

2018 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

2018 Season Hurdles Report

Men's 110m Hurdles

Top 10 Times	5
IAAF Continental Cup (Ostrava, CZE) (TV Analysis) — Final	<i>NEW</i> 6
AG Memorial van Damme (Brussels, BEL) (TV Analysis) — Final	7
Müller Grand Prix (Birmingham, GBR) (TV Analysis) — Final	8
Müller Anniversary Games (London, GBR) (TV Analysis) — Final	9
Herculis Meeting International d'Athlétisme (Monaco, MON) (TV Analysis) — Final	10
Meeting Città di Padova (Padova, ITA) (TV Analysis) — Final	11
Athletissima (Lausanne, SUI) (TV Analysis) — Final	11
István Gyulai Memorial (Székesfehérvár, HUN) (TV Analysis) — Final	12
Meeting de Paris (Paris, FRA) (TV Analysis) — Final	13
USATF National Championships (Des Moines, IA) (TV Analysis) — Final	14
Meeting International de Montreuil (Montreuil, FRA) (TV Analysis) — Final	15
NCAA National Championships (Eugene, OR) (TV Analysis) — Final	15
Prefontaine Classic (Eugene, OR) (TV Analysis) — Final	16
Shanghai Diamond League (Shanghai, CHN) — Final	17
IAAF World Indoor Championships (Birmingham, GBR) — Final	18

Women's 100m Hurdles

Top 10 Times	20
IAAF Continental Cup (Ostrava, CZE) (TV Analysis) — Final	<i>NEW</i> 21
AG Memorial van Damme (Brussels, BEL) (TV Analysis) — Final	22
Müller Anniversary Games (London, GBR) (TV Analysis) — Final	23
Meeting International Mohammed VI d'Athlétisme (Rabat, MAR) (TV Analysis) — Final	24
Spitzen Leichtathletik (Luzern, SUI) (TV Analysis) — Final	25
USATF National Championships (Des Moines, IA) (TV Analysis) — FINAL	26
Bauhaus Athletics (Stockholm, SWE) (TV Analysis) — Final	27
NCAA National Championships (Eugene, OR) (TV Analysis) — Final	28
Leise Prokop Memorial (St. Pölten, AUT) (TV Analysis) — Final, Heat 1	<i>NEW</i> 28
Bislett Games (Oslo, NOR) (TV Analysis) — Final	29
Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis) — Final	30
South Eastern Conference Championships (Knoxville, TN) (TV Analysis) — Final	31
Shanghai Diamond League (Shanghai, CHN) (TV Analysis) — Final	32
Doha Diamond League (Doha, QAT) (TV Analysis) — Final	33
IAAF World Indoor Championships (Birmingham, GBR) — Final	34

2018 Season Hurdles Report

Men's 400m Hurdles

Top 10 Times	36
IAAF Continental Cup (Ostrava, CZE) (TV Analysis) — Final	NEW 37
Weltklasse (Zürich, SUI) (TV Analysis) — Final	38
Müller Anniversary Games (London, GBR) (TV Analysis) — Final	39
Athletissima (Lausanne, SUI) (TV Analysis) — Final	40
Meeting de Paris (Paris, FRA) (TV Analysis) — Final	41
Bauhaus Athletics (Stockholm, SWE) (TV Analysis) — Final	42
NCAA National Championships (Eugene, OR) (TV Analysis) — Final	43
Commonwealth Games (Gold Coast, AUS) (TV Analysis) — Final	43
Bislett Games (Oslo, NOR) (TV Analysis) — Final	44
Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis) — Final	45
Doha Diamond League (Doha, QAT) (TV Analysis) — Final	46

Women's 400m Hurdles

Top 10 Times	48
IAAF Continental Cup (Ostrava, CZE) (TV Analysis) — Final	NEW 49
Weltklasse (Zürich, SUI) (TV Analysis) — Final	50
Müller Grand Prix (Birmingham, GBR) (TV Analysis) — Final	51
Müller Anniversary Games (London, GBR) (TV Analysis) — Final	52
IAAF World Junior Championships (Tampere, FIN) (TV Analysis) — Final	53
Athletissima (Lausanne, SUI) (TV Analysis) — Final	54
USATF National Championships (Des Moines, IA) (TV Analysis) — Final	55
NCAA National Championships (Eugene, OR) (TV Analysis) — Final	56
South Eastern Conference Championships (Knoxville, TN) (TV Analysis) — Final	56
National Relay Championships (Fayetteville, AR) (TV Analysis) — Final	56
Bislett Games (Oslo, NOR) — Semi-Final 2 & Heat 2	57
Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis) — Final	58
Prefontaine Classic (Eugene, OR) (TV Analysis) — Final	59
Shanghai Diamond League (Shanghai, CHN) (TV Analysis) — Final	60

