugene, OR) (TV Analysis)

100m Hurdles

Date: 2021.08.21

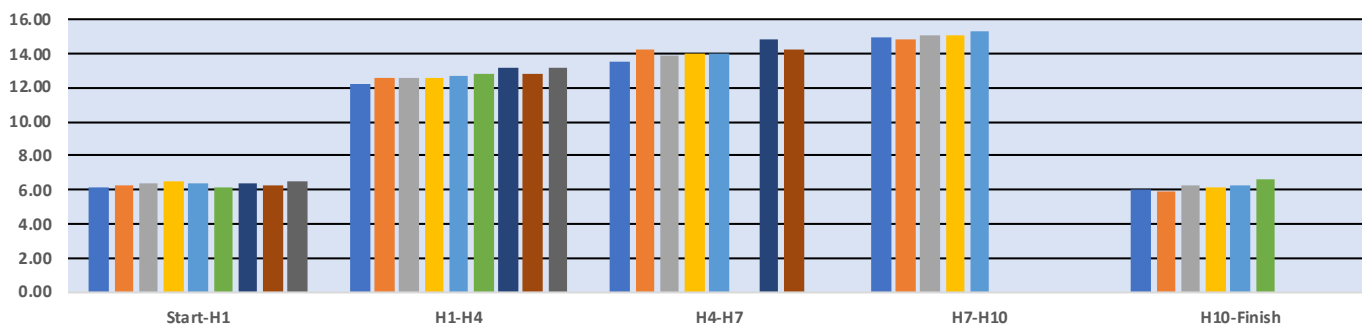
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Muhammad, Dalilah (USA) (1990)	time		6.12	10.06	14.12	18.28	22.64	27.12	31.84	36.66	41.64	46.76		52.77	5 / 1			
	reaction time	0.164														12.16	13.56	14.92
	interval velocity		7.35	8.88	8.62	8.41	4.36	4.48	4.72	4.82	4.98	5.12	6.01			8.63	7.74	7.04
	H1 lead leg	R	23	15	15	15	15	15	15	15	16	16	19.2	179.2				
Little, Shamier (USA) (1995)	time		6.28	10.40	14.60	18.88	23.46	28.20	33.10	37.96	42.88	47.88		53.79	6 / 2			
	reaction time	0.190														12.60	14.22	14.78
	interval velocity		7.17	8.50	8.33	8.18	7.64	7.38	7.14	7.20	7.11	7.00	5.91			8.33	7.38	7.10
	H1 lead leg	R	23	15	15	15	16	16	16	16	17	16	19	184				
Woodruff, Gianna (PAN) (1993)	time		6.40	10.44	14.64	18.96	23.38	28.00	32.84	37.68	42.72	47.88		54.20	8 / 3			
	reaction time	0.249														12.56	13.88	15.04
	interval velocity		7.03	8.66	8.33	8.10	7.92	7.58	7.23	7.23	6.94	5.16	6.32	NR PB		8.36	7.56	6.98
	H1 lead leg	L	23	15	15	15	15	15	15	15	16	16	19.2	179.2				
Ryzhykova, Anna (UKR) (1989)	time		6.52	10.64	14.84	19.12	23.52		33.12	38.00	43.00	48.22		54.40	3 / 4			
	reaction time	0.162														12.60	14.00	15.10
	interval velocity		6.90	8.50	8.33	8.18	7.95		9.60	4.88	5.00	5.22	6.18			8.33	7.50	6.95
	H1 lead leg	R	22	14	14	14	14		7.29	7.17	7.00	6.70	6.47	7.35				
Russell, Janieve (JAM) (1993)	time		6.36	10.52	14.76	19.04	23.48		33.04	37.88	42.92	48.28		54.50	4 / 5			
	reaction time	0.155														12.68	14.00	15.24
	interval velocity		7.08	8.41	8.25	8.18	7.88		9.56	4.84	5.04	5.36	6.22			8.28	7.50	6.89
	H1 lead leg	R	23	15	15	15	15		7.32	7.23	6.94	6.53	6.43	7.34				
Hailey, Nnenna (USA) (1994)	time		6.12	10.24	14.52	18.88	23.24		33.04	37.88	42.92	48.28		55.16	1 / 6			
	reaction time	0.153														12.76		
	interval velocity		7.35	8.50	8.18	8.03	8.03		14.36	5.12	5.76	6.68				8.23		
	H1 lead leg	L	24	16	16	16	16		7.31	6.84	6.08	5.99	7.25					
Whyte, Ronda (JAM) (1990)	time		6.44	10.72	15.08	19.60	24.36	29.32	34.36	39.36	44.52			55.57	7 / 7			
	reaction time	0.153														13.16	14.76	
	interval velocity		6.99	8.18	8.03	7.74	7.35	7.06	6.94	7.00	6.78					7.98	7.11	
	H1 lead leg	L	23	15	15	15	16		16	16	17							
Nugent, Leah (JAM) (1992)	time		6.32	10.52	14.72	19.08	23.64	28.44	33.36	38.48	43.84			55.86	9 / 8			
	reaction time	0.228														12.76	14.28	
	interval velocity		7.12	8.33	8.33	8.03	7.68	7.29	7.11	6.84	6.53					8.23	7.35	
	H1 lead leg	R	22	15	15	15	15	15	15	15	16							
Watson, Sage (CAN) (1994)	time		6.48	10.80	15.16	19.64	24.24		39.64	44.96				56.52	2 / 9			
	reaction time	0.163														13.16		
	interval velocity		6.94	8.10	8.03	7.81	7.61		15.40	5.32						7.98		
	H1 lead leg	R	22	15	15	15	15		6.82	6.58	16							



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=bPuf11O2SXk>

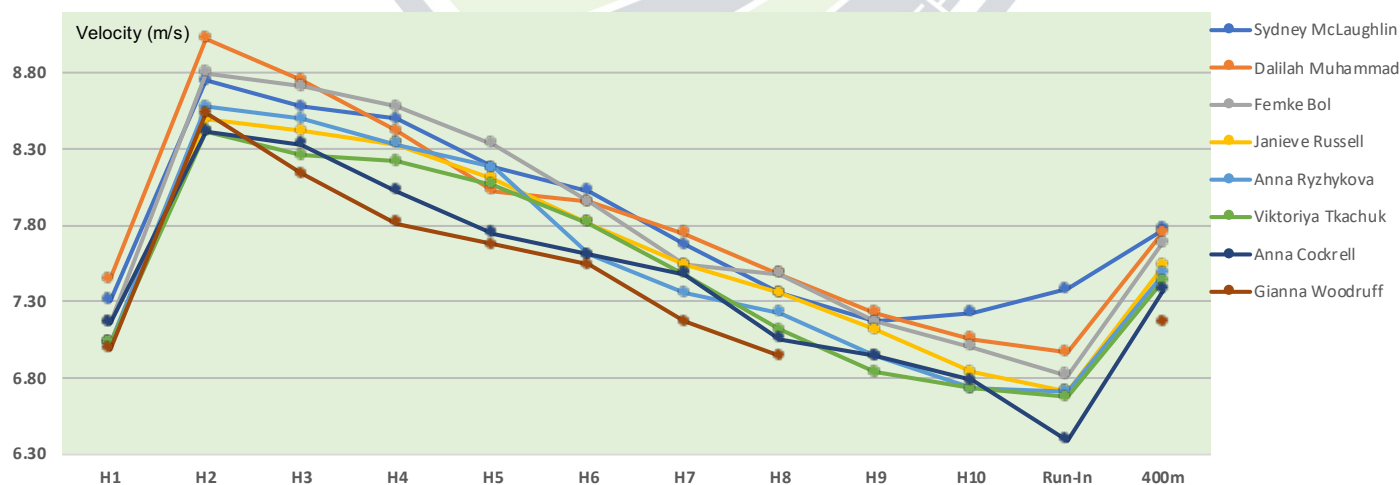
2020 Olympic Games (Tokyo, JPN) (TV Analysis)

Women's 400m Hurdles

Date 2021.08.04

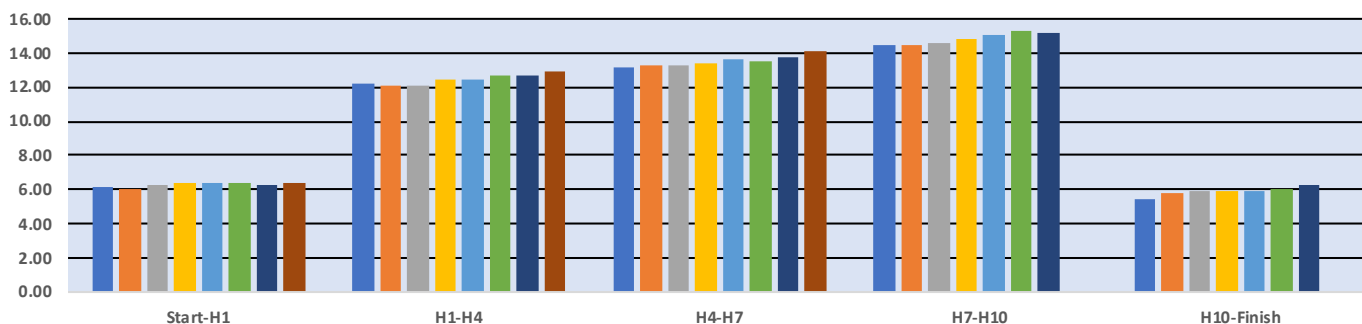
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (1999)	time		6.16	10.16	14.24	18.36	22.64	27.00	31.56	36.32	41.20	46.04		51.46	4 / 1			
	reaction time	0.163																
	interval			4.00	4.08	4.12	4.28	4.36	4.56	4.76	4.88	4.84	5.42	WR		12.20	13.20	14.48
	velocity		7.31	8.75	8.58	8.50	8.18	8.03	7.68	7.35	7.17	7.23	7.38	7.77		8.61	7.95	7.25
Muhammad, Dalilah (USA) (1990)	time		6.04	9.92	13.92	18.08	22.44	26.84	31.36	36.04	40.88	45.84		51.58	7 / 2			
	reaction time	0.200																
	interval			3.88	4.00	4.16	4.36	4.40	4.52	4.68	4.84	4.96	5.74	PB		12.04	13.28	14.48
	velocity		7.45	9.02	8.75	8.41	8.03	7.95	7.74	7.48	7.23	7.06	6.97	7.75		8.72	7.91	7.25
Bol, Femke (NED) (2000)	time		6.28	10.26	14.28	18.36	22.56	26.96	31.60	36.28	41.16	46.16		52.03	5 / 3			
	reaction time	0.165																
	interval			3.98	4.02	4.08	4.20	4.40	4.64	4.68	4.88	5.00	5.87	AR		12.08	13.24	14.56
	velocity		7.17	8.79	8.71	8.58	8.33	7.95	7.54	7.48	7.17	7.00	6.81	7.69		8.69	7.93	7.21
Russell, Janieve (JAM) (1993)	time		6.40	10.52	14.68	18.88	23.20	27.68	32.32	37.08	42.00	47.12		53.08	6 / 4			
	reaction time	0.136																
	interval			4.12	4.16	4.20	4.32	4.48	4.64	4.76	4.92	5.12	5.96	PB		12.48	13.44	14.80
	velocity		7.03	8.50	8.41	8.33	8.10	7.81	7.54	7.35	7.11	6.84	6.71	7.54		8.41	7.81	7.09
Ryzhykova, Anna (UKR) (1989)	time		6.40	10.48	14.60	18.80	23.08	27.68	32.44	37.28	42.32	47.52		53.48	2 / 5			
	reaction time	0.177																
	interval			4.08	4.12	4.20	4.28	4.40	4.76	4.84	5.04	5.20	5.96			12.40	13.64	15.08
	velocity		7.03	8.58	8.50	8.33	8.18	7.61	7.35	7.23	6.94	6.73	6.71	7.48		8.47	7.70	6.96
Tkachuk, Viktoriya (UKR) (1994)	time		6.40	10.56	14.80	19.06	23.40	27.88	32.56	37.48	42.60	47.80		53.79	3 / 6			
	reaction time	0.206																
	interval			4.16	4.24	4.26	4.34	4.48	4.68	4.92	5.12	5.20	5.99	PB		12.66	13.50	15.24
	velocity		7.03	8.41	8.25	8.22	8.06	7.81	7.48	7.11	6.84	6.73	6.68	7.44		8.29	7.78	6.89
Cockrell, Anna (USA) (1997)	time		6.28	10.44	14.64	19.00	23.52	28.12	32.80	37.76	42.80	47.96		54.22	8 / 7	(no official time given)		
	reaction time																	
	interval			4.16	4.20	4.36	4.52	4.60	4.68	4.96	5.04	5.16	6.26	DQ		12.72	13.80	15.16
	velocity		7.17	8.41	8.33	8.03	7.74	7.61	7.48	7.06	6.94	6.78	6.39	7.38		8.25	7.61	6.93
Woodruff, Gianna (PAN) (1993)	time		6.44	10.54	14.84	19.32	23.88	28.52	33.40	38.44				55.84	9 / 7			
	reaction time	0.235																
	interval			4.10	4.30	4.48	4.56	4.64	4.88	5.04						12.88	14.08	
	velocity		6.99	8.54	8.14	7.81	7.68	7.54	7.17	6.94						8.15	7.46	
	H1 lead leg	L																
	strides		22	14	14	14	14	14	14	15	16	15	18.5	170.5				
	H1 lead leg	R																
	strides		22	14	14	14	14	14	14	15	16	15	19	176				
	H1 lead leg	L																
	strides		22	15	15	15	15	15	15	15	15	15	19	176				
	H1 lead leg	R																
	strides		23	15	15	15	15	15	15	16	16	17	19.7	181.7				
	H1 lead leg	R																
	strides		22	14	14	14	14	15	15	15	15	16	19.2	173.2				
	H1 lead leg	L																
	strides		22	15	15	15	15	15	15	16	16	16	19.7	179.7				
	H1 lead leg	L																
	strides		22	15	15	15	15	15	15	16	16	16	16	160				
	H1 lead leg	L																
	strides		22	15	15	15	15	15	15	16	16	16	16	160				
	H1 lead leg	L																
	strides		23	15	15	15	15	15	15	15	15	15	15	128				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=-BTOqOqSR-k>

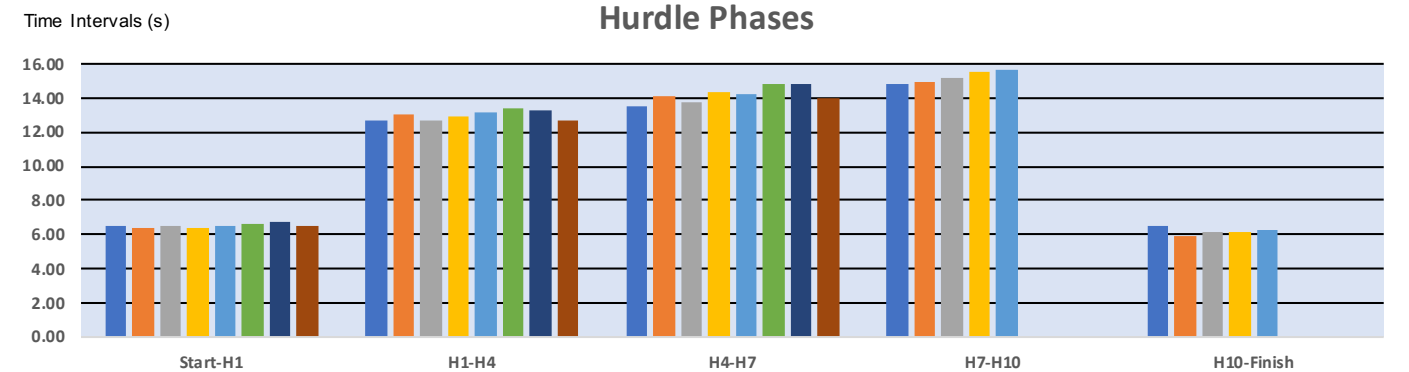
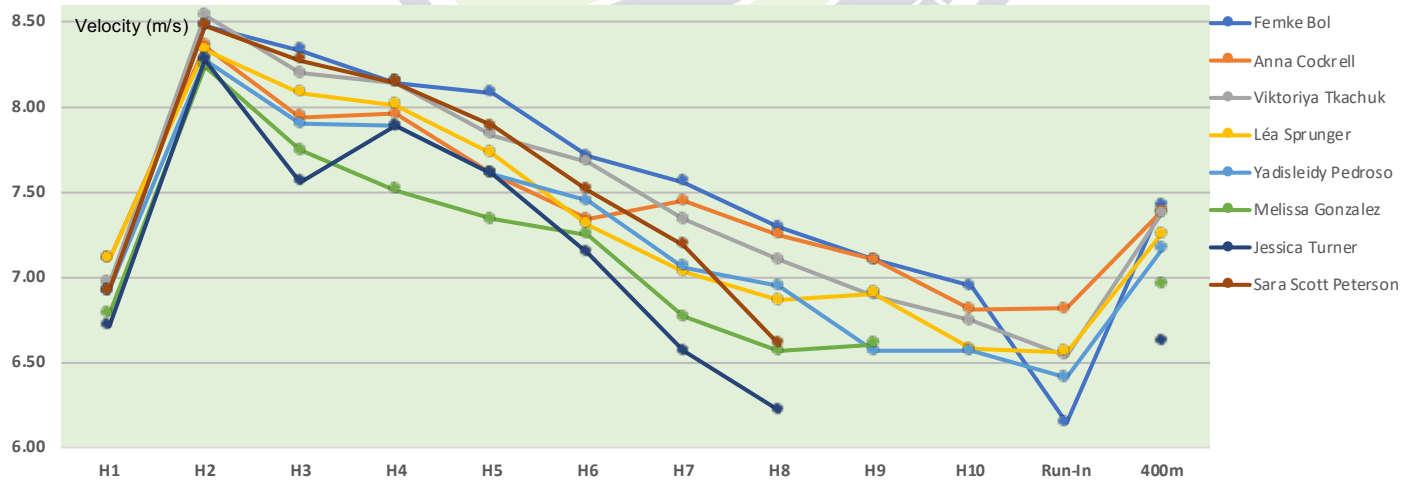
2020 Olympic Games (Tokyo, JPN) (TV Analysis)

Women's 400m Hurdles

Date 2021.08.02

Semi-Final 3

														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	6.50	10.63	14.83	19.13	23.46	28.00	32.63	37.43	42.36	47.40								
	reaction time	0.215	interval	4.13	4.20	4.30	4.33	4.54	4.63	4.80	4.93								
	velocity	6.92	8.47	8.33	8.14	8.08	7.71	7.56	7.29	7.10	6.94								
	H1 lead leg	L	strides	22	15	15	15	15	15	15	15								
Cockrell, Anna (USA) (1997)	time	6.33	10.52	14.93	19.33	23.93	28.70	33.40	38.23	43.16	48.30								
	reaction time	0.174	interval	4.19	4.41	4.40	4.60	4.77	4.70	4.83	4.93								
	velocity	7.11	8.35	7.94	7.95	7.61	7.34	7.45	7.25	7.10	6.81								
	H1 lead leg	L	strides	22	15	15	15	15	15	15	16								
Tkachuk, Viktoriya (UKR) (1994)	time	6.46	10.56	14.83	19.13	23.60	28.16	32.93	37.86	42.94	48.13								
	reaction time	0.224	interval	4.10	4.27	4.30	4.47	4.56	4.77	4.93	5.08								
	velocity	6.97	8.54	8.20	8.14	7.83	7.68	7.34	7.10	6.89	6.74								
	H1 lead leg	L	strides	22	15	15	15	15	16	16	16								
Sprunger, Léa (SUI) (1990)	time	6.33	10.53	14.86	19.23	23.76	28.55	33.53	38.63	43.70	49.02								
	reaction time	0.140	interval	4.20	4.33	4.37	4.53	4.79	4.98	5.10	5.32								
	velocity	7.11	8.33	8.08	8.01	7.73	7.31	7.03	6.86	6.90	6.58								
	H1 lead leg	R	strides	21	14	14	14	15	15	15	19								
Pedroso, Yadisleidy (ITA) (1987)	time	6.50	10.73	15.16	19.60	24.20	28.90	33.86	38.90	44.23	49.56								
	reaction time	0.181	interval	4.23	4.43	4.44	4.60	4.70	4.96	5.04	5.33								
	velocity	6.92	8.27	7.90	7.88	7.61	7.45	7.06	6.94	6.57	6.57								
	H1 lead leg	R	strides	24	16	16	16	16	17	17	18								
Gonzalez, Melissa (COL) (1994)	time	6.63	10.88	15.40	20.06	24.83	29.66	34.83	40.16	45.46									
	reaction time	0.191	interval	4.25	4.52	4.66	4.83	5.17	5.33	5.30									
	velocity	6.79	8.24	7.74	7.51	7.34	7.25	6.77	6.57	6.60									
	H1 lead leg	L	strides	23	15	16	16	16	17	17									
Turner, Jessica (GBR) (1995)	time	6.70	10.93	15.56	20.00	24.60	29.50	34.83	40.46										
	reaction time	0.185	interval	4.23	4.63	4.44	4.60	4.90	5.33	5.63									
	velocity	6.72	8.27	7.56	7.88	7.61	7.14	6.57	6.22										
	H1 lead leg	L	strides	24	16	16	16	16	17	18									
Petersen, Sara Scott (DEN) (1987)	time	6.50	10.63	14.86	19.16	23.60	28.26	33.13	38.43										
	reaction time	0.165	interval	4.13	4.23	4.30	4.44	4.66	4.87	5.30									
	velocity	6.92	8.47	8.27	8.14	7.88	7.51	7.19	6.60										
	H1 lead leg	R	strides	22	15	15	15	15	15	16									



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field/day-10-evening-session-athletics-tokyo-2020-replays>

Women's 400m Hurdles

Date 2021.08.02

Semi-Final 2

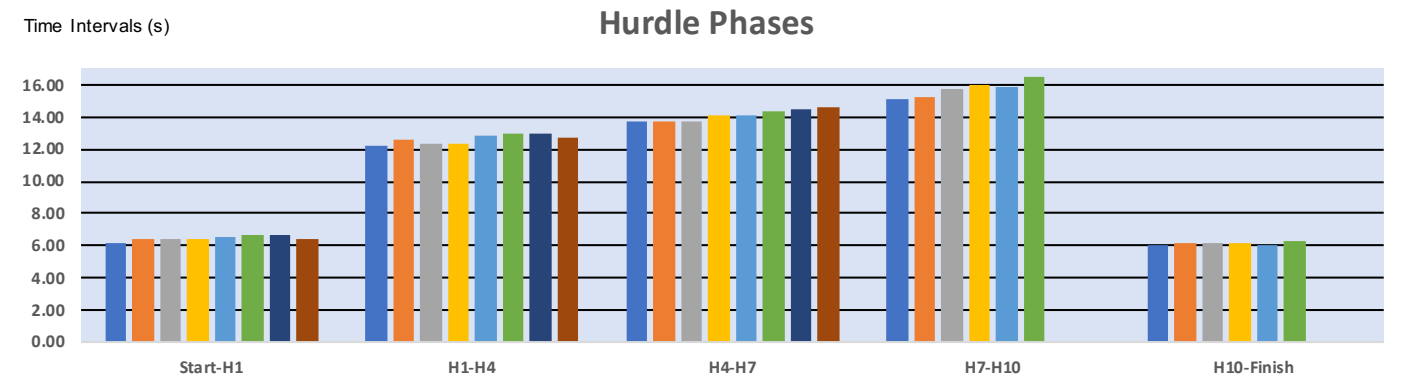
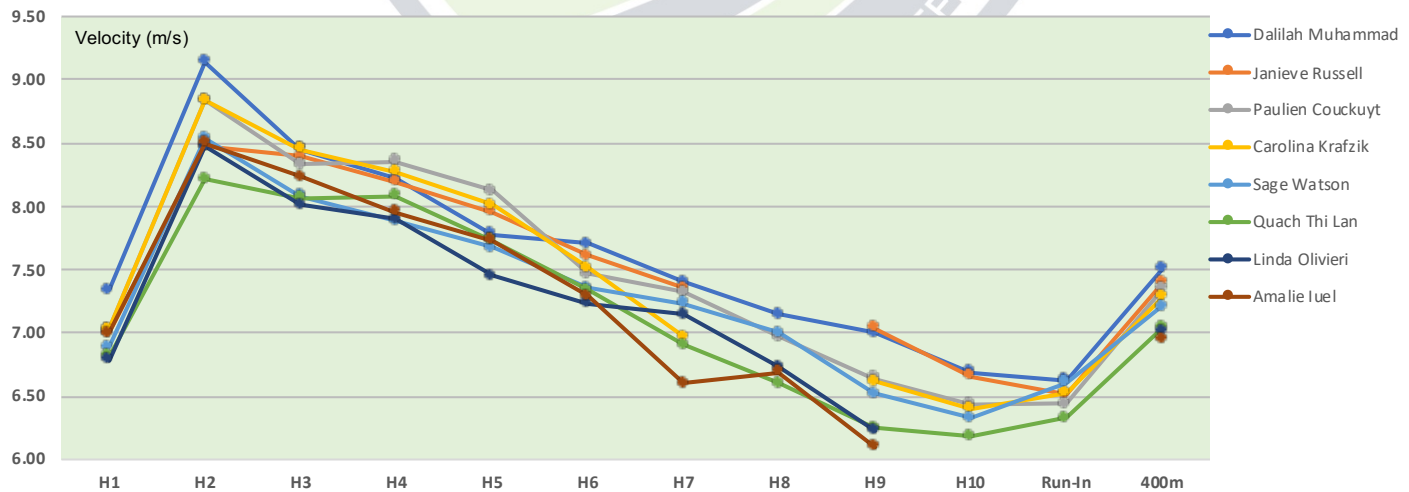
Athlete	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m
Sydney McLaughlin	6.75	8.85	8.55	8.25	8.10	7.65	7.35	7.35	6.90	6.80	6.95	7.55
Gianna Woodruff	7.10	8.40	8.60	8.20	7.90	7.60	7.35	6.85	6.80	6.70	6.75	7.40
Anna Ryzhykova	7.10	8.55	8.60	8.15	7.90	7.65	7.20	6.90	6.80	6.70	6.70	7.40
Zurian Hechavarria	7.15	8.75	8.60	8.20	7.90	7.65	7.35	6.90	6.55	6.65	6.70	7.30
Joanna Linkiewicz	6.75	8.20	8.15	7.75	7.65	7.35	7.10	6.90	6.60	6.55	6.55	7.20
Emma Zapletalová	6.95	8.25	8.30	7.90	7.90	7.50	7.20	6.70	6.40	6.35	6.45	7.15
Wenda Nel	7.05	8.20	8.05	7.90	7.65	7.40	7.00	6.70	5.75	6.20	6.25	7.15
Tia Adana Belle	7.10	8.40	8.65	7.90	7.90	7.85	7.35	6.40	5.75	6.75	6.75	6.75

Hurdle Phases



2020 Olympic Games (Tokyo, JPN) (TV Analysis)

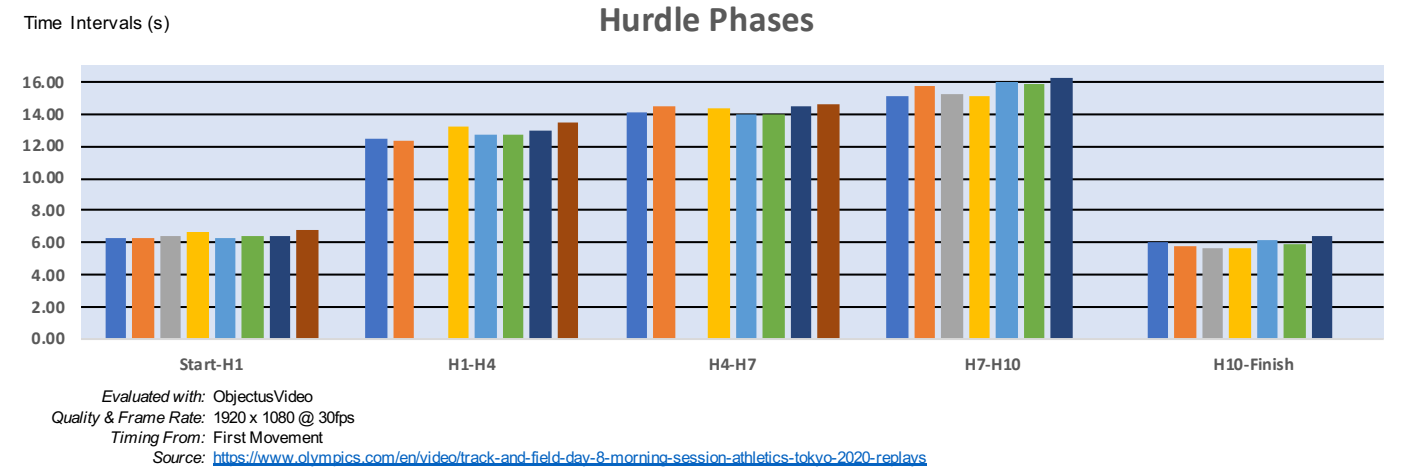
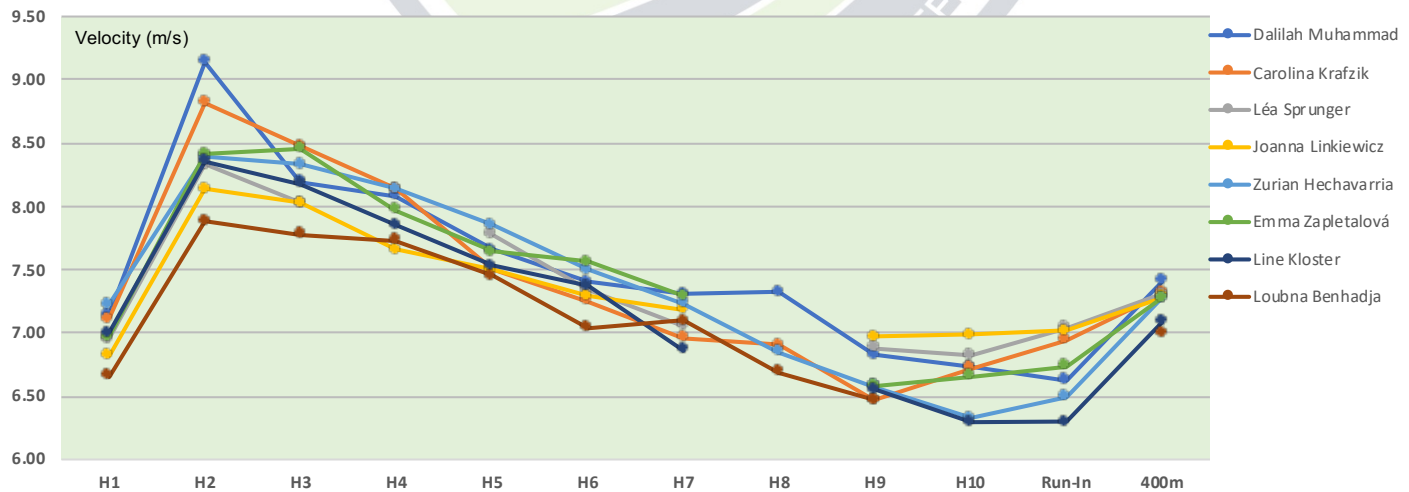
Women's 400m Hurdles			Date 2021.08.02											Semi-Final 1					
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10	
Muhammad, Dalilah (USA) (1990)	time		6.13	9.96	14.10	18.36	22.86	27.40	32.13	37.03	42.03	47.26		53.30	7 / 1				
	reaction time	0.186																	
	interval			3.83	4.14	4.26	4.50	4.54	4.73	4.90	5.00	5.23	6.04				12.23	13.77	15.13
	velocity		7.34	9.14	8.45	8.22	7.78	7.71	7.40	7.14	7.00	6.69	6.62	7.50			8.59	7.63	6.94
Russell, Janieve (JAM) (1993)	H1 lead leg	R																	
	strides		22	15	15	15	15	15	15	15	15	16	16	19	178				
	time		6.43	10.56	14.73	19.00	23.40	28.00	32.76		42.70	47.96		54.10	6 / 2				
	reaction time	0.151																	
interval			4.13	4.17	4.27	4.40	4.60	4.76		9.94	5.26	6.14				12.57	13.76	15.20	
velocity		7.00	8.47	8.39	8.20	7.95	7.61	7.35		7.04	6.65	6.51	7.39			8.35	7.63	6.91	
Couckuyt, Paulien (BEL) (1997)	H1 lead leg	R																	
	strides		23	15	15	15	15	15	16		16		17	20	167				
	time		6.40	10.36	14.56	18.75	23.06	27.75	32.53	37.55	42.82	48.26		54.47	5 / 3				
	reaction time	0.164																	
interval			3.96	4.20	4.19	4.31	4.69	4.78	5.02	5.27	5.44	6.21	NR PB			12.35	13.78	15.73	
velocity		7.03	8.84	8.33	8.35	8.12	7.46	7.32	6.97	6.64	6.43	6.44	7.34			8.50	7.62	6.68	
Krafzik, Carolina (GER) (1995)	H1 lead leg	L																	
	strides		23	15	15	15	15	16	16	17	17	17	17	21	187				
	time		6.40	10.36	14.50	18.73	23.10	27.76	32.78		43.36	48.83		54.96	4 / 4				
	reaction time	0.172																	
interval			3.96	4.14	4.23	4.37	4.66	5.02		10.58	5.47	6.13				12.33	14.05	16.05	
velocity		7.03	8.84	8.45	8.27	8.01	7.51	6.97		6.62	6.40	6.53	7.28			8.52	7.47	6.54	
Watson, Sage (CAN) (1994)	H1 lead leg	L																	
	strides		23	15	15	15	15	17	17	17	17	17	21	189					
	time		6.53	10.63	14.96	19.40	23.96	28.72	33.56	38.56	43.93	49.46		55.51	8 / 5				
	reaction time	0.163																	
interval			4.10	4.33	4.44	4.56	4.76	4.84	5.00	5.37	5.53	6.05				12.87	14.16	15.90	
velocity		6.89	8.54	8.08	7.88	7.68	7.35	7.23	7.00	6.52	6.33	6.61	7.21			8.16	7.42	6.60	
Quach Thi Lan (VIE) (1995)	H1 lead leg	R																	
	strides		22	15	15	15	15	15	15		16	17		145					
	time		6.60	10.86	15.20	19.53	24.06	28.83	33.90	39.20	44.80	50.46		56.78	3 / 6				
	reaction time	0.188																	
interval			4.26	4.34	4.33	4.53	4.77	5.07	5.30	5.60	5.66	6.32				12.93	14.37	16.56	
velocity		6.82	8.22	8.06	8.08	7.73	7.34	6.90	6.60	6.25	6.18	6.33	7.04			8.12	7.31	6.34	
Olivieri, Linda (ITA) (1998)	H1 lead leg	L																	
	strides		23	16	15	15	15	15	16		17	17		149					
	time		6.63	10.76	15.13	19.56	24.26	29.10	34.00	39.20	44.82			57.03	9 / 7				
	reaction time	0.120																	
interval			4.13	4.37	4.43	4.70	4.84	4.90	5.20	5.62						12.93	14.44		
velocity		6.79	8.47	8.01	7.90	7.45	7.23	7.14	6.73	6.23			7.01			8.12	7.27		
Luel, Amalie (NOR) (1994)	H1 lead leg	R																	
	strides		23	15	15	15	16	16	16		18			134					
	time		6.43	10.55	14.80	19.20	23.73	28.53	33.83	39.06	44.80			57.61	1 / 8				
	reaction time	0.121																	
interval			4.12	4.25	4.40	4.53	4.80	5.30	5.23	5.74						12.77	14.63		
velocity		7.00	8.50	8.24	7.95	7.73	7.29	6.60	6.69	6.10			6.94			8.22	7.18		
H1 lead leg	L																		
	strides		23	15	15	15	15	15	16		17	17		148					



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field/day-10-evening-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