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

2018 Top 10 Times - Men's 110m Hurdles

Shubenkov, Sergey (ANA) (1990)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 István Gyulai Memorial (Székesfehérvár, HUN) (TV Analysis)			<i>Henson (2020) - Athlete First: 2018 year end hurdle report</i>																
date	2-Jun	time	2.52	3.54	4.54	5.52	6.50	7.48	8.46	9.46	10.48	11.52		12.92	6 / 1		3.00	2.94	3.06
reaction time	0.169	interval	7 steps	1.02	1.00	0.98	0.98	0.98	0.98	1.00	1.02	1.04	1.40	NR PB			9.14	9.33	8.96
wind	0.6 m/s	velocity	5.44	8.96	9.14	9.33	9.33	9.33	9.33	9.14	8.96	8.79	10.01	8.51					
Shubenkov, Sergey (ANA) (1990)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 Athletissima (Lausanne, SUI) (TV Analysis)			<i>Henson (2020) - Athlete First: 2018 year end hurdle report</i>																
date	5-Jun	time	2.59	3.61	4.62	5.60	6.58	7.56	8.54	9.54	10.58	11.65		12.95	6 / 1		3.01	2.94	3.11
reaction time	0.147	interval	7 steps	1.02	1.01	0.98	0.98	0.98	0.98	1.00	1.04	1.07	1.30				9.11	9.33	8.82
wind	0.6 m/s	velocity	5.30	8.96	9.05	9.33	9.33	9.33	9.33	9.14	8.79	8.54	10.78	8.49					
Shubenkov, Sergey (ANA) (1990)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 AG Memorial van Damme (Brussels, BEL) (TV Analysis)			<i>Henson (2020) - Athlete First: 2018 year end hurdle report</i>																
date	31-Aug	time	2.54	3.56	4.58	5.58	6.56	7.54	8.52	9.52	10.54	11.56		12.97	5 / 1		3.04	2.94	3.04
reaction time	0.168	interval	7 steps	1.02	1.02	1.00	0.98	0.98	0.98	1.00	1.02	1.02	1.41				9.02	9.33	9.02
wind	-0.1 m/s	velocity	5.40	8.96	8.96	9.14	9.33	9.33	9.33	9.14	8.96	8.96	9.94	8.48					
Shubenkov, Sergey (ANA) (1990)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 Meeting International de Montreuil (Montreuil, FRA) (TV Analysis)			<i>Henson (2020) - Athlete First: 2018 year end hurdle report</i>																
date	19-Jun	time	2.62	3.64	4.64	5.62	6.60	7.58	8.56	9.56	10.58	11.62		12.99	5 / 1		3.00	2.94	3.06
reaction time	0.143	interval	7 steps	1.02	1.00	0.98	0.98	0.98	0.98	1.00	1.02	1.04	1.37				9.14	9.33	8.96
wind	0.5 m/s	velocity	5.24	8.96	9.14	9.33	9.33	9.33	9.33	9.14	8.96	8.79	10.23	8.47					
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 - 2018 Prefontaine Classic (Eugene, OR) (TV Analysis)			<i>Henson (2020) - Athlete First: 2018 year end hurdle report</i>																
date	26-May	time	2.54	3.54	4.56	5.56	6.56	7.54	8.52	9.54	10.54	11.58		13.01	4 / 1		3.02	2.96	3.06
reaction time	0.176	interval		1.00	1.02	1.00	1.00	0.98	0.98	1.02	1.00	1.04	1.43				9.08	9.26	8.96
wind	3.0 m/s	velocity	5.40	9.14	8.96	9.14	9.14	9.33	9.33	8.96	9.14	8.79	9.80	8.46					
Shubenkov, Sergey (ANA) (1990)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 IAAF Continental Cup (Ostrava, CZE)			<i>Henson (2021) - Athlete First: 2018 year end hurdle report</i>																
date	9-Sep	time	2.52	3.58	4.60	5.56	6.54	7.54	8.54	9.54	10.54	11.58		13.03	2 / 1		3.04	2.98	3.04
reaction time	0.143	interval	7 steps	1.06	1.02	0.96	0.98	1.00	1.00	1.00	1.00	1.04	1.45				9.02	9.20	9.02
wind	0.9 m/s	velocity	5.44	8.62	8.96	9.52	9.33	9.14	9.14	9.14	9.14	8.79	9.67	8.44					
Shubenkov, Sergey (ANA) (1990)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10	
Heat 1 - 2018 Meeting de Paris (Paris, FRA)			<i>Henson (2020) - Athlete First: 2018 year end hurdle report</i>																
date	30-Jun	time											13.05	4 / 1					
reaction time	0.152	interval	No Information Available																
wind	0.7 m/s	velocity																	
Shubenkov, Sergey (ANA) (1990)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 Herculis Meeting International d'Athletisme (Monaco, MON) (TV Analysis)			<i>Henson (2020) - Athlete First: 2018 year end hurdle report</i>																
date	20-Jul	time	2.52	3.56	4.56	5.56	6.56	7.56	8.56	9.56	10.58	11.60		13.07	4 / 1		3.04	3.00	3.04
reaction time	0.132	interval	7 steps	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.02	1.47				9.02	9.14	9.02
wind	-0.2 m/s	velocity	5.44	8.79	9.14	9.14	9.14	9.14	9.14	9.14	8.96	8.96	9.54	8.42					
Shubenkov, Sergey (ANA) (1990)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 Prefontaine Classic (Eugene, OR) (TV Analysis)			<i>Henson (2020) - Athlete First: 2018 year end hurdle report</i>																
date	26-May	time	2.56	3.58	4.58	5.56	6.56	7.56	8.56	9.58	10.62	11.66		13.08	6 / 2		3.00	3.00	3.10
reaction time	0.173	interval	7 steps	1.02	1.00	0.98	1.00	1.00	1.00	1.02	1.04	1.04	1.42				9.14	9.14	8.85
wind	3.0 m/s	velocity	5.36	8.96	9.14	9.33	9.14	9.14	9.14	8.96	8.79	8.79	9.87	8.41					
Ortega, Orlando (ESP) (1991)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 Müller Grand Prix (Birmingham, GBR) (TV Analysis)			<i>Henson (2020) - Athlete First: 2018 year end hurdle report</i>																
date	18-Aug	time	2.48	3.52	4.54	5.54	6.52	7.52	8.52	9.54	10.56	11.58		13.08	6 / 1		3.06	2.98	3.06
reaction time	0.139	interval	7 steps	1.04	1.02	1.00	0.98	1.00	1.00	1.02	1.02	1.02	1.50				8.96	9.20	8.96
wind	1.3 m/s	velocity	5.53	8.79	8.96	9.14	9.33	9.14	9.14	8.96	8.96	8.96	9.35	8.41					
Shubenkov, Sergey (ANA) (1990)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 Meeting Città di Padova (Padova, ITA) (TV Analysis)			<i>Henson (2020) - Athlete First: 2018 year end hurdle report</i>																
date	2-Sep	time	2.56	3.58	4.60	5.58	6.56	7.56	8.56	9.56	10.56	11.60		13.09	4 / 1		3.02	2.98	3.04
reaction time		interval	7 steps	1.02	1.02	0.98	0.98	1.00	1.00	1.00	1.00	1.04	1.49				9.08	9.20	9.02
wind	1.7 m/s	velocity	5.36	8.96	8.96	9.33	9.33	9.14	9.14	9.14	9.14	8.79	9.41	8.40					

2018 IAAF Continental Cup (Ostrava, CZE) (TV Analysis)

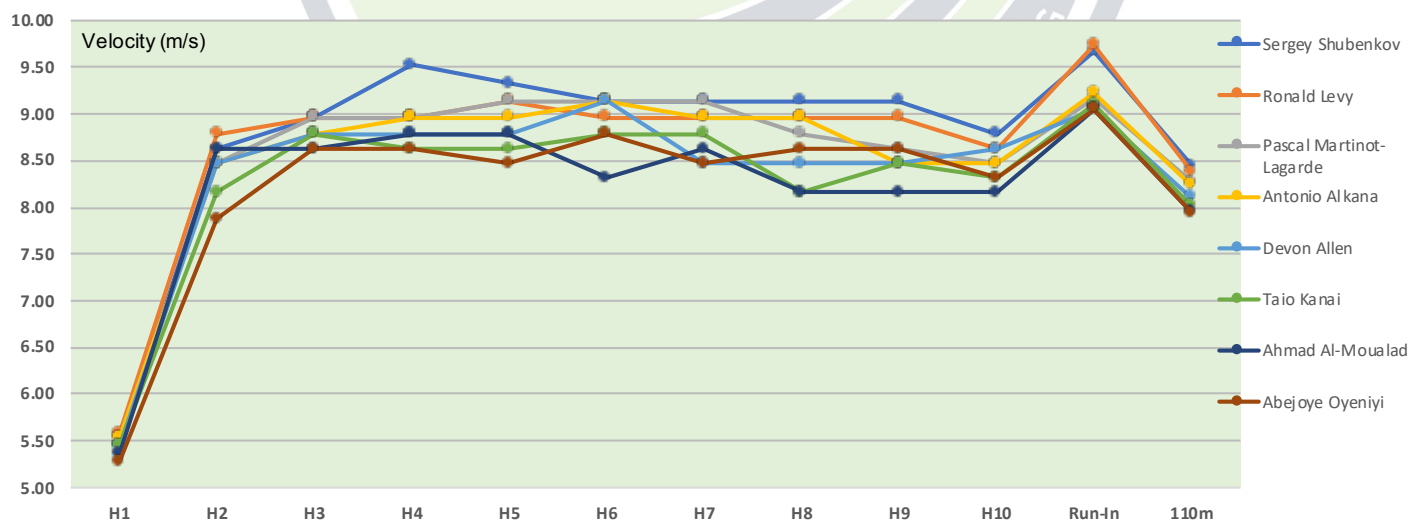
110m Hurdles

Date: 2018.09.09

Wind: 0.9 m/s

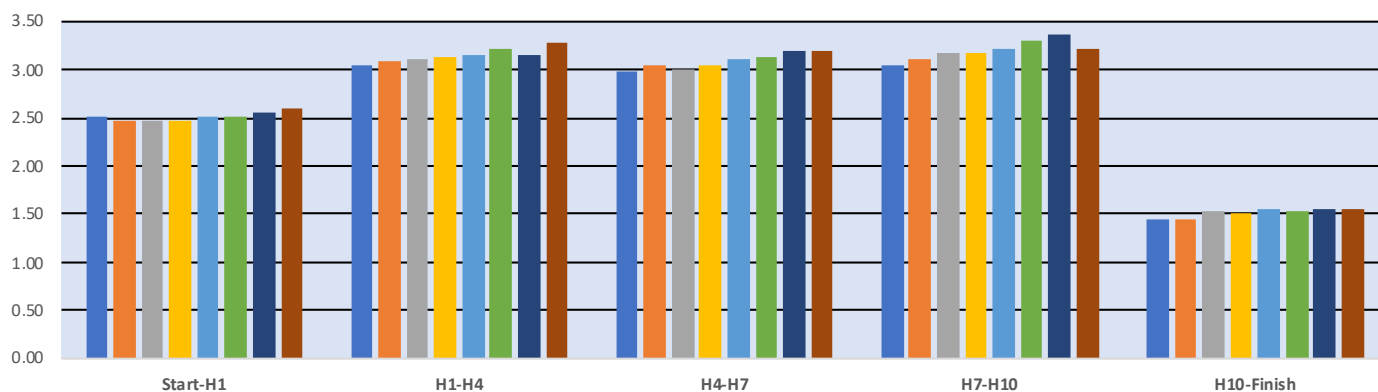
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Shubenkov, Sergey (ANA) (1990)	time		2.52	3.58	4.60	5.56	6.54	7.54	8.54	9.54	10.54	11.58		13.03	2 / 1			
	reaction time	0.143											1.45			3.04	2.98	3.04
	interval velocity		7 steps	1.06	1.02	0.96	0.98	1.00	1.00	1.00	1.00	1.04	1.45	8.44		9.02	9.20	9.02
Levy, Ronald (JAM) (1992)	time		2.46	3.50	4.52	5.54	6.54	7.56	8.58	9.60	10.62	11.68		13.12	3 / 2			
	reaction time	0.115											1.44			3.08	3.04	3.10
	interval velocity		7 steps	5.58	8.79	8.96	8.96	9.14	8.96	8.96	8.96	8.62	9.74	8.38		8.90	9.02	8.85
Martinot-Lagarde, Pascal (FRA) (199)	time		2.48	3.56	4.58	5.60	6.60	7.60	8.60	9.64	10.70	11.78		13.31	6 / 3			
	reaction time	0.146											1.53			3.12	3.00	3.18
	interval velocity		7 steps	5.53	8.46	8.96	8.96	9.14	9.14	8.79	8.62	8.46	9.16	8.26		8.79	9.14	8.62
Alkana, Antonio (RSA) (1990)	time		2.48	3.56	4.60	5.62	6.64	7.64	8.66	9.68	10.76	11.84		13.36	4 / 4			
	reaction time	0.117											1.52			3.14	3.04	3.18
	interval velocity			5.53	8.46	8.79	8.96	8.96	9.14	8.96	8.46	8.46	9.22	8.23		8.73	9.02	8.62
Allen, Devon (USA) (1994)	time		2.52	3.60	4.64	5.68	6.72	7.72	8.80	9.88	10.96	12.02		13.57	7 / 5			
	reaction time	0.118											1.55			3.16	3.12	3.22
	interval velocity			5.44	8.46	8.79	8.79	8.79	9.14	8.46	8.46	8.62	9.05	8.11		8.68	8.79	8.52
Kanai, Taio (JPN) (1995)	time		2.52	3.64	4.68	5.74	6.80	7.84	8.88	10.00	11.08	12.18		13.72	5 / 6			
	reaction time	0.119											1.54			3.22	3.14	3.30
	interval velocity		7 steps	5.44	8.16	8.79	8.62	8.62	8.79	8.16	8.46	8.31	9.10	8.02		8.52	8.73	8.31
Al-Moualad, Ahmad (KSA) (1988)	time		2.56	3.62	4.68	5.72	6.76	7.86	8.92	10.04	11.16	12.28		13.83	1 / 7			
	reaction time	0.143											1.55			3.16	3.20	3.36
	interval velocity			5.36	8.62	8.62	8.79	8.79	8.31	8.62	8.16	8.16	9.05	7.95		8.68	8.57	8.16
Oyeniyi, Abejoye (NGR) (1993)	time		2.60	3.76	4.82	5.88	6.96	8.00	9.08	10.14	11.20	12.30		13.85	8 / 8			
	reaction time	0.225														3.28	3.20	3.22
	interval velocity		7 steps	5.28	7.88	8.62	8.62	8.46	8.79	8.46	8.62	8.62	8.31	7.94		8.36	8.57	8.52