Women's 400m Hurdles				Date 2021.07.31											Heat 5					
				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10	
Muhammad, Dalilah (USA) (1990)				time	6.30	10.13	14.40	18.73	23.30	28.03	32.82	37.60	42.73	47.93		53.97	3 / 1			
reaction time				interval		3.83	4.27	4.33	4.57	4.73	4.78	5.13	5.20	6.04			12.43	14.09	15.11	
H1 lead leg				R	velocity	7.14	9.14	8.20	8.08	7.66	7.40	7.31	7.32	6.82	6.73	6.62	7.41	8.45	7.45	6.95
					strides	22	15	15	15	15	15	15	16	16	19	178				
Krafzik, Carolina (GER) (1995)				time	6.33	10.30	14.43	18.73	23.40	28.23	33.26	38.33	43.74	48.95		54.71	5 / 2			
reaction time				0.189	interval		3.97	4.13	4.30	4.67	4.83	5.03	5.07	5.41	5.21	5.76	PB	12.40	14.53	15.69
H1 lead leg				L	velocity	7.11	8.82	8.47	8.14	7.49	7.25	6.96	6.90	6.47	6.72	6.94	7.31	8.47	7.23	6.69
					strides	23	15	15	15	17	17	17	17	17	20	173				
Sprunger, Léa (SUI) (1990)				time	6.47	10.67	15.03		24.03	28.80	33.76		43.93	49.06		54.74	9 / 3			
reaction time				0.186	interval		4.20	4.36		9.00	4.77	4.96		10.17	5.13	5.68		-6.47	33.76	15.30
H1 lead leg				R	velocity	6.96	8.33	8.03		7.78	7.34	7.06		6.88	6.82	7.04	7.31	-16.23	3.11	6.86
					strides	21	14	14		15	15			15	18	112				
Linkiewicz, Joanna (POL) (1990)				time	6.60	10.90	15.26	19.83	24.50	29.30	34.17		44.22	49.23		54.93	8 / 4			
reaction time				0.130	interval		4.30	4.36	4.57	4.67	4.80	4.87		10.05	5.01	5.70	PB	13.23	14.34	15.06
H1 lead leg				L	velocity	6.82	8.14	8.03	7.66	7.49	7.29	7.19		6.97	6.99	7.02	7.28	7.94	7.32	6.97
					strides	24	16	16	16	16	17	17		17	20	159				
Hechavarria, Zurian (CUB) (1995)				time	6.23	10.40	14.60	18.90	23.36	28.03	32.87	37.98	43.30	48.83		54.99	6 / 5			
reaction time				0.181	interval		4.17	4.20	4.30	4.46	4.67	4.84	5.11	5.32	5.53	6.16	PB	12.67	13.97	15.96
H1 lead leg				L	velocity	7.22	8.39	8.33	8.14	7.85	7.49	7.23	6.85	6.58	6.33	6.49	7.27	8.29	7.52	6.58
					strides	23	15	15	15	15	16	16	16	17	17	21	186			
Zapletalová, Emma (SVK) (2000)				time	6.46	10.62	14.76	19.15	23.73	28.36	33.16		43.80	49.06		55.00	7 / 6			
reaction time				0.166	interval		4.16	4.14	4.39	4.58	4.63	4.80		10.64	5.26	5.94		12.69	14.01	15.90
H1 lead leg				R	velocity	6.97	8.41	8.45	7.97	7.64	7.56	7.29		6.58	6.65	6.73	7.27	8.27	7.49	6.60
					strides	23	15	15	15	15	15	15	16		16	19	164			
Kloster, Line (NOR) (1990)				time	6.43	10.62	14.90	19.36	24.01	28.76	33.86		44.54	50.10		56.45	2 / 7			
reaction time				0.151	interval		4.19	4.28	4.46	4.65	4.75	5.10		10.68	5.56	6.35		12.93	14.50	16.24
H1 lead leg				R	velocity	7.00	8.35	8.18	7.85	7.53	7.37	6.86		6.55	6.29	6.30	7.09	8.12	7.24	6.47
					strides	22	15	15	15	15	15	16			17	130				
Benhadja, Loubna (ALG) (2001)				time	6.76	11.20	15.70	20.23	24.93	29.90	34.83	40.06	45.47			57.19	4 / 8			
reaction time				0.200	interval		4.44	4.50	4.53	4.70	4.97	4.93	5.23	5.41		PB	13.47	14.60		
H1 lead leg				R	velocity	6.66	7.88	7.78	7.73	7.45	7.04	7.10	6.69	6.47		6.99	7.80	7.19		
					strides	24	16	16	15	16	16	16		17		136				



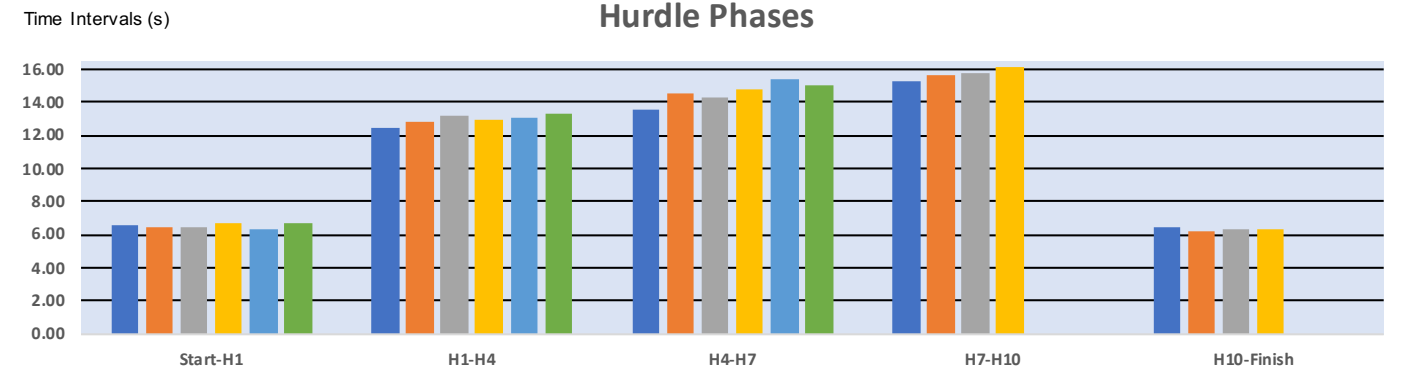
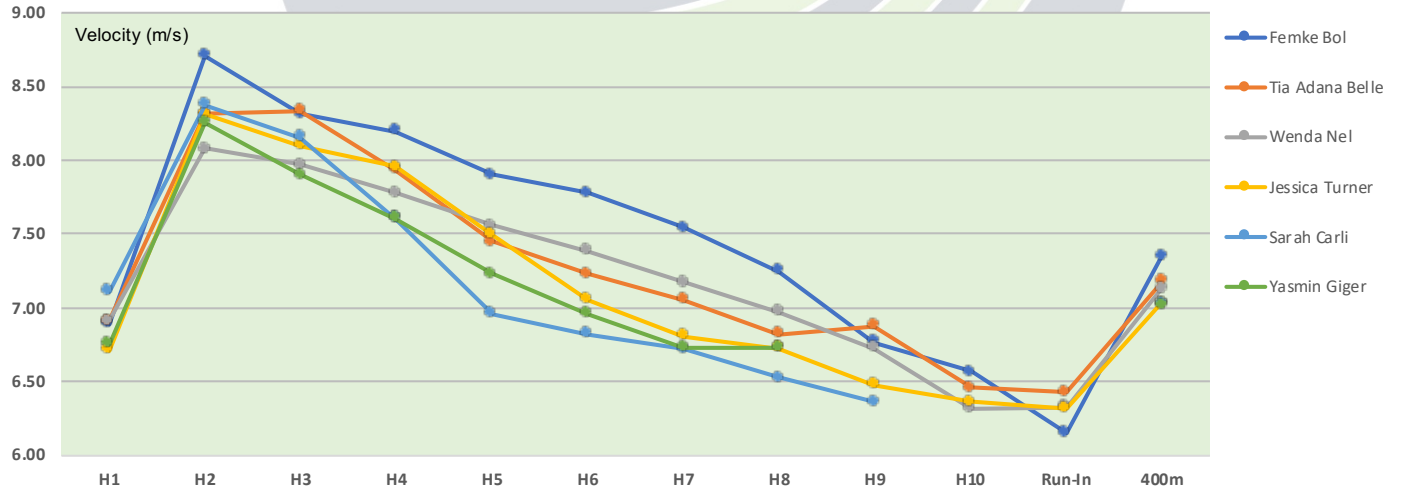
2020 Olympic Games (Tokyo, JPN) (TV Analysis)

Women's 400m Hurdles

Date 2021.07.31

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		6.53	10.55	14.76	19.03	23.46	27.96	32.60	37.43	42.60	47.93		54.43	8 / 1			
	reaction time	0.194														12.50	13.57	15.33
	interval		6.89	4.02	4.21	4.27	4.43	4.50	4.64	4.83	5.17	5.33	6.50			8.40	7.74	6.85
	velocity																	
Belle, Tia Adana (BAR) (1996)	time		6.51	10.72	14.92	19.33	24.03	28.87	33.83	38.96	44.05	49.47		55.69	7 / 2			
	reaction time	0.166														12.82	14.50	15.64
	interval		6.91	4.21	4.20	4.41	4.70	4.84	4.96	5.13	5.09	5.42	6.22			8.19	7.24	6.71
	velocity																	
Nel, Wenda (RSA) (1988)	time		6.51	10.84	15.23	19.73	24.36	29.10	33.98	39.00	44.20	49.74		56.06	3 / 3			
	reaction time	0.194														13.22	14.25	15.76
	interval		6.91	4.33	4.39	4.50	4.63	4.74	4.88	5.02	5.20	5.54	6.32			7.94	7.37	6.66
	velocity																	
Turner, Jessica (GBR) (1995)	time		6.70	10.91	15.23	19.63	24.30	29.26	34.40	39.60	45.00	50.50		56.83	5 / 4			
	reaction time	0.186														12.93	14.77	16.10
	interval		6.72	4.21	4.32	4.40	4.67	4.96	5.14	5.20	5.40	5.50	6.33			8.12	7.11	6.52
	velocity																	
Carli, Sarah (AUS) (1994)	time		6.33	10.51	14.80	19.40	24.43	29.56	34.77	40.13	45.63			56.93	6 / 5			
	reaction time	0.167														13.07	15.37	
	interval		7.11	4.18	4.29	4.60	5.03	5.13	5.21	5.36	5.50					8.03	6.83	
	velocity																	
Giger, Yasmin (SUI) (1999)	time		6.66	10.90	15.33	19.93	24.77	29.80	35.00	40.20				57.03	9 / 6			
	reaction time	0.165														13.27	15.07	
	interval		6.76	4.24	4.43	4.60	4.84	5.03	5.20	5.20						7.91	6.97	
	velocity																	
	time		23	15	15	15	15	16	16	16				131				
	reaction time																	
	interval																	
	velocity																	



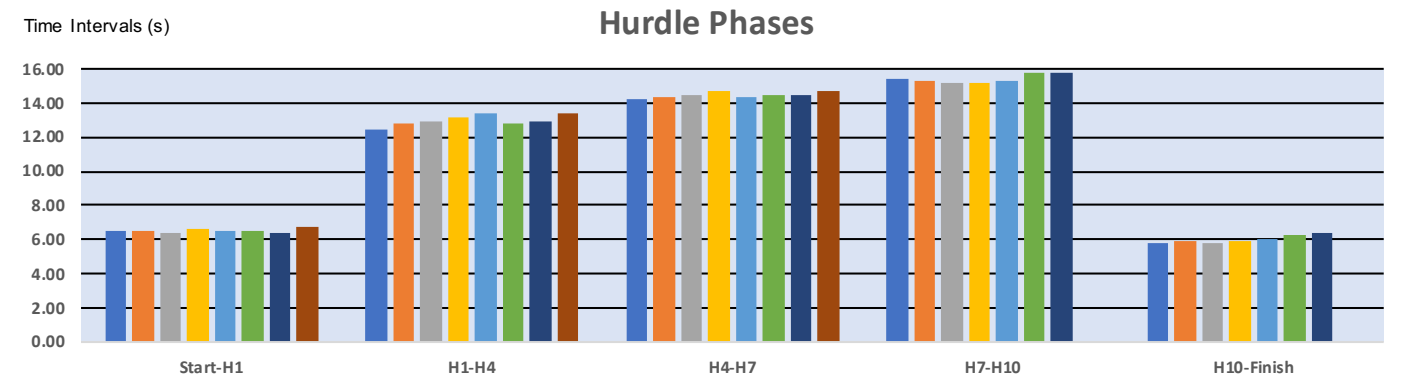
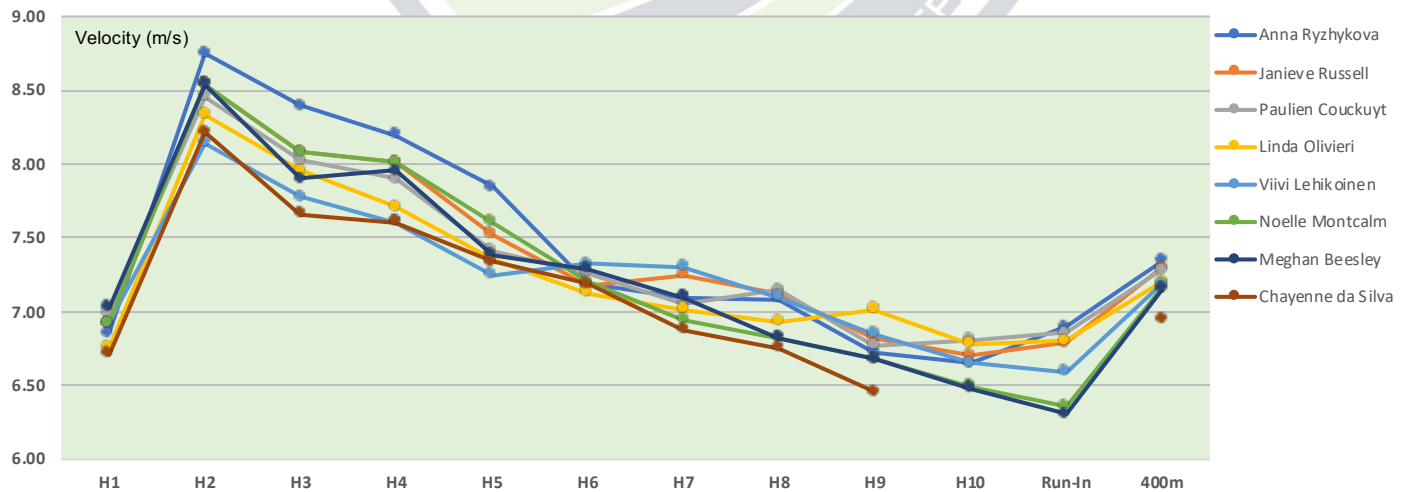
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Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field-day-8-morning-session-athletics-tokyo-2020-replays>

Biomechanical Analysis
2020 Olympic Games (Tokyo, JPN) (TV Analysis)

Women's 400m Hurdles			Date 2021.07.31											Heat 3					
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-in	400m	Lane / Place	H1-H4	H4-H7	H7-H10	
McLaughlin, Sydney (USA) (1999)	time		6.43	10.63	14.93	19.40	23.90	28.70	33.63	38.50	43.67	48.85		54.65	5 / 1				
	reaction time	0.180																	
	interval		4.20	4.30	4.47	4.50	4.80	4.93	4.87	5.17	5.18	5.80				12.97	14.23	15.22	
	velocity	7.00	8.33	8.14	7.83	7.78	7.29	7.10	7.19	6.77	6.76	6.90	7.32			8.10	7.38	6.90	
H1 lead leg	R	strides	22	14	14	14	14	15	15	15	16	16	18.5	173.5					
	Woodruff, Gianna (PAN) (1993)	time	6.60	10.76	15.06	19.50	24.03	28.75	33.70	38.83	44.06	49.45		55.49	7 / 2				
		reaction time	0.268																
		interval		4.16	4.30	4.44	4.53	4.72	4.95	5.13	5.23	5.39	6.04				12.90	14.20	15.75
velocity		6.82	8.41	8.14	7.88	7.73	7.42	7.07	6.82	6.69	6.49	6.62	7.21			8.14	7.39	6.67	
H1 lead leg	L	strides	23	15	15	15	15	15	15	16	16	17	19	181					
	Petersen, Sara Scott (DEN) (1987)	time	6.56		15.07	19.50	23.90	28.56	33.46	38.56	43.93	49.46		55.52	9 / 3				
		reaction time	0.161																
		interval			8.51	4.43	4.40	4.66	4.90	5.10	5.37	5.53	6.06				12.94	13.96	16.00
velocity		6.86		8.23	7.90	7.95	7.51	7.14	6.86	6.52	6.33	6.60	7.20			8.11	7.52	6.56	
H1 lead leg	R	strides	22	15		15	15	15	15	16	17	17	19.7	166.7					
	Nugent, Leah (JAM) (1992)	time	6.58	11.05	15.50	20.05	24.87	29.63	34.56	39.50	44.53	49.73		55.54	6 / 4				
		reaction time	0.240																
		interval		4.47	4.45	4.55	4.82	4.76	4.93	4.94	5.03	5.20	5.81	DQ			(no official time given)		
velocity		6.84	7.83	7.87	7.69	7.26	7.35	7.10	7.09	6.96	6.73	6.88	7.20			13.47	14.51	15.17	
H1 lead leg	R	strides	22	15	14	14	15	15	15	15	15	15	18.2	173.2		7.80	7.24	6.92	
	Quach Thi Lan (VIE) (1995)	time	6.46	10.85	15.16	19.53	24.10	28.88	33.83	38.96	44.26	49.67		55.71	8 / 5				
		reaction time	0.150																
		interval		4.39	4.31	4.37	4.57	4.78	4.95	5.13	5.30	5.41	6.04				13.07	14.30	15.84
velocity		6.97	7.97	8.12	8.01	7.66	7.32	7.07	6.82	6.60	6.47	6.62	7.18			8.03	7.34	6.63	
H1 lead leg	R	strides	22	15	15	15	15	15	15	16	16	16	19	179					
	Marchiando, Eleonora (ITA) (1997)	time	6.66		15.33	19.86	24.43	29.26	34.40	39.43	44.73	50.20		56.82	3 / 6				
		reaction time	0.166																
		interval			8.67	4.53	4.57	4.83	5.14	5.03	5.30	5.47	6.62				13.20	14.54	15.80
velocity		6.76		8.07	7.73	7.66	7.25	6.81	6.96	6.60	6.40	6.04	7.04			7.95	7.22	6.65	
H1 lead leg	L	strides	24			16	16	16	17	17	17	17	21.2	161.2					
	Mykolenko, Mariya (UKR) (1994)	time	6.73		15.46	19.96	24.66	29.62	34.73		45.76			57.86	4 / 6				
		reaction time	0.200																
		interval			8.73	4.50	4.70	4.96	5.11		11.03						13.23	14.77	
velocity		6.69		8.02	7.78	7.45	7.06	6.85		6.35			6.91			7.94	7.11		
H1 lead leg	R	strides	23	15		15	15	16	16		16			116					
	Knight, Jessie (GBR) (1994)	time	fell into hurdle											dnf	2 / --				
		reaction time	0.160																
		interval																	
velocity																			
H1 lead leg	R	strides	23											23					

Biomechanical Analysis
2020 Olympic Games (Tokyo, JPN) (TV Analysis)

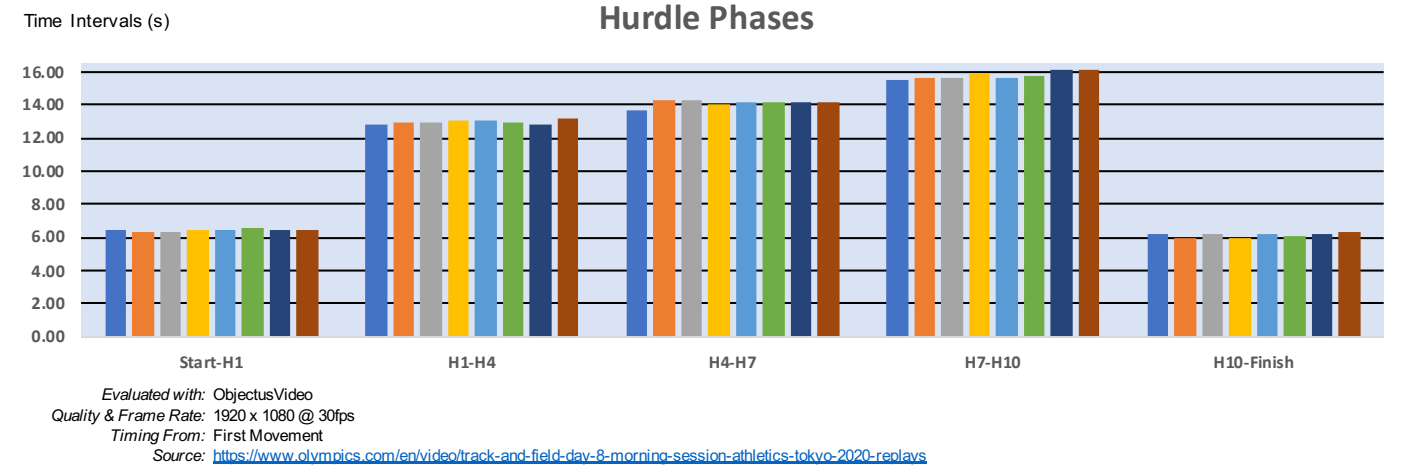
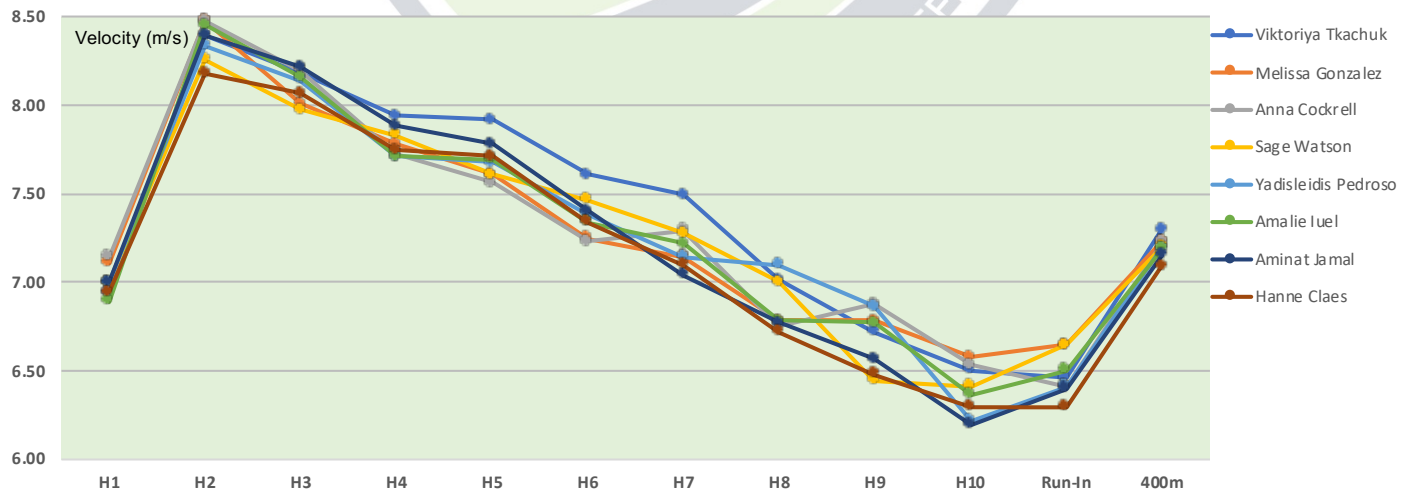
Women's 400m Hurdles				Date 2021.07.31											Heat 2				
				H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Ryzhykova, Anna (UKR) (1989)	time			6.56	10.56	14.73	19.00	23.46	28.33	33.26	38.20	43.40	48.66		54.46	2 / 1			
	reaction time	0.191															12.44	14.26	15.40
	interval																8.44	7.36	6.82
	velocity	6.86	8.75	8.39	8.20	7.85	7.19	7.10	7.09	6.73	6.65	6.90	7.34						
H1 lead leg	R			22	14	14	14	14	15	15	15	16	16	19	174				
	strides																		
	time			6.50	10.60	14.93	19.30	23.95	28.83	33.66	38.57	43.70	48.92		54.81	7 / 2			
	reaction time	0.159															12.80	14.36	15.26
interval															8.20		7.31	6.88	
velocity	6.92	8.54	8.08	8.01	7.53	7.17	7.25	7.13	6.82	6.70	6.79	7.30							
H1 lead leg	R			23	15	15	15	16	16	16	16	16	16	19.7	183.7				
	strides																		
	time			6.43	10.57	14.93	19.36	24.08	28.90	33.86	38.76	43.93	49.07		54.90	9 / 3			
	reaction time	0.182															12.93	14.50	15.21
interval															8.12		7.24	6.90	
velocity	7.00	8.45	8.03	7.90	7.42	7.26	7.06	7.14	6.77	6.81	6.86	7.29							
H1 lead leg	L			23	15	15	15	16	16	16	16	17	17	20	186				
	strides																		
	time			6.66	10.86	15.26	19.80	24.56	29.47	34.46	39.51	44.50	49.66		55.54	8 / 4			
	reaction time	0.130															13.14	14.66	15.20
interval															7.99		7.16	6.91	
velocity	6.76	8.33	7.95	7.71	7.35	7.13	7.01	6.93	7.01	6.78	6.80	7.20							
H1 lead leg	R			23	15	15	15	15	16	16	16	16	17	20	184				
	strides																		
	time			6.50	10.80	15.30	19.90	24.73	29.51	34.30	39.23	44.34	49.60		55.67	6 / 5			
	reaction time	0.155															13.40	14.40	15.30
interval															7.84		7.29	6.86	
velocity	6.92	8.14	7.78	7.61	7.25	7.32	7.31	7.10	6.85	6.65	6.59	7.19							
H1 lead leg	R			23	16	16	16	16	16	16	16	17	17	20.5	189.5				
	strides																		
	time			6.50	10.60	14.93	19.30	23.90	28.76	33.80	38.93	44.17	49.56		55.85	3 / 6			
	reaction time	0.197															12.80	14.50	15.76
interval															8.20		7.24	6.66	
velocity	6.92	8.54	8.08	8.01	7.61	7.20	6.94	6.82	6.68	6.49	6.36	7.16							
H1 lead leg	R			24	16	16	16	16	16	17	17	17	17	21.2	193.2				
	strides																		
	time			6.40	10.50	14.93	19.33	24.07	28.87	33.80	38.93	44.17	49.57		55.91	5 / 7			
	reaction time	0.165															12.93	14.47	15.77
interval															8.12		7.26	6.66	
velocity	7.03	8.54	7.90	7.95	7.38	7.29	7.10	6.82	6.68	6.48	6.31	7.15							
H1 lead leg	L			24	16	16	16	16	17	17	17	18	18	22.5	197.5				
	strides																		
	time			6.70	10.96	15.53	20.13	24.90	29.77	34.86	40.04	45.46		57.55	4 / 8				
	reaction time	0.165															13.43	14.73	
interval																7.82	7.13		
velocity	6.72	8.22	7.66	7.61	7.34	7.19	6.88	6.76	6.46										
H1 lead leg	L			23	15	15	15	16	16	17	17	17			151				
	strides																		



Evaluated with: ObjectusVideo
Quality & Frame Rate: 1920 x 1080 @ 30fps
Timing From: First Movement
Source: <https://www.olympics.com/en/video/track-and-field/day-8-morning-session-athletics-tokyo-2020-replays>

2020 Olympic Games (Tokyo, JPN) (TV Analysis)

Women's 400m Hurdles			Date 2021.07.31											Heat 1				
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Tkachuk, Viktoriya (UKR) (1994)	time		6.48	10.65	14.93	19.34	23.76	28.36	33.03	38.02	43.23	48.61		54.80	9 / 1			
	reaction time	0.256																
	interval			4.17	4.28	4.41	4.42	4.60	4.67	4.99	5.21	5.38	6.19			12.86	13.69	15.58
	velocity		6.94	8.39	8.18	7.94	7.92	7.61	7.49	7.01	6.72	6.51	6.46	7.30		8.16	7.67	6.74
Gonzalez, Melissa (COL) (1994)	H1 lead leg	L																
	strides		22	15	15	15	15	15	15	15	16	16	19.5	178.5				
	time		6.33	10.46	14.83	19.33	23.93	28.76	33.66	38.82	43.98	49.30		55.32	3 / 2			
	reaction time	0.146																
Cockrell, Anna (USA) (1997)	interval			4.13	4.37	4.50	4.60	4.83	4.90	5.16	5.16	5.32	6.02	AR PB		13.00	14.33	15.64
	velocity		7.11	8.47	8.01	7.78	7.61	7.25	7.14	6.78	6.78	6.58	6.64	7.23		8.08	7.33	6.71
	H1 lead leg	L																
	strides		23	15	15	15	15	16	16	16	17	17	20	185				
Watson, Sage (CAN) (1994)	time		6.30	10.43	14.70	19.23	23.86	28.70	33.50	38.68	43.77	49.13		55.37	7 / 3			
	reaction time	0.213																
	interval			4.13	4.27	4.53	4.63	4.84	4.80	5.18	5.09	5.36	6.24			12.93	14.27	15.63
	velocity		7.14	8.47	8.20	7.73	7.56	7.23	7.29	6.76	6.88	6.53	6.41	7.22		8.12	7.36	6.72
Pedroso, Yadisleidis (ITA) (1987)	H1 lead leg	L																
	strides		22	15	15	15	15	15	15	16	16	16	20	180				
	time		6.43	10.67	15.06	19.53	24.13	28.82	33.63	38.63	44.06	49.52		55.54	8 / 4			
	reaction time	0.176																
Luel, Amalie (NOR) (1994)	interval			4.24	4.39	4.47	4.60	4.69	4.81	5.00	5.43	5.46	6.02			13.10	14.10	15.89
	velocity		7.00	8.25	7.97	7.83	7.61	7.46	7.28	7.00	6.45	6.41	6.64	7.20		8.02	7.45	6.61
	H1 lead leg	R																
	strides		22	15	15	15	15	15	15	15	17	17	20	181				
Jamal, Aminat (BRN) (1997)	time		6.43	10.63	14.93	19.47	24.03	28.77	33.67	38.60	43.70	49.33		55.57	6 / 5			
	reaction time	0.186																
	interval			4.20	4.30	4.54	4.56	4.74	4.90	4.93	5.10	5.63	6.24			13.04	14.20	15.66
	velocity		7.00	8.33	8.14	7.71	7.68	7.38	7.14	7.10	6.86	6.22	6.41	7.20		8.05	7.39	6.70
Claes, Hanne (BEL) (1991)	H1 lead leg	R																
	strides		24	16	16	16	16	17	17	17	17	19	21.2	196.2				
	time		6.53	10.67	14.96	19.50	24.05	28.82	33.67	38.83	44.00	49.50		55.65	5 / 6			
	reaction time	0.129																
Jamal, Aminat (BRN) (1997)	interval			4.14	4.29	4.54	4.55	4.77	4.85	5.16	5.17	5.50	6.15			12.97	14.17	15.83
	velocity		6.89	8.45	8.16	7.71	7.69	7.34	7.22	6.78	6.77	6.36	6.50	7.19		8.10	7.41	6.63
	H1 lead leg	L																
	strides		23	15	15	15	15	15	15	16	16	17	20	182				
Claes, Hanne (BEL) (1991)	time		6.43	10.60	14.86	19.30	23.80	28.53	33.50	38.67	44.00	49.65		55.90	2 / 7			
	reaction time	0.208																
	interval			4.17	4.26	4.44	4.50	4.73	4.97	5.17	5.33	5.65	6.25			12.87	14.20	16.15
	velocity		7.00	8.39	8.22	7.88	7.78	7.40	7.04	6.77	6.57	6.19	6.40	7.16		8.16	7.39	6.50
Claes, Hanne (BEL) (1991)	H1 lead leg	R																
	strides		22	15	15	15	15	15	15	16	16	17	20	181				
	time		6.48	10.76	15.10	19.62	24.16	28.93	33.86	39.07	44.47	50.03		56.38	4 / 8			
	reaction time	0.174																
Claes, Hanne (BEL) (1991)	interval			4.28	4.34	4.52	4.54	4.77	4.93	5.21	5.40	5.56	6.35			13.14	14.24	16.17
	velocity		6.94	8.18	8.06	7.74	7.71	7.34	7.10	6.72	6.48	6.29	6.30	7.09		7.99	7.37	6.49
	H1 lead leg	R																
	strides		23	15	15	15	15	16	16	16	17	18		166				



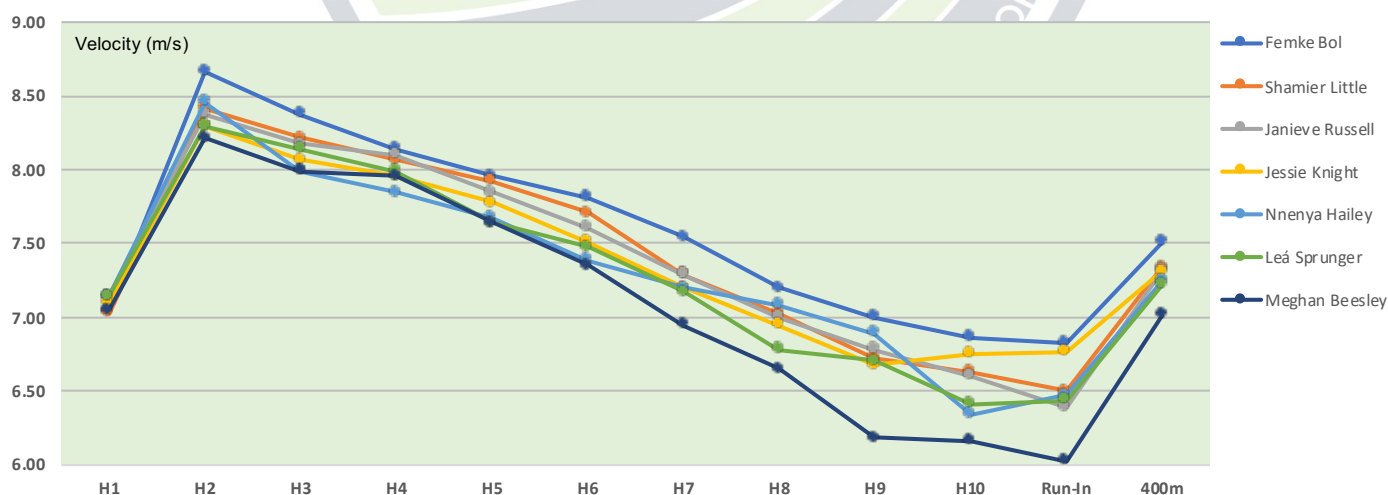
2021 Müller British Grand Prix (Gateshead, GBR) (TV Analysis)

Women's 400m Hurdles

Date 2021.07.13

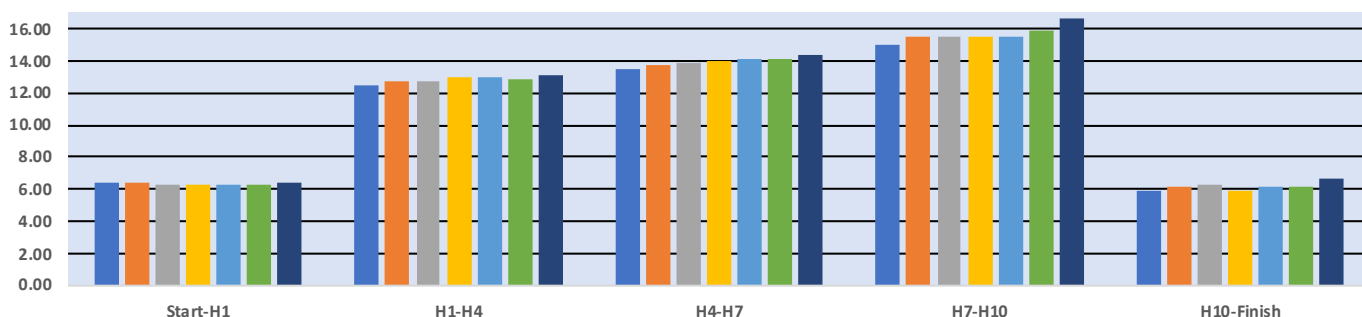
FINAL

			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		6.38	10.42	14.60	18.90	23.30	27.78	32.42	37.28	42.28	47.38		53.24	5 / 1			
	reaction time	0.214														12.52	13.52	14.96
	interval		7.05	8.66	8.37	8.14	7.95	7.81	7.54	7.20	7.00	6.86	6.83	7.51		8.39	7.77	7.02
	velocity																	
Little, Shamier (USA) (1995)	time		6.40	10.56	14.82	19.16	23.58	28.12	32.92	37.90	43.10	48.38		54.53	4 / 2			
	reaction time	0.196														12.76	13.76	15.46
	interval		7.03	8.41	8.22	8.06	7.92	7.71	7.29	7.03	6.73	6.63	6.50	7.34		8.23	7.63	6.79
	velocity																	
Russell, Janieve (JAM) (1993)	time		6.30	10.48	14.76	19.08	23.54	28.14	32.94	37.94	43.10	48.40		54.66	6 / 3			
	reaction time	0.106														12.78	13.86	15.46
	interval		7.14	8.37	8.18	8.10	7.85	7.61	7.29	7.00	6.78	6.60	6.39	7.32		8.22	7.58	6.79
	velocity																	
Knight, Jessie (GBR) (1994)	time		6.34	10.56	14.90	19.30	23.80	28.46	33.32	38.36	43.60	48.78		54.69	3 / 4			
	reaction time	0.147														12.96	14.02	15.46
	interval		7.10	8.29	8.06	7.95	7.78	7.51	7.20	6.94	6.68	6.76	6.77	7.31		8.10	7.49	6.79
	velocity																	
Hailey, Nnenna (USA) (1994)	time		6.30	10.44	14.82	19.28	23.84	28.58	33.44	38.38	43.46	48.98		55.16	7 / 5			
	reaction time	0.181														12.98	14.16	15.54
	interval		7.14	8.45	7.99	7.85	7.68	7.38	7.20	7.09	6.89	6.34	6.47	7.25		8.09	7.42	6.76
	velocity																	
Sprunger, Leá (SUI) (1990)	time		6.30	10.52	14.82	19.20	23.78	28.46	33.34	38.50	43.72	49.18		55.39	8 / 6			
	reaction time	0.123														12.90	14.14	15.84
	interval		7.14	8.29	8.14	7.99	7.64	7.48	7.17	6.78	6.70	6.41	6.44	7.22		8.14	7.43	6.63
	velocity																	
Beesley, Meghan (GBR) (1989)	time		6.38	10.64	15.02	19.42	24.00	28.76	33.80	39.06	44.72	50.40		57.04	1 / 7			
	reaction time	0.145														13.04	14.38	16.60
	interval		7.05	8.22	7.99	7.95	7.64	7.35	6.94	6.65	6.18	6.16	6.02	7.01		8.05	7.30	6.33
	velocity																	



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1078 @ 24fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=UDuzOssoya0>