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=QZtrjkVDIP8>

2018 AG Memorial van Damme (Brussels, BEL) (TV Analysis)

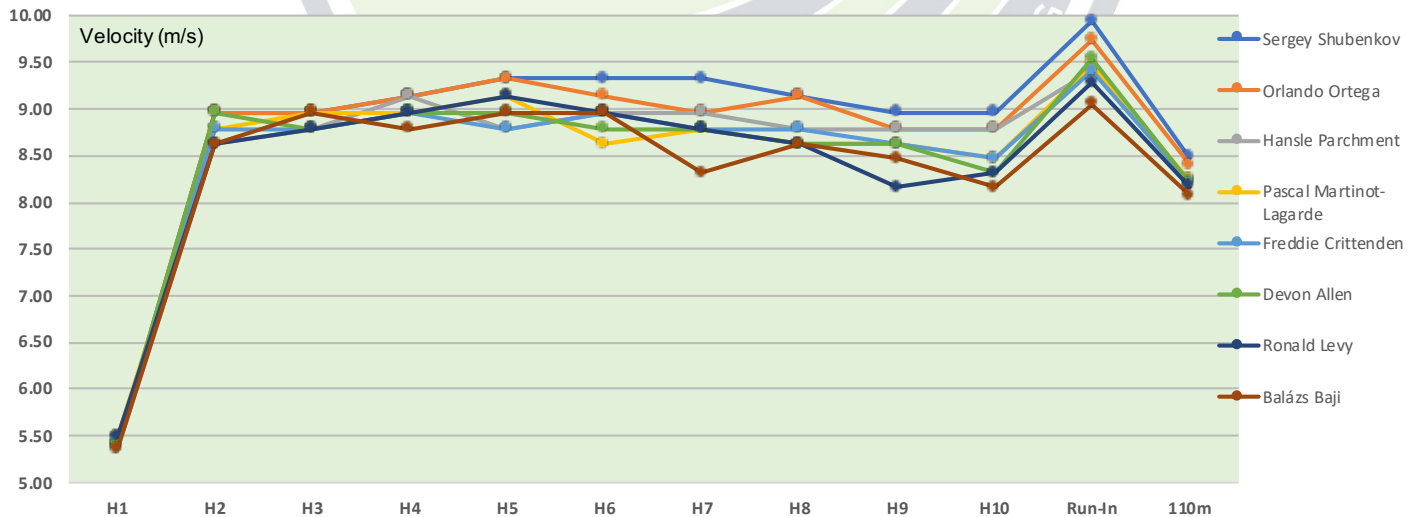
110m Hurdles

Date: 2018.08.31

Wind: -0.1 m/s

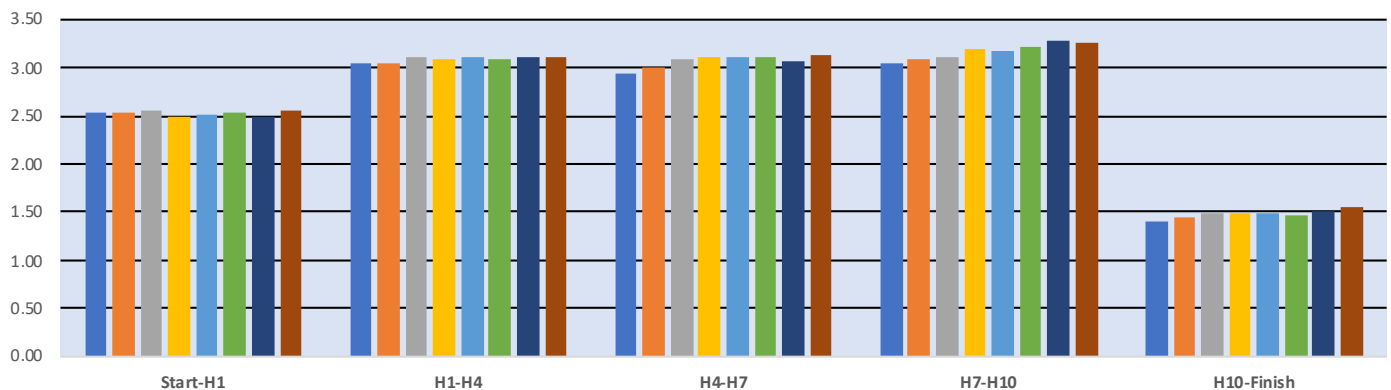
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Shubenkov, Sergey (ANA) (1990)	time		2.54	3.56	4.58	5.58	6.56	7.54	8.52	9.52	10.54	11.56		12.97	5 / 1	3.04	2.94	3.04
	reaction time	0.168											1.41					
	interval		7 steps	1.02	1.02	1.00	0.98	0.98	0.98	1.00	1.02	1.02	1.44					
	velocity		5.40	8.96	8.96	9.14	9.33	9.33	9.33	9.14	8.96	8.96	9.94	8.48		9.02	9.33	9.02
Ortega, Orlando (ESP) (1991)	time		2.54	3.56	4.58	5.58	6.56	7.56	8.58	9.58	10.62	11.66		13.10	6 / 2	3.04	3.00	3.08
	reaction time	0.124											1.44					
	interval		7 steps	1.02	1.02	1.00	0.98	1.00	1.02	1.00	1.04	1.04	1.44					
	velocity		5.40	8.96	8.96	9.14	9.33	9.14	8.96	9.14	8.79	8.79	9.74	8.40		9.02	9.14	8.90
Parchment, Hansle (JAM) (1990)	time		2.56	3.62	4.66	5.66	6.70	7.72	8.74	9.78	10.82	11.86		13.35	7 / 3	3.10	3.08	3.12
	reaction time	0.152											1.49					
	interval		7 steps	1.06	1.04	1.00	1.04	1.02	1.02	1.04	1.04	1.04	1.49					
	velocity		5.36	8.62	8.79	9.14	8.79	8.96	8.96	8.79	8.79	8.79	9.41	8.24		8.85	8.90	8.79
Martinot-Lagarde, Pascal (FRA) (199)	time		2.50	3.54	4.56	5.58	6.58	7.64	8.68	9.74	10.80	11.88		13.36	3 / 4	3.08	3.10	3.20
	reaction time	0.153											1.48					
	interval		7 steps	1.04	1.02	1.02	1.00	1.06	1.04	1.06	1.06	1.08	1.48					
	velocity		5.49	8.79	8.96	8.96	9.14	8.62	8.79	8.62	8.62	8.46	9.47	8.23		8.90	8.85	8.57
Crittenden, Freddie (USA) (1994)	time		2.52	3.56	4.60	5.62	6.66	7.68	8.72	9.76	10.82	11.90		13.39	8 / 5	3.10	3.10	3.18
	reaction time	0.151											1.49					
	interval		7 steps	1.04	1.04	1.02	1.04	1.02	1.04	1.04	1.06	1.08	1.49					
	velocity		5.44	8.79	8.79	8.96	8.79	8.96	8.79	8.79	8.62	8.46	9.41	8.22		8.85	8.85	8.62
Allen, Devon (USA) (1994)	time		2.54	3.56	4.60	5.62	6.64	7.68	8.72	9.78	10.84	11.94		13.41	2 / 6	3.08	3.10	3.22
	reaction time	0.126											1.47					
	interval		7 steps	1.02	1.04	1.02	1.02	1.04	1.04	1.06	1.06	1.10	1.47					
	velocity		5.40	8.96	8.79	8.96	8.96	8.79	8.79	8.62	8.62	8.31	9.54	8.20		8.90	8.85	8.52
Levy, Ronald (JAM) (1992)	time		2.50	3.56	4.60	5.62	6.62	7.64	8.68	9.74	10.86	11.96		13.47	4 / 7	3.12	3.06	3.28
	reaction time	0.148											1.51					
	interval		7 steps	1.06	1.04	1.02	1.00	1.02	1.04	1.06	1.12	1.10	1.51					
	velocity		5.49	8.62	8.79	8.96	9.14	8.96	8.79	8.62	8.16	8.31	9.28	8.17		8.79	8.96	8.36
Baji, Balázs (HUN) (1989)	time		2.56	3.62	4.64	5.68	6.70	7.72	8.82	9.88	10.96	12.08		13.63	1 / 8	3.12	3.14	3.26
	reaction time	0.140											1.55					
	interval		7 steps	1.06	1.02	1.04	1.02	1.02	1.10	1.06	1.08	1.12	1.55					
	velocity		5.36	8.62	8.96	8.79	8.96	8.96	8.31	8.62	8.46	8.16	9.05	8.07		8.79	8.73	8.41