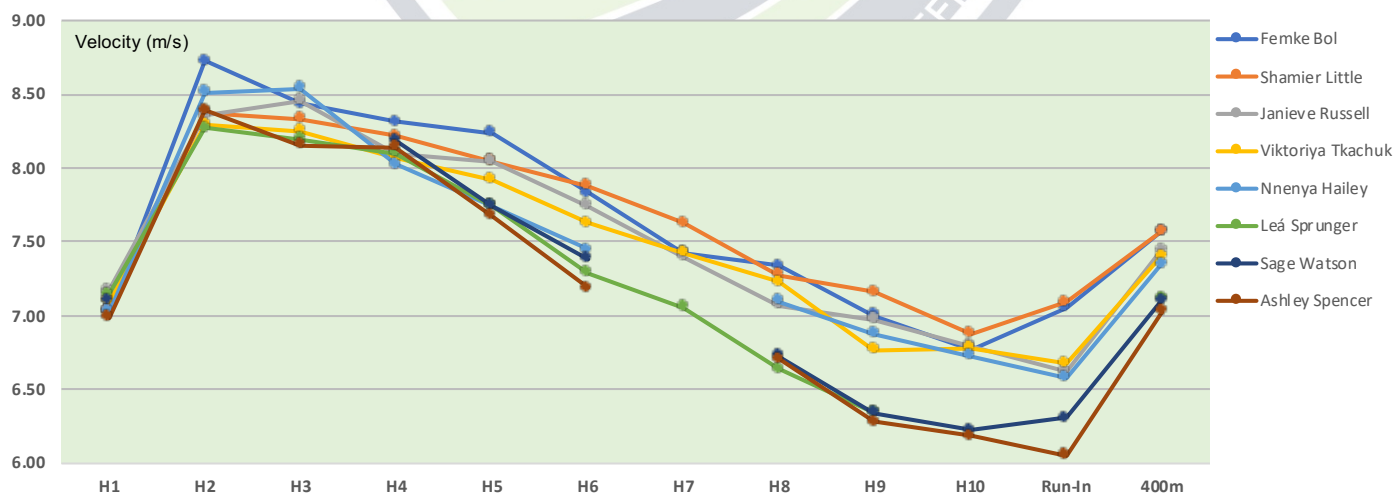
2021 István Gyulai Memorial (Székesfehérvár, HUN) (TV Analysis)

Women's 400m Hurdles

Date 2021.07.06

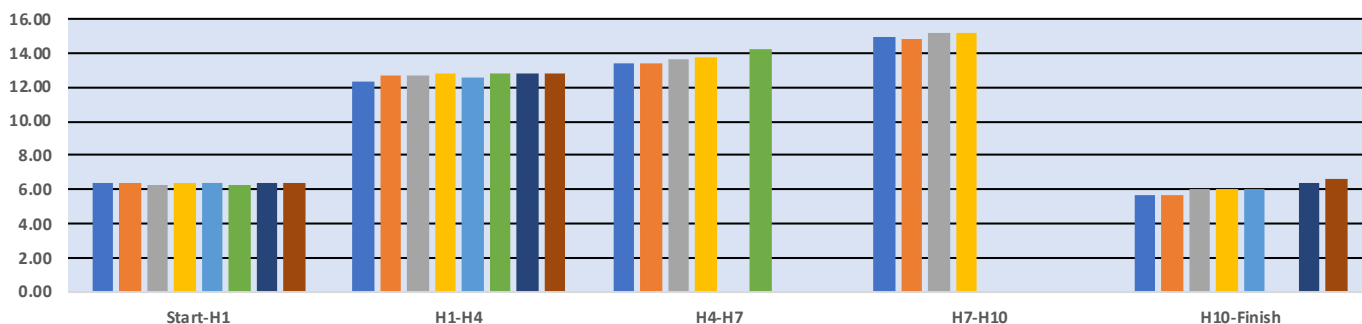
FINAL

			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	10.41	14.56	18.77	23.02	27.49	32.20	36.97	41.97	47.14		52.81	5 / 1			
	reaction time	0.247																
	interval		7.03	4.01	4.15	4.21	4.25	4.47	4.71	4.77	5.00	5.17	5.67			12.37	13.43	14.94
	velocity		7.03	8.37	8.43	8.31	8.24	7.83	7.43	7.34	7.00	6.77	7.05	7.57		8.49	7.82	7.03
Little, Shamier (USA) (1995)	time		6.40	10.58	14.78	19.04	23.39	27.83	32.42	37.23	42.12	47.21		52.85	6 / 2			
	reaction time	0.339																
	interval		7.03	4.18	4.20	4.26	4.35	4.44	4.59	4.81	4.89	5.09	5.64			12.64	13.38	14.79
	velocity		7.03	8.37	8.33	8.22	8.05	7.88	7.63	7.28	7.16	6.88	7.09	7.57		8.31	7.85	7.10
Russell, Janieve (JAM) (1993)	time		6.27	10.46	14.60	18.92	23.27	27.79	32.52	37.47	42.49	47.64		53.68	4 / 3			
	reaction time	0.168																
	interval		7.18	4.19	4.14	4.32	4.35	4.52	4.73	4.95	5.02	5.15	6.04			12.65	13.60	15.12
	velocity		7.18	8.35	8.45	8.10	8.05	7.74	7.40	7.07	6.97	6.80	6.62	7.45		8.30	7.72	6.94
Tkachuk, Viktoriya (UKR) (1994)	time		6.34	10.56	14.80	19.14	23.56	28.15	32.86	37.70	42.87	48.03		54.02	8 / 4			
	reaction time	0.260																
	interval		7.10	4.22	4.24	4.34	4.42	4.59	4.71	4.84	5.17	5.16	5.99	PB		12.80	13.72	15.17
	velocity		7.10	8.29	8.25	8.06	7.92	7.63	7.43	7.23	6.77	6.78	6.68	7.40		8.20	7.65	6.92
Hailey, Nnenna (USA) (1994)	time		6.40	10.51	14.61	18.97	23.49	28.19		38.05	43.14	48.34		54.42	2 / 5			
	reaction time	0.338																
	interval		7.03	4.11	4.10	4.36	4.52	4.70		9.86	5.09	5.20	6.08			12.57		
	velocity		7.03	8.52	8.54	8.03	7.74	7.45		7.10	6.88	6.73	6.58	7.35		8.35		
Sprunger, Leá (SUI) (1990)	time		6.30	10.53	14.80	19.12	23.64	28.44	33.40	38.67	44.19			56.24	7 / 6			
	reaction time	0.224																
	interval		7.14	4.23	4.27	4.32	4.52	4.80	4.96	5.27	5.52					12.82	14.28	
	velocity		7.14	8.27	8.20	8.10	7.74	7.29	7.06	6.64	6.34					8.19	7.35	
Watson, Sage (CAN) (1994)	time		6.34			19.17	23.69	28.43		38.84	44.36	49.98		56.32	1 / 7			
	reaction time	0.167																
	interval					12.83	4.52	4.74		10.41	5.52	5.62	6.34			12.83		
	velocity		7.10			8.18	7.74	7.38		6.72	6.34	6.23	6.31	7.10		8.18		
Spencer, Ashley (USA) (1993)	time		6.44	10.61	14.90	19.20	23.76	28.63		39.07	44.64	50.30		56.91	3 / 8			
	reaction time	0.204																
	interval		6.99	4.17	4.29	4.30	4.56	4.87		10.44	5.57	5.66	6.61			12.76		
	velocity		6.99	8.39	8.16	8.14	7.68	7.19		6.70	6.28	6.18	6.05	7.03		8.23		
	time																	
	reaction time																	
	interval																	
	velocity																	



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 60fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=zFVRA0B8Rlw>

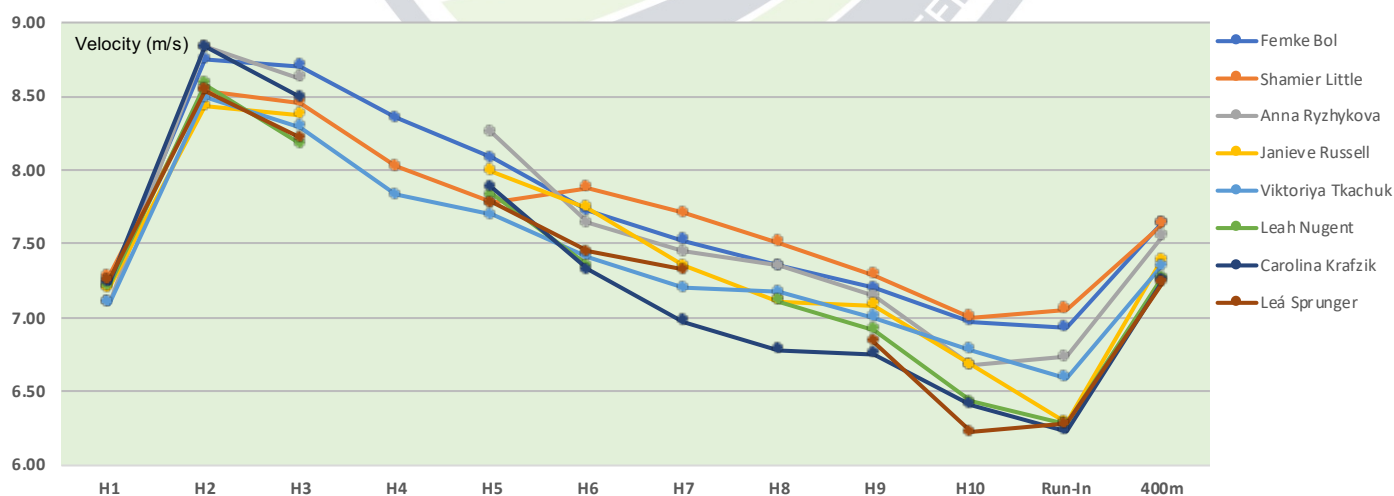
2021 Bauhaus Galan (Stockholm, SWE) (TV Analysis)

Women's 400m Hurdles

Date 2021.07.04

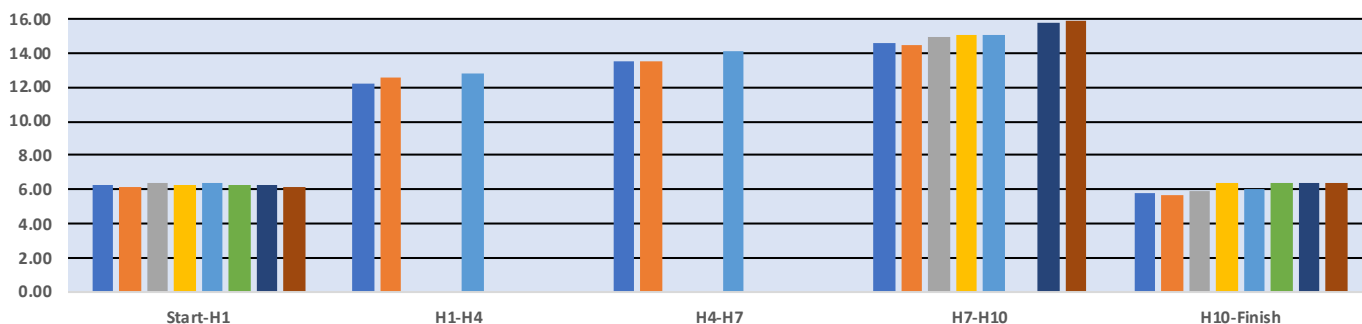
FINAL

			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		6.24	10.24	14.26	18.45	22.78	27.31	31.96	36.72	41.58	46.60		52.37	5 / 1			
	reaction time	0.195																
	interval		7.21	4.00	4.02	4.19	4.33	4.53	4.65	4.76	4.86	5.02	5.77	NR PB		12.21	13.51	14.64
	velocity			8.75	8.71	8.35	8.08	7.73	7.53	7.35	7.20	6.97	6.93	7.64		8.60	7.77	7.17
Little, Shamier (USA) (1995)	time		6.18	10.28	14.42	18.78	23.28	27.72	32.26	36.92	41.72	46.72		52.39	6 / 2			
	reaction time	0.200																
	interval		7.28	4.10	4.14	4.36	4.50	4.44	4.54	4.66	4.80	5.00	5.67	PB		12.60	13.48	14.46
	velocity			8.54	8.45	8.03	7.78	7.88	7.71	7.51	7.29	7.00	7.05	7.64		8.33	7.79	7.26
Ryzhykova, Anna (UKR) (1989)	time		6.34	10.30	14.36		22.84	27.42	32.12	36.88	41.78	47.02		52.96	3 / 3			
	reaction time	0.183																
	interval		7.10	3.96	4.06		8.48	4.58	4.70	4.76	4.90	5.24	5.94	NR PB				14.90
	velocity			8.84	8.62		8.25	7.64	7.45	7.35	7.14	6.68	6.73	7.55				7.05
Russell, Janieve (JAM) (1993)	time		6.25	10.40	14.58		23.34	27.86	32.62	37.54	42.48	47.72		54.08	4 / 4			
	reaction time	0.151																
	interval		7.20	4.15	4.18		8.76	4.52	4.76	4.92	4.94	5.24	6.36					15.10
	velocity			8.43	8.37		7.99	7.74	7.35	7.11	7.09	6.68	6.29	7.40				6.95
Tkachuk, Viktoriya (UKR) (1994)	time		6.34	10.46	14.68	19.15	23.70	28.42	33.28	38.16	43.16	48.32		54.39	7 / 5			
	reaction time	0.254																
	interval		7.10	4.12	4.22	4.47	4.55	4.72	4.86	4.88	5.00	5.16	6.07	PB		12.81	14.13	15.04
	velocity			8.50	8.29	7.83	7.69	7.42	7.20	7.17	7.00	6.78	6.59	7.35		8.20	7.43	6.98
Nugent, Leah (JAM) (1992)	time		6.24	10.32	14.60		23.54	28.30		38.14	43.20	48.64		55.01	1 / 6			
	reaction time	0.193																
	interval		7.21	4.08	4.28		8.94	4.76		9.84	5.06	5.44	6.37					
	velocity			8.58	8.18		7.83	7.35		7.11	6.92	6.43	6.28	7.27				
Krafzik, Carolina (GER) (1995)	time		6.22	10.18	14.30		23.18	27.96	32.98	38.14	43.32	48.78		55.20	2 / 7			
	reaction time	0.187																
	interval		7.23	3.96	4.12		8.88	4.78	5.02	5.16	5.18	5.46	6.42					15.80
	velocity			8.84	8.50		7.88	7.32	6.97	6.78	6.76	6.41	6.23	7.25				6.65
Sprunger, Leá (SUI) (1990)	time		6.20	10.30	14.56		23.56	28.26	33.04		43.28	48.90		55.27	8 / 8			
	reaction time	0.186																
	interval		7.26	4.10	4.26		9.00	4.70	4.78		10.24	5.62	6.37					15.86
	velocity			8.54	8.22		7.78	7.45	7.32		6.84	6.23	6.28	7.24				6.62
H1 lead leg				15	14			15	15	15		16		90				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=ngnN5kWBxJk>

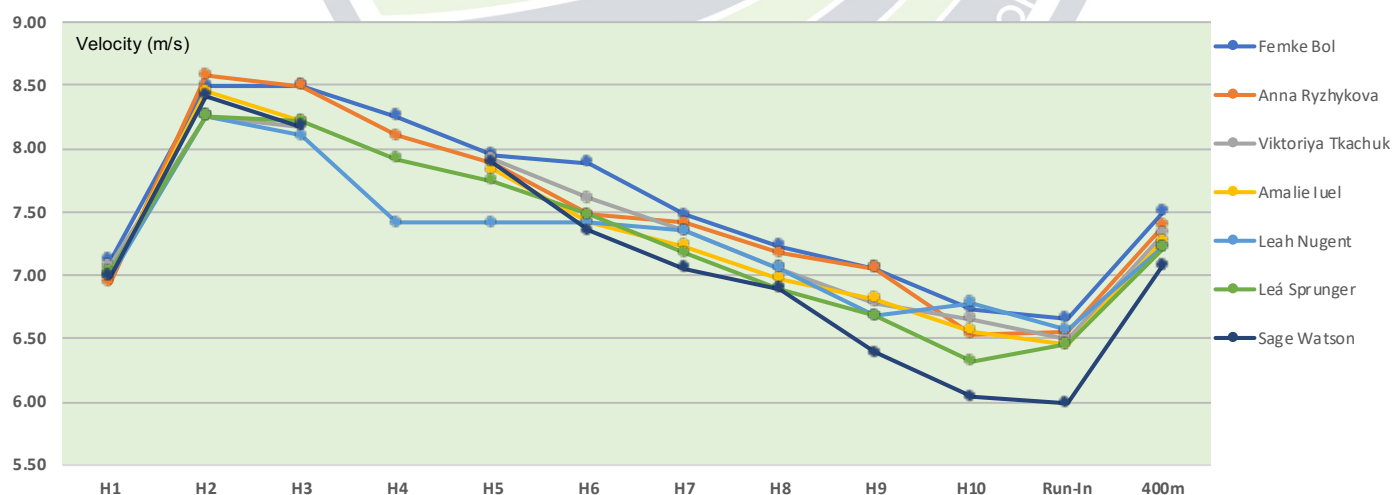
2021 Bislett Games (Oslo, NOR) (TV Analysis)

Women's 400m Hurdles

Date 2021.07.01

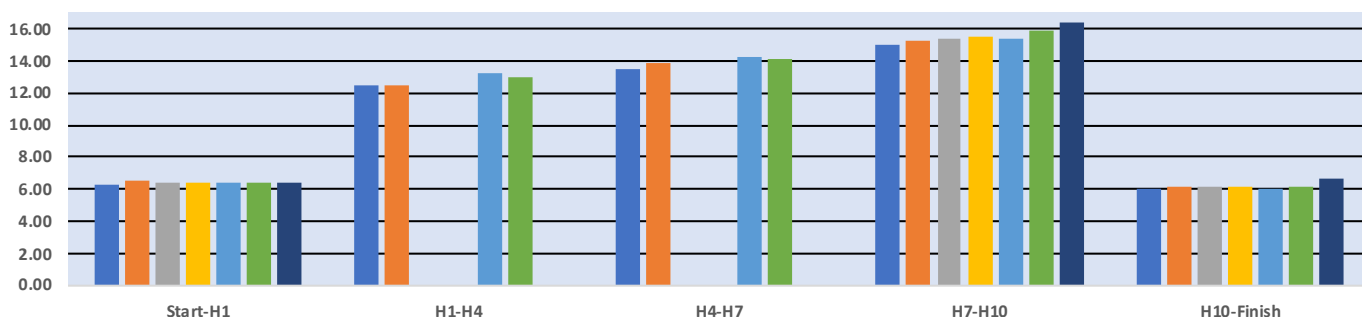
FINAL

			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		6.32	10.44	14.56	18.80	23.20	27.64	32.32	37.16	42.12	47.32		53.33	4 / 1			
	reaction time	0.199																
	interval		7.12	4.12	4.12	4.24	4.40	4.44	4.68	4.84	4.96	5.20	6.01	NR PB		12.48	13.52	15.00
	velocity		7.12	8.50	8.50	8.25	7.95	7.88	7.48	7.23	7.06	6.73	6.66	7.50		8.41	7.77	7.00
Ryzhykova, Anna (UKR) (1989)	time		6.48	10.56	14.68	19.00	23.44	28.12	32.84	37.72	42.68	48.04		54.15	5 / 2			
	reaction time	0.185																
	interval		6.94	4.08	4.12	4.32	4.44	4.68	4.72	4.88	4.96	5.36	6.11	PB		12.52	13.84	15.20
	velocity		6.94	8.58	8.50	8.10	7.88	7.48	7.42	7.17	7.06	6.53	6.55	7.39		8.39	7.59	6.91
Tkachuk, Viktoriya (UKR) (1994)	time		6.36	10.60	14.88	19.00	23.72	28.32	33.08	38.04	43.20	48.46		54.62	2 / 3			
	reaction time	0.250																
	interval		7.08	4.24	4.28	4.84	4.60	4.76	4.96	5.16	5.26	6.16	6.16	7.32				15.38
	velocity		7.08	8.25	8.18	7.92	7.61	7.35	7.06	6.78	6.65	6.49	6.49	7.32				6.83
Iuel, Amalie (NOR) (1994)	time		6.44	10.58	14.84	19.00	23.78	28.50	33.34	38.36	43.50	48.84		55.04	7 / 4			
	reaction time	0.150																
	interval		6.99	4.14	4.26	4.72	4.72	4.72	4.84	5.02	5.14	5.34	6.20					15.50
	velocity		6.99	8.45	8.22	7.83	7.42	7.23	6.97	6.81	6.55	6.45	7.27					6.77
Nugent, Leah (JAM) (1992)	time		6.44	10.68	15.00	19.72	24.44	29.16	33.92	38.88	44.12	49.28		55.37	3 / 5			
	reaction time	0.233																
	interval		6.99	4.24	4.32	4.72	4.72	4.72	4.88	5.08	5.24	5.16	6.09			13.28	14.20	15.36
	velocity		6.99	8.25	8.10	7.42	7.42	7.42	7.35	7.06	6.68	6.78	6.57	7.22		7.91	7.39	6.84
Sprunger, Leá (SUI) (1990)	time		6.40	10.64	14.90	19.32	23.84	28.52	33.40	38.48	43.72	49.26		55.46	6 / 6			
	reaction time	0.152																
	interval		7.03	4.24	4.26	4.42	4.52	4.68	4.88	5.08	5.24	5.54	6.20			12.92	14.08	15.86
	velocity		7.03	8.25	8.22	7.92	7.74	7.48	7.17	6.89	6.68	6.32	6.45	7.21		8.13	7.46	6.62
Watson, Sage (CAN) (1994)	time		6.44	10.60	14.88	19.00	23.76	28.52	33.48	38.56	44.04	49.84		56.52	8 / 7			
	reaction time	0.204																
	interval		6.99	4.16	4.28	8.88	4.76	4.96	5.08	5.48	5.80	6.68	6.68					16.36
	velocity		6.99	8.41	8.18	7.88	7.35	7.06	6.89	6.39	6.03	5.99	7.08					6.42
Watson, Sage (CAN) (1994)	time		6.44	10.60	14.88	19.00	23.76	28.52	33.48	38.56	44.04	49.84		56.52	8 / 7			
	reaction time	0.204																
	interval		6.99	4.16	4.28	8.88	4.76	4.96	5.08	5.48	5.80	6.68	6.68					16.36
	velocity		6.99	8.41	8.18	7.88	7.35	7.06	6.89	6.39	6.03	5.99	7.08					6.42
Watson, Sage (CAN) (1994)	time		6.44	10.60	14.88	19.00	23.76	28.52	33.48	38.56	44.04	49.84		56.52	8 / 7			
	reaction time	0.204																
	interval		6.99	4.16	4.28	8.88	4.76	4.96	5.08	5.48	5.80	6.68	6.68					16.36
	velocity		6.99	8.41	8.18	7.88	7.35	7.06	6.89	6.39	6.03	5.99	7.08					6.42
Watson, Sage (CAN) (1994)	time		6.44	10.60	14.88	19.00	23.76	28.52	33.48	38.56	44.04	49.84		56.52	8 / 7			
	reaction time	0.204																
	interval		6.99	4.16	4.28	8.88	4.76	4.96	5.08	5.48	5.80	6.68	6.68					16.36
	velocity		6.99	8.41	8.18	7.88	7.35	7.06	6.89	6.39	6.03	5.99	7.08					6.42



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=R3BXj5glouA>

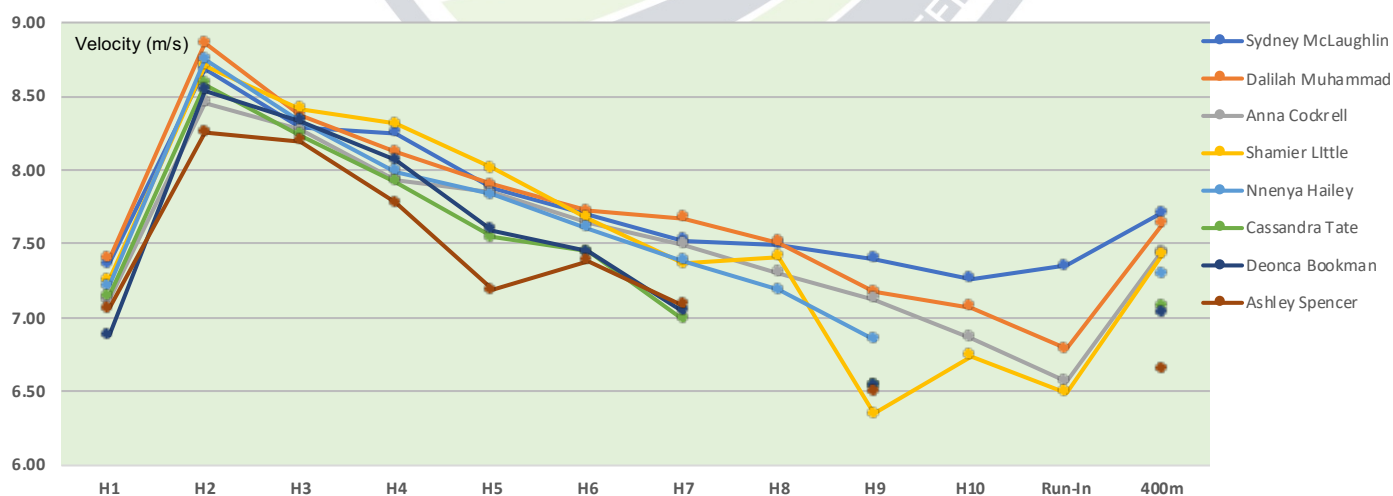
2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

Women's 400m Hurdles

Date 2021.06.27

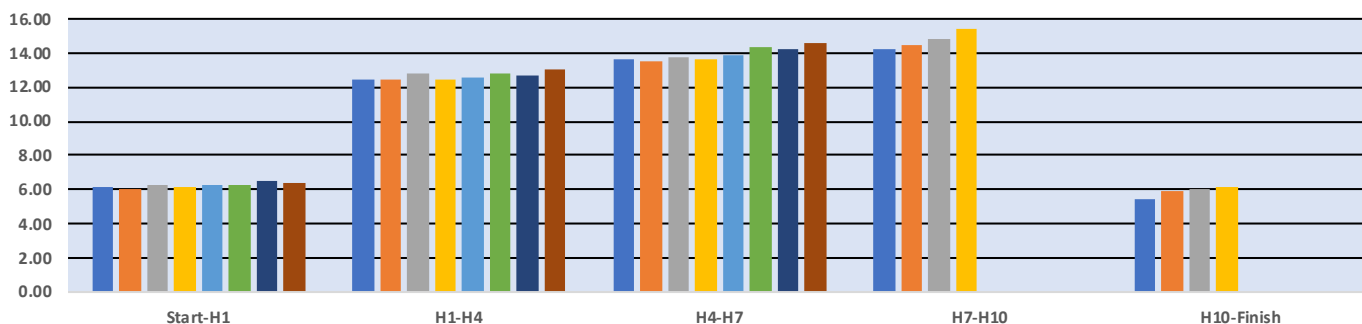
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (1999)	time		6.11	10.14	14.36	18.60	23.04	27.59	32.24	36.91	41.64	46.46		51.90	6 / 1			
	reaction time	0.194																
	interval			4.03	4.22	4.24	4.44	4.55	4.65	4.67	4.73	4.82	5.44	WR		12.49	13.64	14.22
	velocity		7.36	8.68	8.29	8.25	7.88	7.69	7.53	7.49	7.40	7.26	7.35	7.71		8.41	7.70	7.38
Muhammad, Dalilah (USA) (1990)	time		6.08	10.03	14.21	18.52	22.95	27.48	32.04	36.70	41.58	46.53		52.42	7 / 2			
	reaction time	0.167																
	interval			3.95	4.18	4.31	4.43	4.53	4.56	4.66	4.88	4.95	5.89			12.44	13.52	14.49
	velocity		7.40	8.86	8.37	8.12	7.90	7.73	7.68	7.51	7.17	7.07	6.79	7.63		8.44	7.77	7.25
Cockrell, Anna (USA) (1997)	time		6.32	10.46	14.69	19.10	23.56	28.14	32.81	37.60	42.51	47.61		53.70	9 / 3			
	reaction time	0.201																
	interval			4.14	4.23	4.41	4.46	4.58	4.67	4.79	4.91	5.10	6.09	PB		12.78	13.71	14.80
	velocity		7.12	8.45	8.27	7.94	7.85	7.64	7.49	7.31	7.13	6.86	6.57	7.45		8.22	7.66	7.09
Little, Shamier (USA) (1995)	time		6.20	10.22	14.38	18.59	22.96	27.52	32.27	36.99	42.50	47.69		53.85	5 / 4			
	reaction time	0.213																
	interval			4.02	4.16	4.21	4.37	4.56	4.75	4.72	5.51	5.19	6.16			12.39	13.68	15.42
	velocity		7.26	8.71	8.41	8.31	8.01	7.68	7.37	7.42	6.35	6.74	6.49	7.43		8.47	7.68	6.81
Hailey, Nnenna (USA) (1994)	time		6.24	10.24	14.44	18.82	23.29	27.89	32.63	37.50	42.61			54.79	8 / 5			
	reaction time	0.251																
	interval			4.00	4.20	4.38	4.47	4.60	4.74	4.87	5.11			DQ		12.58	13.81	
	velocity		7.21	8.75	8.33	7.99	7.83	7.61	7.38	7.19	6.85			7.30		8.35	7.60	
Tate, Cassandra (USA) (1990)	time		6.30	10.38	14.63	19.05	23.69	28.39	33.40		44.11			56.51	4 / 6			
	reaction time	0.194																
	interval			4.08	4.25	4.42	4.64	4.70	5.01		10.71			7.08		12.75	14.35	
	velocity		7.14	8.58	8.24	7.92	7.54	7.45	6.99		6.54			7.3		8.24	7.32	
Bookman, Deonca (USA) (1995)	time		6.54	10.64	14.84	19.18	23.79	28.49	33.46		44.17			56.90	2 / 7			
	reaction time	0.349																
	interval			4.10	4.20	4.34	4.61	4.70	4.97		10.71			7.03		12.64	14.28	
	velocity		6.88	8.54	8.33	8.06	7.59	7.45	7.04		6.54			83		8.31	7.35	
Spencer, Ashley (USA) (1993)	time		6.37	10.61	14.88	19.38	24.25	28.99	33.93		44.71			60.19	3 / 8			
	reaction time	0.222																
	interval			4.24	4.27	4.50	4.87	4.74	4.94		10.78			6.65		13.01	14.55	
	velocity		7.06	8.25	8.20	7.78	7.19	7.38	7.09		6.49			75		8.07	7.22	



Time Intervals (s)

Hurdle Phases



1st-4th Place

Source: Athlete Tracking (2021.06.28). Women's 400mH - Unofficial Split Times.

Retrieved from <https://twitter.com/athletranking/status/1409736538364260357?s=21>

5th-8th Place

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=YiZ62VM5bqA>

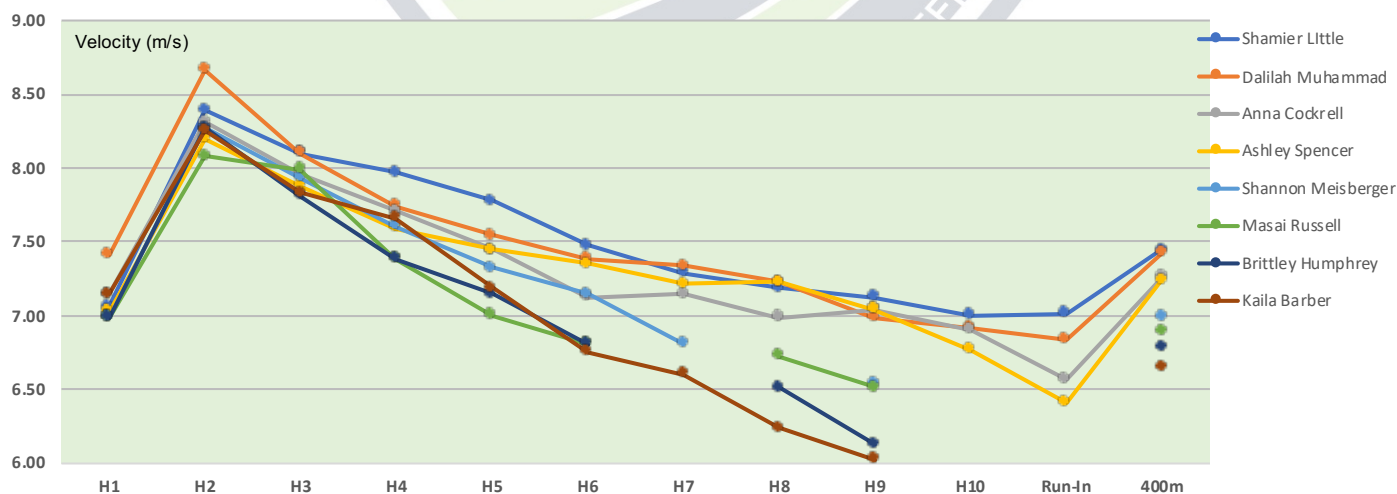
2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

Women's 400m Hurdles

Date 2021.06.26

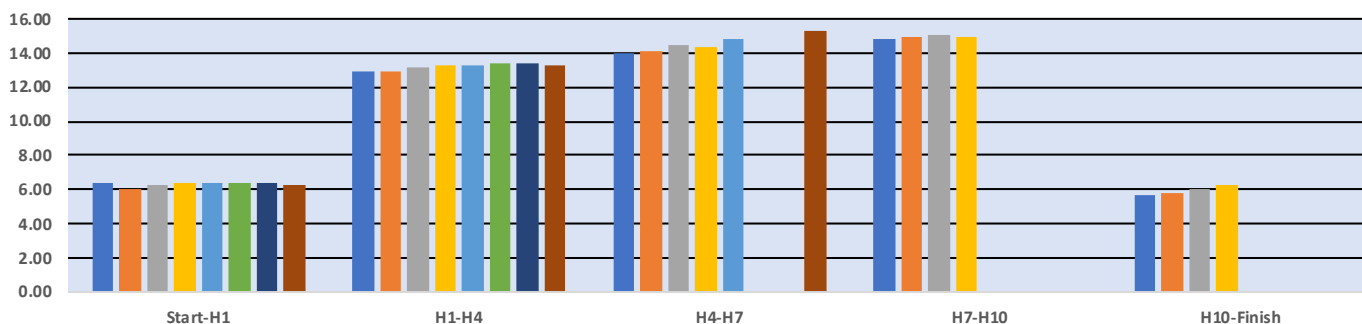
Semi-Final 2

			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		6.37	10.54	14.86	19.25	23.75	28.43	33.23	38.10	43.01	48.01		53.71	5 / 1			
	reaction time	0.222																
	interval			4.17	4.32	4.39	4.50	4.68	4.80	4.87	4.91	5.00	5.70			12.88	13.98	14.78
	velocity		7.06	8.39	8.10	7.97	7.78	7.48	7.29	7.19	7.13	7.00	7.02	7.45		8.15	7.51	7.10
	H1 lead leg	R			15	15	15	15	16	16	16	16	19	159				
Muhammad, Dalilah (USA) (1990)	time		6.07	10.11	14.43	18.95	23.59	28.33	33.10	37.94	42.95	48.01		53.86	6 / 2			
	reaction time	0.174																
	interval			4.04	4.32	4.52	4.64	4.74	4.77	4.84	5.01	5.06	5.85			12.88	14.15	14.91
	velocity		7.41	8.66	8.10	7.74	7.54	7.38	7.34	7.23	6.99	6.92	6.84	7.43		8.15	7.42	7.04
	H1 lead leg	R		22	15	15	15	15	15	15	16	16	18.7	177.7				
Cockrell, Anna (USA) (1997)	time		6.30	10.51	14.91	19.45	24.15	29.06	33.96	38.97	43.94	49.01		55.10	8 / 3			
	reaction time	0.177																
	interval			4.21	4.40	4.54	4.70	4.91	4.90	5.01	4.97	5.07	6.09			13.15	14.51	15.05
	velocity		7.14	8.31	7.95	7.71	7.45	7.13	7.14	6.99	7.04	6.90	6.57	7.26		7.98	7.24	6.98
	H1 lead leg	L			15	15	15	16	15	16	16	16		139				
Spencer, Ashley (USA) (1993)	time		6.40	10.67	15.11	19.72	24.42	29.18	34.03	38.87	43.84	49.01		55.25	7 / 4			
	reaction time	0.208																
	interval			4.27	4.44	4.61	4.70	4.76	4.85	4.84	4.97	5.17	6.24			13.32	14.31	14.98
	velocity		7.03	8.20	7.88	7.59	7.45	7.35	7.22	7.23	7.04	6.77	6.41	7.24		7.88	7.34	7.01
	H1 lead leg	L		22	15	15	15	15	15	15	15	15		142				
Meisberger, Shannon (USA) (1999)	time		6.44	10.67	15.08	19.68	24.46	29.36	34.50		45.21			57.22	9 / 5			
	reaction time	0.260									10.71							
	interval			4.23	4.41	4.60	4.78	4.90	5.14							13.24	14.82	
	velocity		6.99	8.27	7.94	7.61	7.32	7.14	6.81		6.54			6.99		7.93	7.09	
	H1 lead leg	L			15	15	15	16	16	17	17			111				
Russell, Masai (USA) (2000)	time		6.44	10.77	15.15	19.89	24.89	30.03		40.44	45.81			58.00	3 / 6			
	reaction time	0.332									10.41	5.37						
	interval			4.33	4.38	4.74	5.00	5.14								13.45		
	velocity		6.99	8.08	7.99	7.38	7.00	6.81		6.72	6.52			6.90		7.81		
	H1 lead leg	R			16	16	16	16			17			81				
Humphrey, Brittley (USA) (1998)	time		6.44	10.67	15.15	19.89	24.79	29.93		40.67	46.38			58.95	2 / 7			
	reaction time	0.190									10.74	5.71						
	interval			4.23	4.48	4.74	4.90	5.14								13.45		
	velocity		6.99	8.27	7.81	7.38	7.14	6.81		6.52	6.13			6.79		7.81		
	H1 lead leg	L			15	15	15	15			17			77				
Barber, Kaila (USA) (1993)	time		6.30	10.54	15.01	19.58	24.45	29.63	34.93	40.54	46.35			60.14	4 / 8			
	reaction time	0.174									5.81							
	interval			4.24	4.47	4.57	4.87	5.18	5.30	5.61						13.28	15.35	
	velocity		7.14	8.25	7.83	7.66	7.19	6.76	6.60	6.24	6.02			6.65		7.91	6.84	
	H1 lead leg	R			16	16	16	16		17	18			99				