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=Jg5lOv_8XsY

2018 Müller Grand Prix (Birmingham, GBR) (TV Analysis)

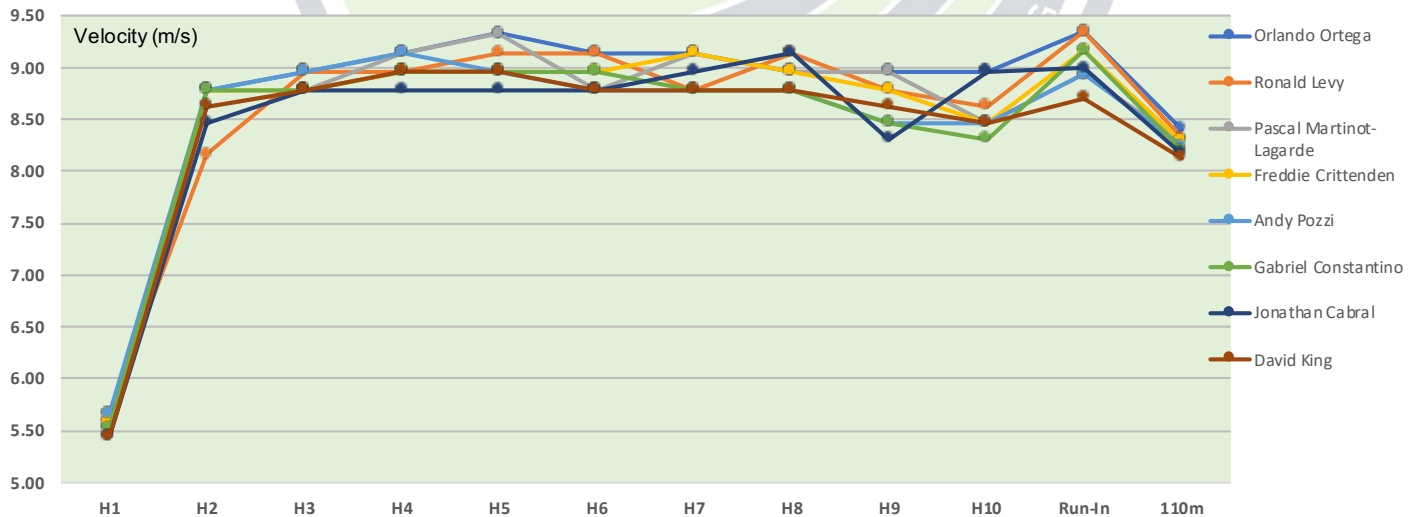
110m Hurdles

Date: 2018.08.18

Wind: 1.3 m/s

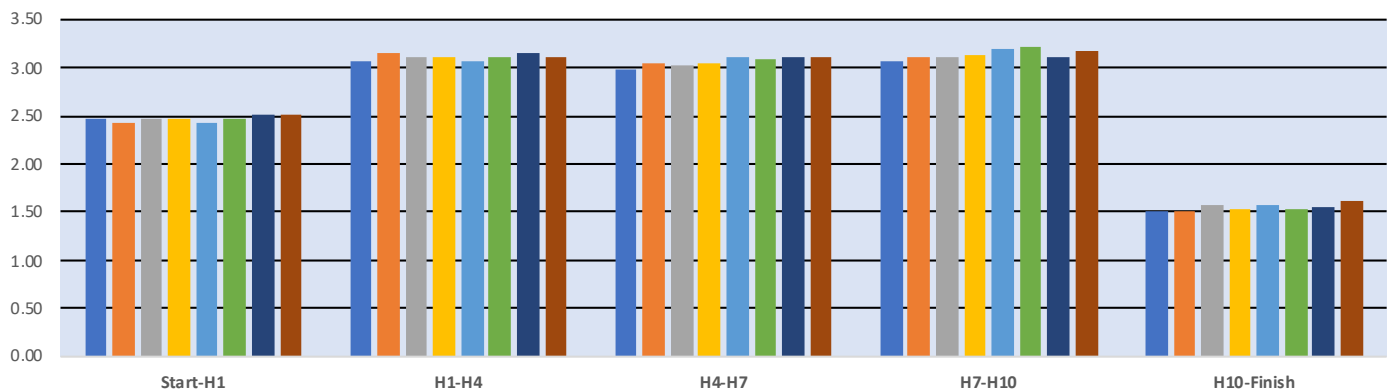
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Ortega, Orlando (ESP) (1991)	time		2.48	3.52	4.54	5.54	6.52	7.52	8.52	9.54	10.56	11.58		13.08	6 / 1	3.06	2.98	3.06
	reaction time	0.139											1.50					
	interval		7 steps	1.04	1.02	1.00	0.98	1.00	1.00	1.02	1.02	1.02	1.50	8.41				
	velocity		5.53	8.79	8.96	9.14	9.33	9.14	9.14	8.96	8.96	8.96	9.35	8.41		8.96	9.20	8.96
Levy, Ronald (JAM) (1992)	time		2.42	3.54	4.56	5.58	6.58	7.58	8.62	9.62	10.66	11.72		13.22	3 / 2	3.16	3.04	3.10
	reaction time	0.132											1.50					
	interval		7 steps	1.12	1.02	1.02	1.00	1.00	1.04	1.00	1.04	1.06	1.50	8.32				
	velocity		5.67	8.16	8.96	8.96	9.14	9.14	8.79	9.14	8.79	8.62	9.35	8.32		8.68	9.02	8.85
Martinot-Lagarde, Pascal (FRA) (199)	time		2.46	3.52	4.56	5.56	6.54	7.58	8.58	9.60	10.62	11.70		13.27	7 / 3	3.10	3.02	3.12
	reaction time	0.166											1.57					
	interval		7 steps	1.06	1.04	1.00	0.98	1.04	1.00	1.02	1.02	1.08	1.57	8.29				
	velocity		5.58	8.62	8.79	9.14	9.33	8.79	9.14	8.96	8.96	8.46	8.93	8.29		8.85	9.08	8.79
Crittenden, Freddie (USA) (1994)	time		2.46	3.50	4.54	5.56	6.58	7.60	8.60	9.62	10.66	11.74		13.27	2 / 4	3.10	3.04	3.14
	reaction time	0.128											1.53					
	interval		7 steps	1.04	1.04	1.02	1.02	1.02	1.00	1.02	1.04	1.08	1.53	8.29				
	velocity		5.58	8.79	8.79	8.96	8.96	8.96	9.14	8.96	8.79	8.46	9.16	8.29		8.85	9.02	8.73
Pozzi, Andy (GBR) (1992)	time		2.42	3.46	4.48	5.48	6.50	7.54	8.58	9.62	10.70	11.78		13.35	5 / 5	3.06	3.10	3.20
	reaction time	0.128											1.57					
	interval		7 steps	1.04	1.02	1.00	1.02	1.04	1.04	1.04	1.08	1.08	1.57	8.24				
	velocity		5.67	8.79	8.96	9.14	8.96	8.79	8.79	8.79	8.46	8.46	8.93	8.24		8.96	8.85	8.57
Constantino, Gabriel (BRA) (1995)	time		2.48	3.52	4.56	5.58	6.60	7.62	8.66	9.70	10.78	11.88		13.41	8 / 6	3.10	3.08	3.22
	reaction time	0.126											1.53					
	interval		7 steps	1.04	1.04	1.02	1.02	1.02	1.04	1.04	1.08	1.10	1.53	8.20				
	velocity		5.53	8.79	8.79	8.96	8.96	8.96	8.79	8.79	8.46	8.31	9.16	8.20		8.85	8.90	8.52
Cabral, Johnathan (CAN) (1992)	time		2.52	3.60	4.64	5.68	6.72	7.76	8.78	9.78	10.88	11.90		13.46	4 / 7	3.16	3.10	3.12
	reaction time	0.117											1.56					
	interval		7 steps	1.08	1.04	1.04	1.04	1.04	1.02	1.00	1.10	1.02	1.56	8.17				
	velocity		5.44	8.46	8.79	8.79	8.79	8.79	8.96	9.14	8.31	8.96	8.99	8.17		8.68	8.85	8.79
King, David (GBR) (1994)	time		2.52	3.58	4.62	5.64	6.66	7.70	8.74	9.78	10.84	11.92		13.53	9 / 8	3.12	3.10	3.18
	reaction time	0.124											1.61					
	interval		7 steps	1.06	1.04	1.02	1.02	1.04	1.04	1.04	1.06	1.08	1.61	8.13				
	velocity		5.44	8.62	8.79	8.96	8.96	8.79	8.79	8.79	8.62	8.46	8.71	8.13		8.79	8.85	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=iQBhqmzjGo>

2018 Müller Anniversary Games (London, GBR) (TV Analysis)

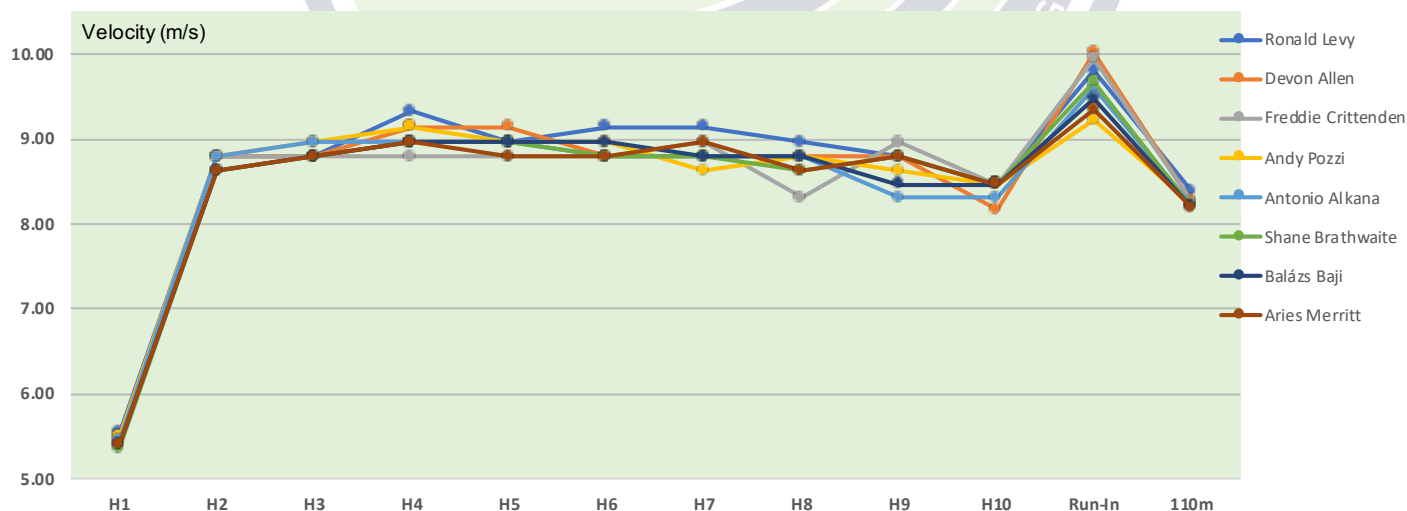
110m Hurdles

Date: 2018.07.22

Wind: 0.2 m/s

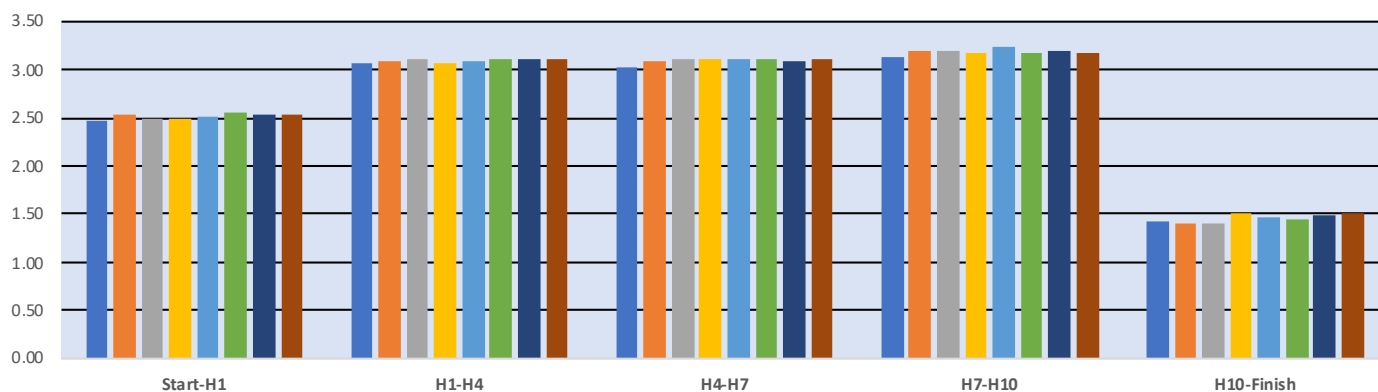
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Levy, Ronald (JAM) (1992)	time		2.48	3.52	4.56	5.54	6.56	7.56	8.56	9.58	10.62	11.70		13.13	5 / 1			
	reaction time	0.134														3.06	3.02	3.14
	interval		7 steps	1.04	1.04	0.98	1.02	1.00	1.00	1.02	1.04	1.08	1.43			8.96	9.08	8.73
Allen, Devon (USA) (1994)	time		2.54	3.58	4.62	5.62	6.62	7.66	8.70	9.74	10.78	11.90		13.30	6 / 2			
	reaction time	0.111														3.08	3.08	3.20
	interval		7 steps	1.04	1.04	1.00	1.00	1.04	1.04	1.04	1.04	1.12	1.40			8.90	8.90	8.57
Crittenden, Freddie (USA) (1994)	time		2.50	3.54	4.58	5.62	6.66	7.70	8.72	9.82	10.84	11.92		13.33	2 / 3			
	reaction time	0.137														3.12	3.10	3.20
	interval		7 steps	1.04	1.04	1.04	1.04	1.04	1.02	1.10	1.02	1.08	1.41			8.79	8.85	8.57
Pozzi, Andy (GBR) (1992)	time		2.50	3.54	4.56	5.56	6.58	7.60	8.66	9.70	10.76	11.84		13.36	3 / 4			
	reaction time	0.129														3.06	3.10	3.18
	interval		7 steps	1.04	1.02	1.00	1.02	1.02	1.06	1.04	1.06	1.08	1.52			8.96	8.85	8.62
Alkana, Antonio (RSA) (1990)	time		2.52	3.56	4.58	5.60	6.62	7.66	8.70	9.74	10.84	11.94		13.40	7 / 5			
	reaction time	0.140														3.08	3.10	3.24
	interval		7 steps	1.04	1.02	1.02	1.02	1.04	1.04	1.04	1.10	1.10	1.46			8.90	8.85	8.46
Brathwaite, Shane (BAR) (1990)	time		2.56	3.62	4.66	5.68	6.70	7.74	8.78	9.84	10.88	11.96		13.41	9 / 6			
	reaction time	0.119														3.12	3.10	3.18
	interval		7 steps	1.06	1.04	1.02	1.02	1.04	1.04	1.06	1.04	1.08	1.45			8.79	8.85	8.62
Baji, Balázs (HUN) (1989)	time		2.54	3.60	4.64	5.66	6.68	7.70	8.74	9.78	10.86	11.94		13.42	8 / 7			
	reaction time	0.146														3.12	3.08	3.20
	interval		7 steps	1.06	1.04	1.02	1.02	1.02	1.04	1.04	1.08	1.08	1.48			8.79	8.90	8.57
Merritt, Aries (USA) (1985)	time		2.54	3.60	4.64	5.66	6.70	7.74	8.76	9.82	10.86	11.94		13.44	4 / 8			
	reaction time	0.132														3.12	3.10	3.18
	interval		7 steps	1.06	1.04	1.02	1.04	1.04	1.02	1.06	1.04	1.08	1.50			8.79	8.85	8.62
	velocity		5.40	8.62	8.79	8.96	8.79	8.79	8.96	8.62	8.79	8.46	9.35	8.18				



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=GyU4176AqKQ>

2018 Herculis Meeting International d'Athletisme (Monaco, MON) (TV Analysis)

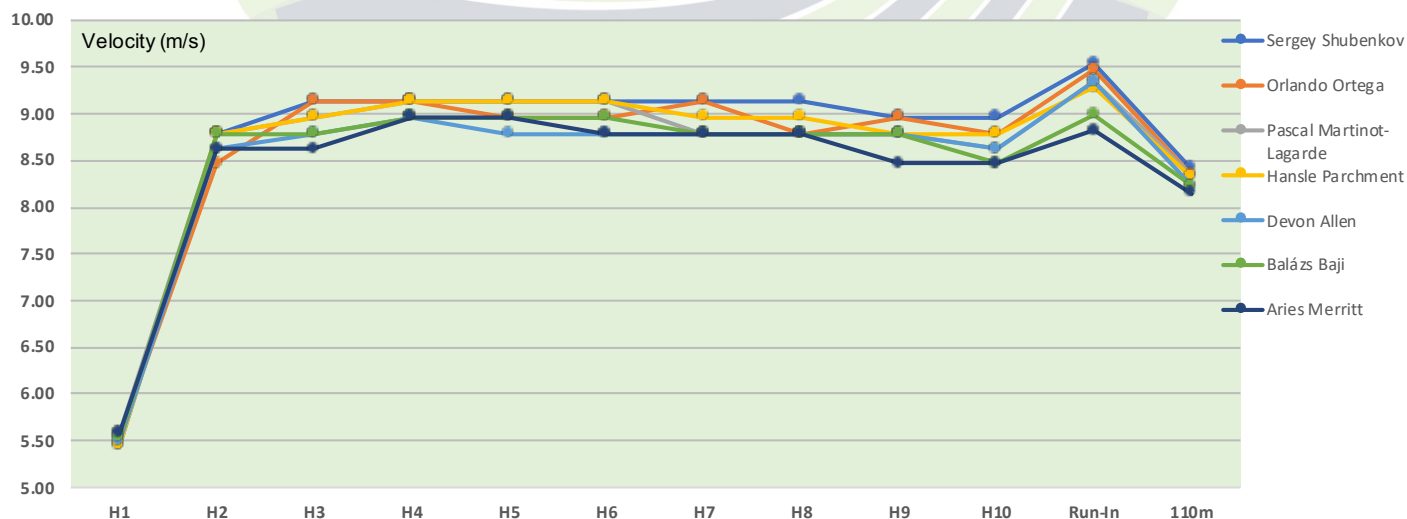
110m Hurdles

Date: 2018.07.20

Wind: -0.2 m/s

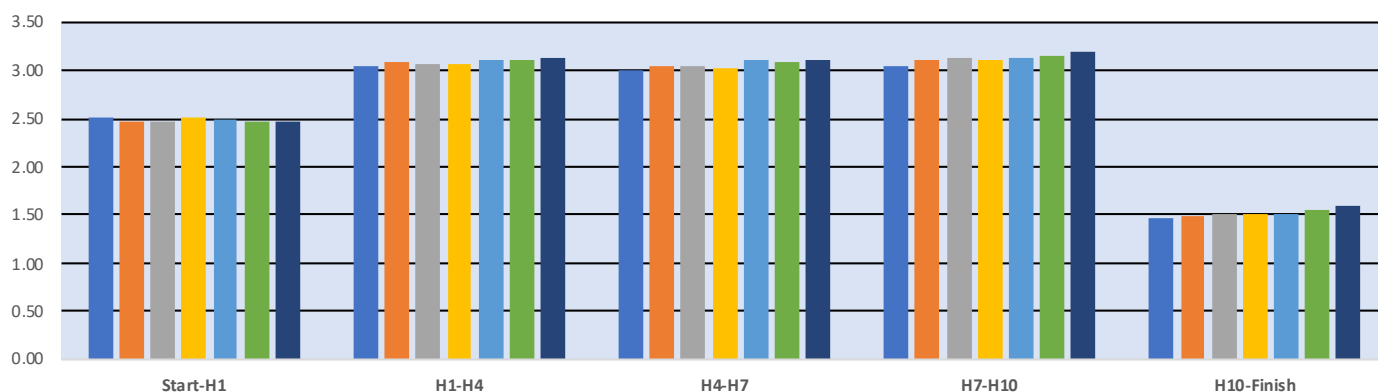
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Shubenkov, Sergey (ANA) (1990)	time		2.52	3.56	4.56	5.56	6.56	7.56	8.56	9.56	10.58	11.60		13.07	4 / 1			
	reaction time	0.132											1.47			3.04	3.00	3.04
	interval velocity		7 steps	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.02	9.54	8.42		9.02	9.14	9.02
Ortega, Orlando (ESP) (1991)	time		2.48	3.56	4.56	5.56	6.58	7.60	8.60	9.64	10.66	11.70		13.18	5 / 2			
	reaction time	0.129											1.48			3.08	3.04	3.10
	interval velocity		7 steps	1.08	1.00	1.00	1.02	1.02	1.00	1.04	1.02	1.04	9.47	8.35		8.90	9.02	8.85
Martinot-Lagarde, Pascal (FRA) (1999)	time		2.46	3.50	4.52	5.52	6.52	7.52	8.56	9.60	10.64	11.70		13.20	6 / 3			
	reaction time	0.157											1.50			3.06	3.04	3.14
	interval velocity		7 steps	1.04	1.02	1.00	1.00	1.00	1.04	1.04	1.04	1.06	9.35	8.33		8.96	9.02	8.73
Parchment, Hansle (JAM) (1990)	time		2.52	3.56	4.58	5.58	6.58	7.58	8.60	9.62	10.66	11.70		13.21	3 / 4			
	reaction time	0.155											1.51			3.06	3.02	3.10
	interval velocity		7 steps	1.04	1.02	1.00	1.00	1.00	1.02	1.02	1.04	1.04	9.28	8.33		8.96	9.08	8.85
Allen, Devon (USA) (1994)	time		2.50	3.56	4.60	5.62	6.66	7.70	8.74	9.78	10.82	11.88		13.38	2 / 5			
	reaction time	0.141											1.50			3.12	3.12	3.14
	interval velocity			1.06	1.04	1.02	1.04	1.04	1.04	1.04	1.04	1.06	9.35	8.22		8.79	8.79	8.73
Baji, Balázs (HUN) (1989)	time		2.48	3.52	4.56	5.58	6.60	7.62	8.66	9.70	10.74	11.82		13.38	7 / 6			
	reaction time	0.139											1.56			3.10	3.08	3.16
	interval velocity		7 steps	1.04	1.04	1.02	1.02	1.02	1.04	1.04	1.04	1.08	8.99	8.22		8.85	8.90	8.68
Merritt, Aries (USA) (1985)	time		2.46	3.52	4.58	5.60	6.62	7.66	8.70	9.74	10.82	11.90		13.49	8 / 7			
	reaction time	0.136											1.59			3.14	3.10	3.20
	interval velocity		7 steps	1.06	1.06	1.02	1.02	1.04	1.04	1.04	1.08	1.08	8.82	8.15		8.73	8.85	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=7GATXvW4Dmg>