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=SMwV6be7I9A>

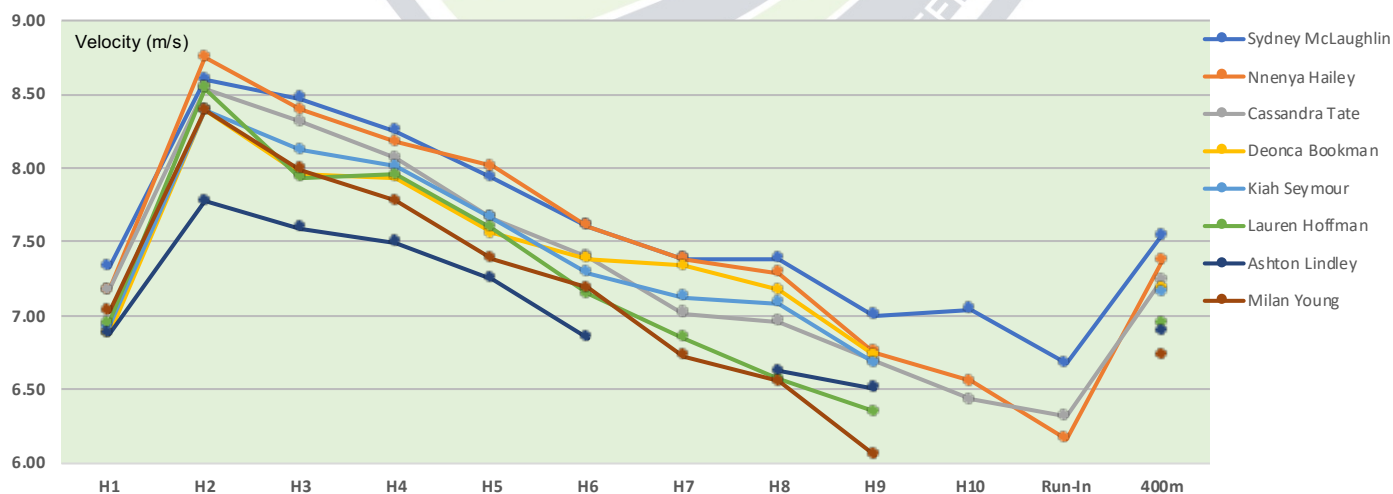
2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

Women's 400m Hurdles

Date 2021.06.26

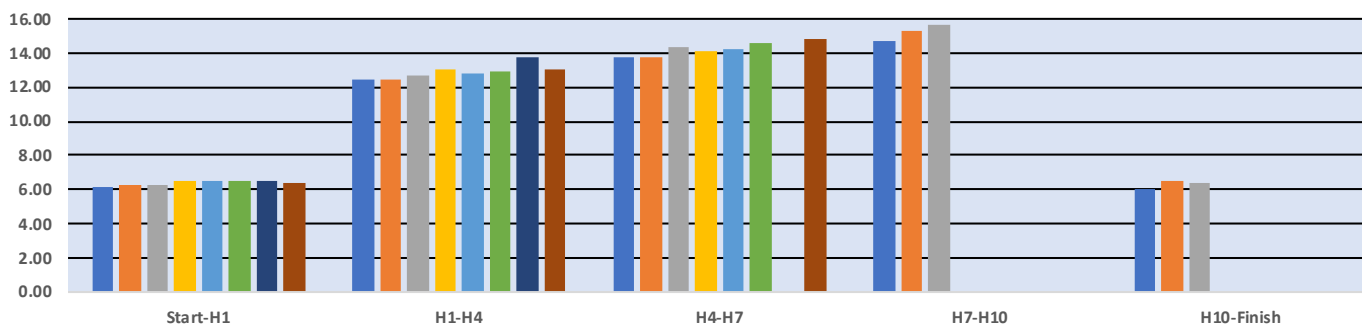
Semi-Final 1

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (1999)	time		6.14	10.21	14.34	18.58	22.99	27.59	32.33	37.07	42.07	47.04		53.03	5 / 1			
	reaction time	0.227																
	interval		7.33	4.07	4.13	4.24	4.41	4.60	4.74	4.74	5.00	4.97	5.99			12.44	13.75	14.71
	velocity		7.33	8.60	8.47	8.25	7.94	7.61	7.38	7.38	7.00	7.04	6.68	7.54		8.44	7.64	7.14
Hailey, Nnenna (USA) (1994)	time		6.27	10.27	14.44	18.72	23.09	27.69	32.43	37.23	42.41	47.75		54.24	8 / 2			
	reaction time	0.266																
	interval		7.18	4.00	4.17	4.28	4.37	4.60	4.74	4.80	5.18	5.34	6.49	PB		12.45	13.71	15.32
	velocity		7.18	8.75	8.39	8.18	8.01	7.61	7.38	7.29	6.76	6.55	6.16	7.37		8.43	7.66	6.85
Tate, Cassandra (USA) (1990)	time		6.27	10.37	14.58	18.92	23.49	28.22	33.21	38.24	43.47	48.91		55.24	6 / 3			
	reaction time	0.211																
	interval		7.18	4.10	4.21	4.34	4.57	4.73	4.99	5.03	5.23	5.44	6.33			12.65	14.29	15.70
	velocity		7.18	8.54	8.31	8.06	7.66	7.40	7.01	6.96	6.69	6.43	6.32	7.24		8.30	7.35	6.69
Bookman, Deonca (USA) (1995)	time		6.54	10.71	15.11	19.52	24.15	28.89	33.66	38.54	43.74			55.66	9 / 4			
	reaction time	0.338																
	interval		6.88	4.17	4.40	4.41	4.63	4.74	4.77	4.88	5.20					12.98	14.14	
	velocity		6.88	8.39	7.95	7.94	7.56	7.38	7.34	7.17	6.73					8.09	7.43	
Seymour, Kiah (USA) (1994)	time		6.50	10.67	14.98	19.35	23.92	28.72	33.63	38.57	43.81			55.84	7 / 5			
	reaction time	0.204																
	interval		6.92	4.17	4.31	4.37	4.57	4.80	4.91	4.94	5.24					12.85	14.28	
	velocity		6.92	8.39	8.12	8.01	7.66	7.29	7.13	7.09	6.68					8.17	7.35	
Hoffman, Lauren (USA) (1999)	time		6.47	10.57	14.98	19.38	23.99	28.89	34.00	39.33	44.84			57.59	3 / 6			
	reaction time	0.224																
	interval		6.96	4.10	4.41	4.40	4.61	4.90	5.11	5.33	5.51					12.91	14.62	
	velocity		6.96	8.54	7.94	7.95	7.59	7.14	6.85	6.57	6.35					8.13	7.18	
Lindley, Ashton (USA) (2002)	time		6.54	11.04	15.65	20.32	25.15	30.26		40.83	46.21			58.04	2 / 7			
	reaction time	0.288																
	interval		6.88	4.50	4.61	4.67	4.83	5.11		10.57	5.38					13.78		
	velocity		6.88	7.78	7.59	7.49	7.25	6.85		6.62	6.51					7.62		
Young, Milan (USA) (1999)	time		6.40	10.57	14.95	19.45	24.19	29.06	34.26	39.60	45.38			59.39	4 / 8			
	reaction time	0.187																
	interval		7.03	4.17	4.38	4.50	4.74	4.87	5.20	5.34	5.78					13.05	14.81	
	velocity		7.03	8.39	7.99	7.78	7.38	7.19	6.73	6.55	6.06					8.05	7.09	



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=ZMxyKQ1hg18>

2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

Women's 400m Hurdles

Date 2021.06.25

Heat 4

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Muhammad, Dalilah (USA) (1990)	time	6.03	10.06	14.40	18.80	23.40	28.13	33.10	38.30	43.60	49.03		55.51	3 / 1			
	reaction time	0.184															
	interval		4.03	4.34	4.40	4.60	4.73	4.97	5.20	5.30	5.43	6.48			12.77	14.30	15.93
	velocity		7.46	8.68	8.06	7.95	7.61	7.40	6.73	6.60	6.45	6.17	7.21		8.22	7.34	6.59
	H1 lead leg	R															
	strides	22	15	15	15	15	15	15	15	16	16	19	178				

Date 2021.06.25

Heat 3

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Tate, Cassandra (USA) (1990)	time	6.36	10.43	14.80	19.36	24.00	28.70	33.60	38.90	44.26	49.75		56.11	2 / 1			
	reaction time	0.230															
	interval		4.07	4.37	4.56	4.64	4.70	4.90	5.30	5.36	5.49	6.36			13.00	14.24	16.15
	velocity		7.08	8.60	8.01	7.68	7.54	7.14	6.60	6.53	6.38	6.29	7.13		8.08	7.37	6.50
	H1 lead leg	R															
	strides		14	14	15	15	15	15	16	16	16	19.2	155.2				
Cockrell, Anna (USA) (1997)	time	6.40	10.70	15.20	19.73	24.50	29.46	34.70	39.73	44.90	50.26		56.83	7 / 2			
	reaction time	0.196															
	interval		4.30	4.50	4.53	4.77	4.96	5.24	5.03	5.17	5.36	6.57			13.33	14.97	15.56
	velocity		7.03	8.14	7.78	7.73	7.34	7.06	6.68	6.96	6.77	6.53	6.09	7.04	7.88	7.01	6.75
	H1 lead leg	L															
	strides	22	15	15	15	15	15	16	15	16	16	20	180				

Date 2021.06.25

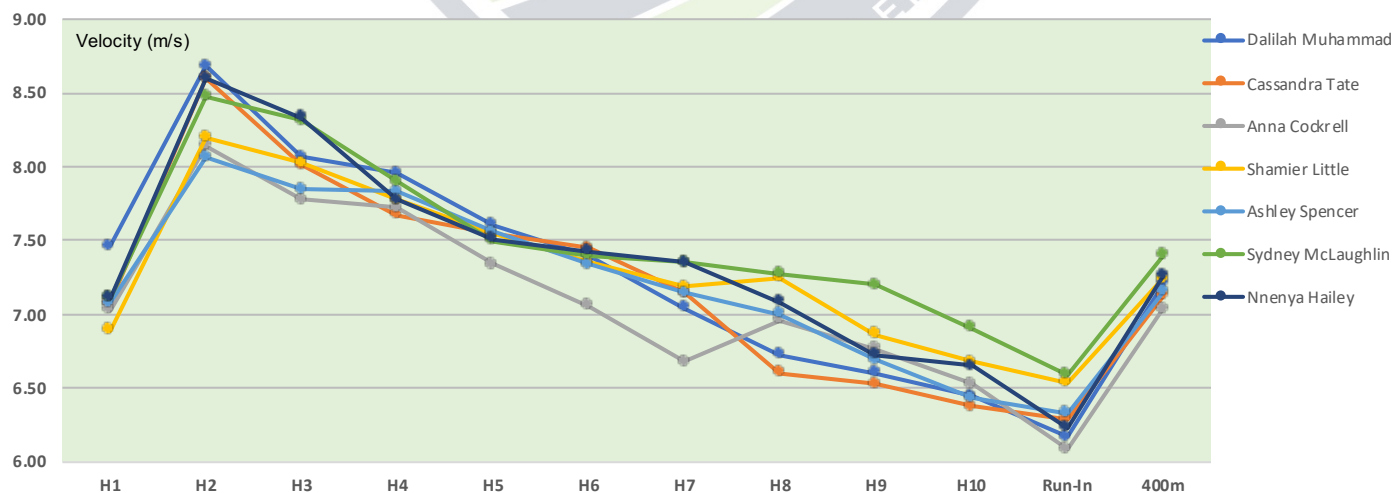
Heat 2

		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	6.53	10.80	15.16	19.66	24.30	29.06	33.93	38.76	43.86	49.10		55.22	7 / 1			
	reaction time	0.301															
	interval		4.27	4.36	4.50	4.64	4.76	4.87	4.83	5.10	5.24	6.12			13.13	14.27	15.17
	velocity		6.89	8.20	8.03	7.78	7.54	7.35	7.19	7.25	6.86	6.68	6.54	7.24	8.00	7.36	6.92
	H1 lead leg	R															
	strides	23	15	15	15	16	16	16	16	16	16	19	183				
Spencer, Ashley (USA) (1993)	time	6.36	10.70	15.16	19.63	24.26	29.03	33.93	38.93	44.16	49.60		55.92	8 / 2			
	reaction time	0.182															
	interval		4.34	4.46	4.47	4.63	4.77	4.90	5.00	5.23	5.44	6.32			13.27	14.30	15.67
	velocity		7.08	8.06	7.85	7.83	7.56	7.34	7.14	7.00	6.69	6.43	6.33	7.15	7.91	7.34	6.70
	H1 lead leg	L															
	strides	22	15	15	15	15	15	15	15	15	15	18	175				

Date 2021.06.25

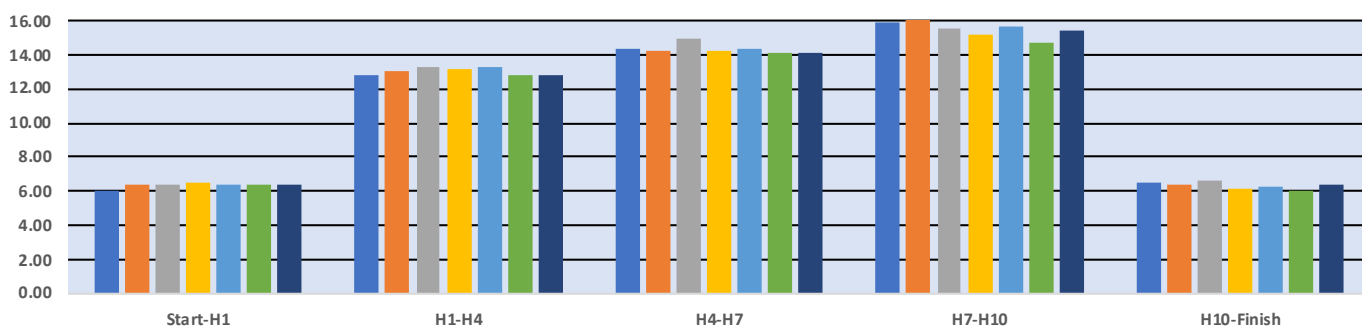
Heat 1

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (1999)	time	6.33	10.46	14.67	19.10	23.77	28.50	33.26	38.07	42.93	48.00		54.07	5 / 1			
	reaction time	0.255															
	interval		4.13	4.21	4.43	4.67	4.73	4.76	4.81	4.86	5.07	6.07			12.77	14.16	14.74
	velocity		7.11	8.47	8.31	7.90	7.49	7.40	7.35	7.28	7.20	6.90	6.59	7.40	8.22	7.42	7.12
	H1 lead leg	R															
	strides	22	14	14	15	15	15	15	15	15	16	18.2	174.2				
Hailey, Nnenna (USA) (1994)	time	6.33	10.40	14.60	19.10	23.76	28.47	33.23	38.17	43.37	48.63		55.05	8 / 2			
	reaction time	0.291															
	interval		4.07	4.20	4.50	4.66	4.71	4.76	4.94	5.20	5.26	6.42			12.77	14.13	15.40
	velocity		7.11	8.60	8.33	7.78	7.51	7.43	7.35	7.09	6.73	6.65	6.23	7.27	8.22	7.43	6.82
	H1 lead leg	L															
	strides		16	16	17	17	17	17	17	18	18	22.2	175.2				



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=QhAEK8AeHsk&t=95s>

Biomechanical Analysis

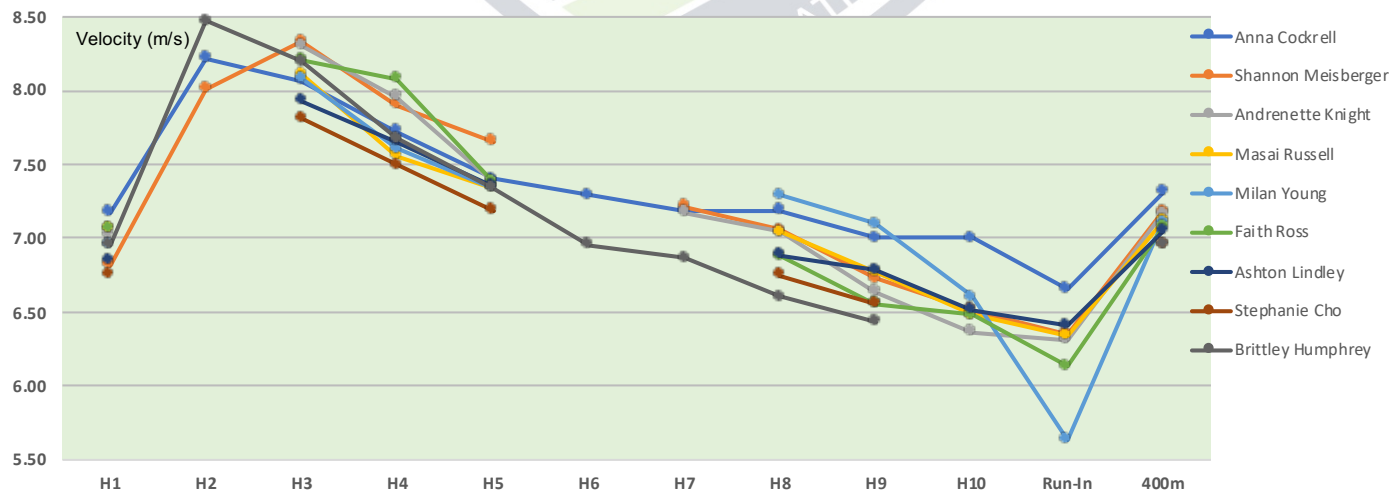
2021 NCAA Championships (Eugene, OR) (TV Analysis)