2018 Meeting Città di Padova (Padova, ITA) (TV Analysis)

110m Hurdles

Date: 2018.09.02

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
Shubenkov, Sergey (ANA) (1990)	time	2.56	3.58	4.60	5.58	6.56	7.56	8.56	9.56	10.56	11.60		13.09	4 / 1			
	reaction time														3.02	2.98	3.04
	interval	7 steps	1.02	1.02	0.98	0.98	1.00	1.00	1.00	1.00	1.04	1.49			9.08	9.20	9.02
	velocity	5.36	8.96	8.96	9.33	9.33	9.14	9.14	9.14	9.14	8.79	9.41	8.40				

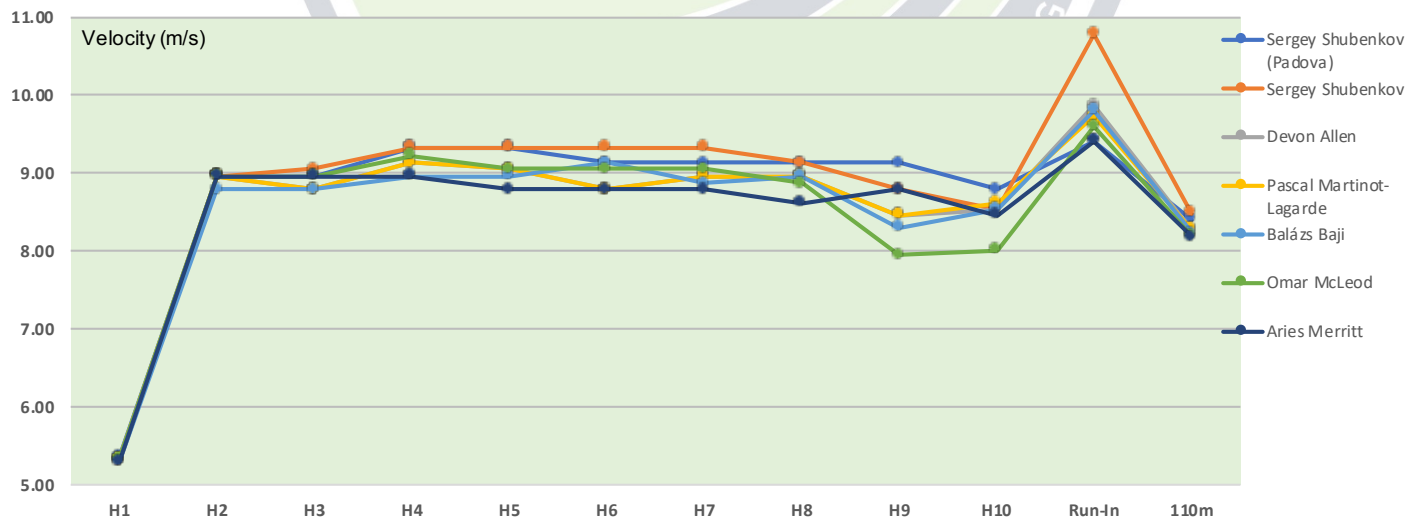
2018 Athletissima (Lausanne, SUI) (TV Analysis)

Date: 2018.07.05

Wind: 0.6 m/s

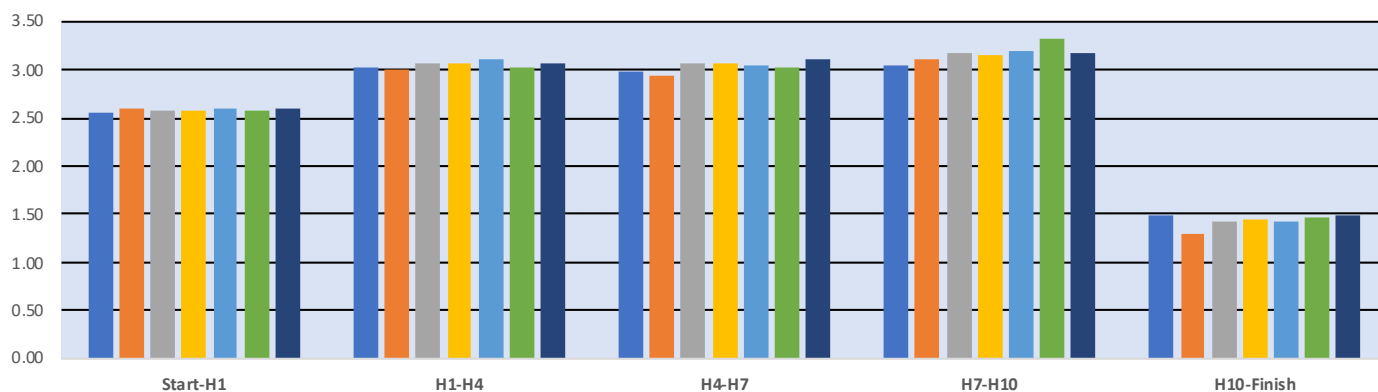
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Shubenkov, Sergey (ANA) (1990)	time	2.59	3.61	4.62	5.60	6.58	7.56	8.54	9.54	10.58	11.65		12.95	6 / 1			
	reaction time	0.147													3.01	2.94	3.11
	interval	7 steps	1.02	1.01	0.98	0.98	0.98	0.98	1.00	1.04	1.07	1.30			9.11	9.33	8.82
	velocity	5.30	8.96	9.05	9.33	9.33	9.33	9.33	9.14	8.79	8.54	10.78	8.49				
Allen, Devon (USA) (1994)	time	2.57	3.59	4.63	5.63	6.64	7.68	8.70	9.72	10.80	11.87		13.29	4 / 2			
	reaction time	0.121													3.06	3.07	3.17
	interval		1.02	1.04	1.00	1.01	1.04	1.02	1.02	1.08	1.07	1.42			8.96	8.93	8.65
	velocity	5.34	8.96	8.79	9.14	9.05	8.79	8.96	8.96	8.46	8.54	9.87	8.28				
Martinot-Lagarde, Pascal (FRA) (1999)	time	2.57	3.59	4.63	5.63	6.64	7.68	8.70	9.72	10.80	11.86		13.30	3 / 3			
	reaction time	0.147													3.06	3.07	3.16
	interval	7 steps	1.02	1.04	1.00	1.01	1.04	1.02	1.02	1.08	1.06	1.44			8.96	8.93	8.68
	velocity	5.34	8.96	8.79	9.14	9.05	8.79	8.96	8.96	8.46	8.62	9.74	8.27				
Baji, Balázs (HUN) (1989)	time	2.59	3.63	4.67	5.69	6.71	7.71	8.74	9.76	10.86	11.93		13.36	7 / 4			
	reaction time	0.135													3.10	3.05	3.19
	interval	7 steps	1.04	1.04	1.02	1.02	1.00	1.03	1.02	1.10	1.07	1.43			8.85	8.99	8.60
	velocity	5.30	8.79	8.79	8.96	8.96	9.14	8.87	8.96	8.31	8.54	9.80	8.23				
McLeod, Omar (JAM) (1994)	time	2.57	3.59	4.61	5.60	6.61	7.62	8.63	9.66	10.81	11.95		13.41	5 / 5			
	reaction time	0.134													3.03	3.03	3.32
	interval		1.02	1.02	0.99	1.01	1.01	1.01	1.03	1.15	1.14	1.46			9.05	9.05	8.26
	velocity	5.34	8.96	8.96	9.23	9.05	9.05	9.05	8.87	7.95	8.02	9.60	8.20				
Merritt, Aries (USA) (1985)	time	2.59	3.61	4.63	5.65	6.69	7.73	8.77	9.83	10.87	11.95		13.44	2 / 6			
	reaction time	0.129													3.06	3.12	3.18
	interval	7 steps	1.02	1.02	1.02	1.04	1.04	1.04	1.06	1.04	1.08	1.49			8.96	8.79	8.62
	velocity	5.30	8.96	8.96	8.96	8.79	8.79	8.79	8.62	8.79	8.46	9.41	8.18				