100m Hurdles

Date: 2021.06.12

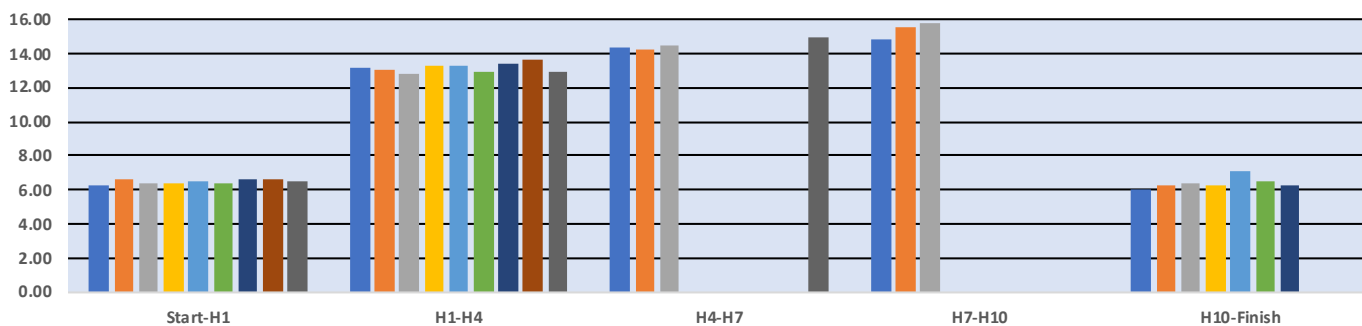
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Cockrell, Anna (USA) (1997)	time		6.27	10.53	14.87	19.40	24.13	28.93	33.80	38.67	43.67	48.67		54.68	6 / 1			
	reaction time	0.166																
	interval		7.18	4.26	4.34	4.53	4.73	4.80	4.87	4.87	5.00	5.00	6.01	PB		13.13	14.40	14.87
	velocity		8.22	8.06	8.06	7.73	7.40	7.29	7.19	7.19	7.00	7.00	6.66	7.32		8.00	7.29	7.06
Meisberger, Shannon (USA) (1999)	time		6.60	10.97	15.17	19.60	24.17		33.87	38.83	44.03	49.40		55.70	8 / 2			
	reaction time	0.275																
	interval		6.82	4.37	4.20	4.43	4.57		9.70	4.96	5.20	5.37	6.30	PB		13.00	14.27	15.53
	velocity		8.01	8.33	7.90	7.66			7.22	7.06	6.73	6.52	6.35	7.18		8.08	7.36	6.76
Knight, Andrenette (JAM) (1996)	time		6.40		14.83	19.23	23.97		33.73	38.70	43.97	49.47		55.81	4 / 3			
	reaction time	0.178																
	interval				8.43	4.40	4.74		9.76	4.97	5.27	5.50	6.34			12.83	14.50	15.74
	velocity		7.03		8.30	7.95	7.38		7.17	7.04	6.64	6.36	6.31	7.17		8.18	7.24	6.67
Russell, Masai (USA) (2000)	time		6.37		15.00	19.63	24.40			39.30	44.47	49.87		56.18	5 / 4			
	reaction time	0.335																
	interval				8.63	4.63	4.77			14.90	5.17	5.40	6.31	PB		13.26		
	velocity		7.06		8.11	7.56	7.34			7.05	6.77	6.48	6.34	7.12		7.92		
Young, Milan (USA) (1999)	time		6.47		15.13	19.73	24.50			38.90	43.83	49.13		56.23	9 / 5			
	reaction time	0.218																
	interval				8.66	4.60	4.77			14.40	4.93	5.30	7.10			13.26		
	velocity		6.96		8.08	7.61	7.34			7.29	7.10	6.60	5.63	7.11		7.92		
Ross, Faith (USA) (1998)	time		6.37		14.90	19.23	23.97			39.23	44.57	49.97		56.49	3 / 6			
	reaction time	0.227																
	interval				8.53	4.33	4.74			15.26	5.34	5.40	6.52	PB		12.86		
	velocity		7.06		8.21	8.08	7.38			6.88	6.55	6.48	6.13	7.08		8.16		
Lindley, Ashton (USA) (2002)	time		6.57		15.40	19.97	24.73			39.97	45.13	50.50		56.74	2 / 7			
	reaction time	0.213																
	interval				8.83	4.57	4.76			15.24	5.16	5.37	6.24	PB		13.40		
	velocity		6.85		7.93	7.66	7.35			6.89	6.78	6.52	6.41	7.05		7.84		
Cho, Stephanie (CAN) (1997)	time		6.67		15.63	20.30	25.17			40.73	46.07			57.48	1 / 8			
	reaction time	0.298																
	interval				8.96	4.67	4.87			15.56	5.34			PB		13.63		
	velocity		6.75		7.81	7.49	7.19			6.75	6.55			6.96		7.70		
Humphrey, Brittley (USA) (1998)	time		6.47	10.60	14.87	19.43	24.20	29.23	34.33	39.63	45.07			57.51	7 / 9			
	reaction time	0.177																
	interval			4.13	4.27	4.56	4.77	5.03	5.10	5.30	5.44					12.96	14.90	
	velocity		6.96	8.47	8.20	7.68	7.34	6.96	6.86	6.60	6.43			6.96		8.10	7.05	
	H1 lead leg	L	23	15	15	15	15	16	16	16	16			147				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 24fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=9ImRZ3Vlomg>

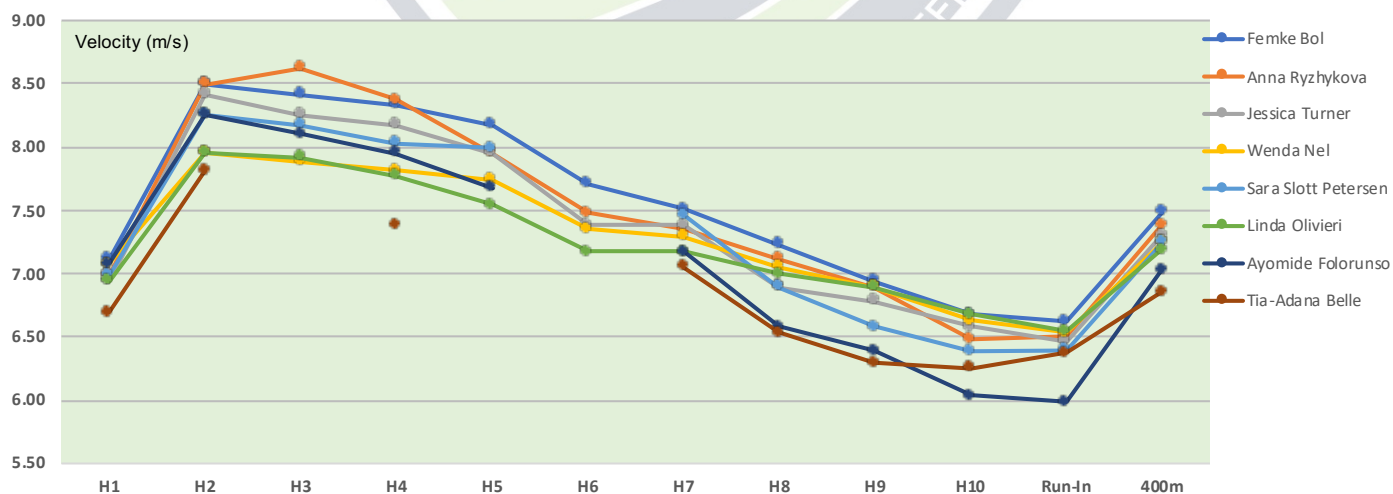
2021 Golden Gala Pietro Mennea (Florence, ITA) (TV Analysis)

Women's 400m Hurdles

Date 2021.06.10

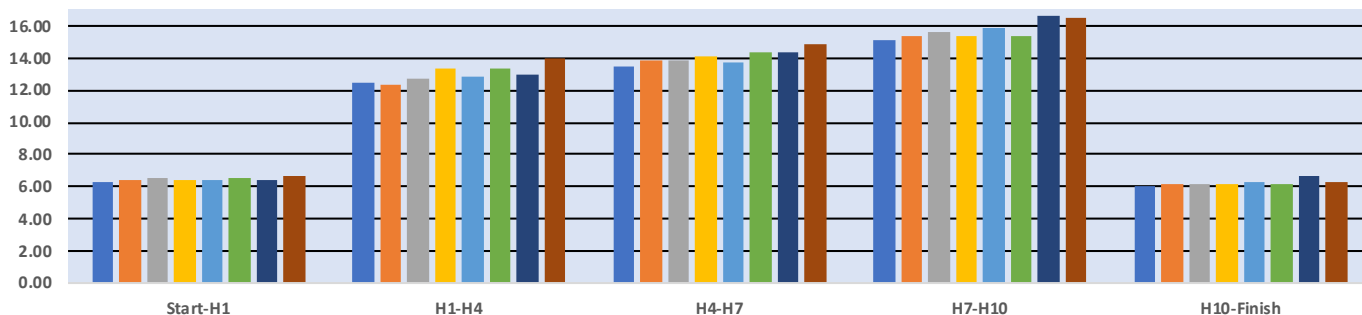
FINAL

			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		6.32	10.44	14.60	18.80	23.08	27.62	32.28	37.12	42.16	47.40		53.44	4 / 1			
	reaction time	0.209											6.04	NR PB		12.48	13.48	15.12
	interval		7.12	4.12	4.16	4.20	4.28	4.54	4.66	4.84	5.04	5.24	6.04			8.41	7.79	6.94
	velocity		7.12	8.50	8.41	8.33	8.18	7.71	7.51	7.23	6.94	6.68	6.62	7.49				
Ryzhykova, Anna (UKR) (1989)	time		6.44	10.56	14.62	18.80	23.20	27.88	32.64	37.56	42.64	48.04		54.19	5 / 2			
	reaction time	0.182											6.15	PB		12.36	13.84	15.40
	interval		6.99	4.12	4.06	4.18	4.40	4.68	4.76	4.92	5.08	5.40	6.15			8.50	7.59	6.82
	velocity		6.99	8.50	8.62	8.37	7.95	7.48	7.35	7.11	6.89	6.48	6.50	7.38				
Turner, Jessica (GBR) (1995)	time		6.48	10.64	14.88	19.16	23.56	28.30	33.04	38.12	43.28	48.60		54.79	6 / 3			
	reaction time	0.199											6.19			12.68	13.88	15.56
	interval		6.94	4.16	4.24	4.28	4.40	4.74	4.74	5.08	5.16	5.32	6.19			8.28	7.56	6.75
	velocity		6.94	8.41	8.25	8.18	7.95	7.38	7.38	6.89	6.78	6.58	6.46	7.30				
Nel, Wenda (RSA) (1988)	time		6.36	10.76	15.20	19.68	24.20	28.96	33.76	38.72	43.80	49.08		55.20	8 / 4			
	reaction time	0.182											6.12			13.32	14.08	15.32
	interval		7.08	4.40	4.44	4.48	4.52	4.76	4.80	4.96	5.08	5.28	6.12			7.88	7.46	6.85
	velocity		7.08	7.95	7.88	7.81	7.74	7.35	7.29	7.06	6.89	6.63	6.54	7.25				
Petersen, Sara Slott (DEN) (1987)	time		6.44	10.68	14.96	19.32	23.70		33.08	38.16	43.48	48.96		55.21	2 / 5			
	reaction time	0.144							9.38	5.08	5.32	5.48	6.25			12.88	13.76	15.88
	interval		6.99	4.24	4.28	4.36	4.38		7.46	6.89	6.58	6.39	6.40	7.25		8.15	7.63	6.61
	velocity		6.99	8.25	8.18	8.03	7.99		7.46	6.89	6.58	6.39	6.40	7.25				
Olivieri, Linda (ITA) (1998)	time		6.48	10.88	15.30	19.80	24.44	29.32	34.20	39.20	44.28	49.52		55.63	7 / 6			
	reaction time	0.134							9.38	5.08	5.24	5.48	6.11	PB		13.32	14.40	15.32
	interval		6.94	4.40	4.42	4.50	4.64	4.88	4.88	5.00	5.08	5.24	6.11			7.88	7.29	6.85
	velocity		6.94	7.95	7.92	7.78	7.54	7.17	7.17	7.00	6.89	6.68	6.55	7.19				
Folorunso, Ayomide (ITA) (1996)	time		6.36	10.60	14.92	19.32	23.88		33.64	38.96	44.44	50.24		56.92	3 / 7			
	reaction time	0.193							9.76	5.32	5.48	5.80	6.68			12.96	14.32	16.60
	interval		7.08	4.24	4.32	4.40	4.56		7.17	6.58	6.39	6.03	5.99	7.03		8.10	7.33	6.33
	velocity		7.08	8.25	8.10	7.95	7.68		7.17	6.58	6.39	6.03	5.99	7.03				
Belle, Tia-Adana (BAR) (1996)	time		6.72	11.20		20.68			35.56	40.92	46.48	52.08		58.36	1 / 8			
	reaction time	0.172							14.88	5.36	5.56	5.60	6.28			13.96	14.88	16.52
	interval		6.70	4.48		9.48			7.06	6.53	6.29	6.25	6.37	6.85		7.52	7.06	6.36
	velocity		6.70	7.81		7.38			7.06	6.53	6.29	6.25	6.37	6.85				
	H1 lead leg	L																
	strides		22	15	15		15	15	15	15	15	16	19.5	162.5				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=YVuMDueaxH0>

Biomechanical Analysis

2021 Music City Track Carnival (Nashville, TN) (TV Analysis)

Women's 400m Hurdles

Date 2021.06.06

FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (1999)	time	6.34	10.64	14.88	19.07	23.45	27.92	32.53	37.34	42.44	47.48		52.83	5 / 1			
	reaction time																
	interval		4.30	4.24	4.19	4.38	4.47	4.61	4.81	5.10	5.04	5.35			12.73	13.46	14.95
	velocity	7.10	8.14	8.25	8.35	7.99	7.83	7.59	7.28	6.86	6.94	7.48	7.57		8.25	7.80	7.02
H1 lead leg	R	22	15	14	14	14	14	15		16	16	18.5	158.5				

2019 IAAF World Championships (Doha, QAT)

Date 2021.06.06

FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (1999)	time	6.27	10.27	14.38	18.65	22.98	27.42	31.96	36.73	41.57	46.58		52.23	4 / 2			
	reaction time	0.161															
	interval		4.00	4.11	4.27	4.33	4.44	4.54	4.77	4.84	5.01	5.65	PB		12.38	13.31	14.62
	velocity	7.18	8.75	8.52	8.20	8.08	7.88	7.71	7.34	7.23	6.99	7.08	7.66		8.48	7.89	7.18
H1 lead leg	R	23	15	15	15	15	15	15	16	16	16	19.2	180.2				

2018 South Eastern Conference Championships (Knoxville, TN) (TV Analysis)

Date 2018.05.13

FINAL

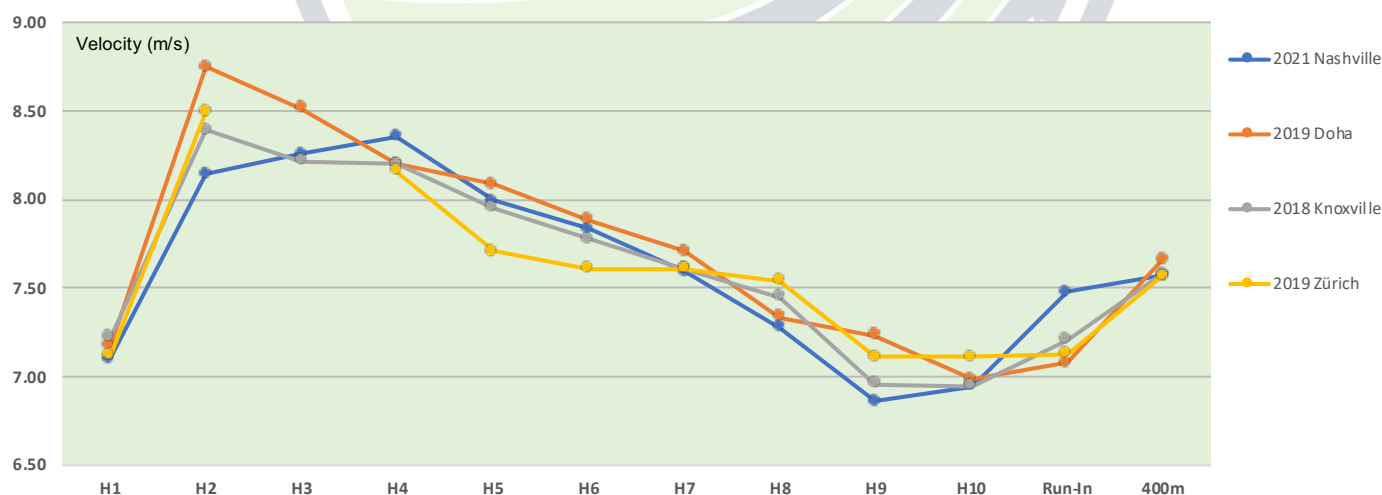
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (1999)	time	6.23	10.40	14.66	18.93	23.33	27.83	32.43	37.13	42.16	47.20		52.75	5 / 1			
	reaction time																
	interval		4.17	4.26	4.27	4.40	4.50	4.60	4.70	5.03	5.04	5.55	WJR PB		12.70	13.50	14.77
	velocity	7.22	8.39	8.22	8.20	7.95	7.78	7.61	7.45	6.96	6.94	7.21	7.58		8.27	7.78	7.11
H1 lead leg	R		15	15	15	15	15	15	15	16	16	18.5	155.5				

2019 Weltklasse (Zürich, SUI) (TV Analysis)

Date 2018.05.13

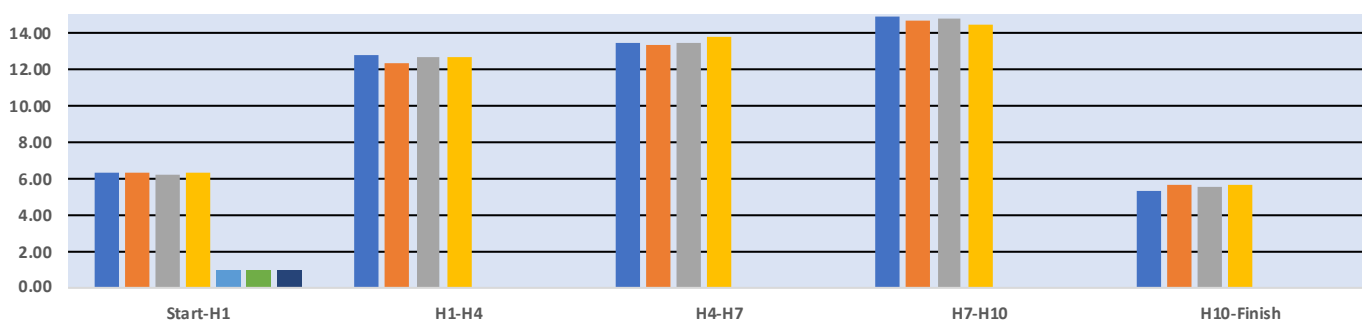
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (1999)	time	6.32	10.44		19.02	23.56	28.16	32.76	37.40	42.32	47.24		52.85	3 / 1			
	reaction time	0.147															
	interval		4.12		8.58	4.54	4.60	4.60	4.64	4.92	4.92	5.61			12.70	13.74	14.48
	velocity	7.12	8.50		8.16	7.71	7.61	7.61	7.54	7.11	7.11	7.13	7.57		8.27	7.64	7.25
H1 lead leg	R	23	15			15	15	15	15	16	16	19	149				



Time Intervals (s)

Hurdle Phases



2021 ATL Music City Track Carnival

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=Xti0evM1wUo>

2019 IAAF World Championships (Doha, QAT)

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

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