Time Intervals (s)

Hurdle Phases



Meeting Città di Padova

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=gPdkQL-1S0c>

Athletissima

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=Gbn9zeM49yc>

2018 István Gyulai Memorial (Székesfehérvár, HUN) (TV Analysis)

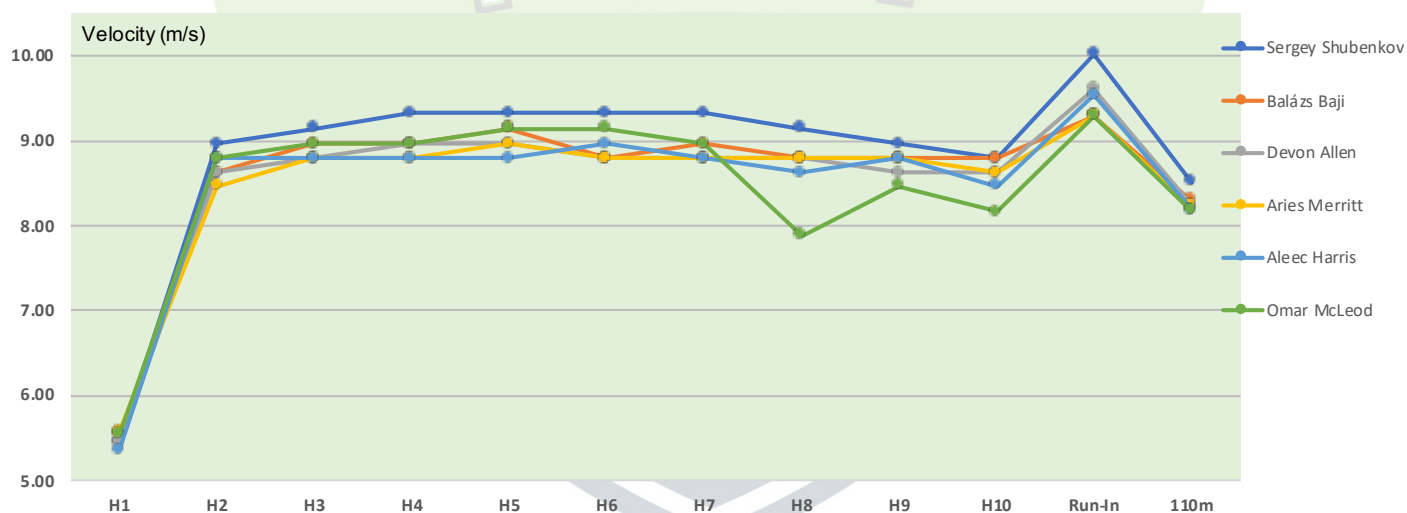
110m Hurdles

Date: 2018.07.02

Wind: 0.6 m/s

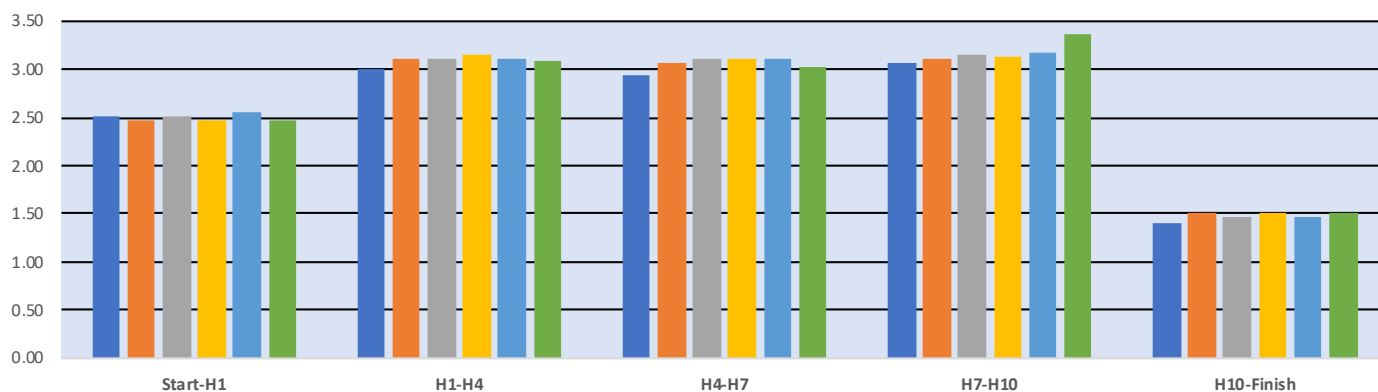
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Shubenkov, Sergey (ANA) (1990)	time	2.52	3.54	4.54	5.52	6.50	7.48	8.46	9.46	10.48	11.52	12.92	13.27	6 / 1	3.00	2.94	3.06
	reaction time	0.169															
	interval	7 steps	1.02	1.00	0.98	0.98	0.98	0.98	1.00	1.02	1.04	1.40	NR PB				
Baji, Balázs (HUN) (1989)	time	2.48	3.54	4.56	5.58	6.58	7.62	8.64	9.68	10.72	11.76	13.27	13.27	2 / 2	3.10	3.06	3.12
	reaction time	0.143															
	interval	7 steps	1.06	1.02	1.02	1.00	1.04	1.02	1.04	1.04	1.04	1.51					
Allen, Devon (USA) (1994)	time	2.52	3.58	4.62	5.64	6.66	7.70	8.74	9.78	10.84	11.90	13.36	13.36	5 / 3	3.12	3.10	3.16
	reaction time	0.130															
	interval	7 steps	1.06	1.04	1.02	1.02	1.04	1.04	1.04	1.06	1.06	1.46					
Merritt, Aries (USA) (1985)	time	2.46	3.54	4.58	5.62	6.64	7.68	8.72	9.76	10.80	11.86	13.37	13.37	3 / 4	3.16	3.10	3.14
	reaction time	0.144															
	interval	7 steps	1.08	1.04	1.04	1.02	1.04	1.04	1.04	1.04	1.06	1.51					
Harris, Aleec (USA) (1990)	time	2.56	3.60	4.64	5.68	6.72	7.74	8.78	9.84	10.88	11.96	13.43	13.43	7 / 5	3.12	3.10	3.18
	reaction time	0.163															
	interval	7 steps	1.04	1.04	1.04	1.04	1.02	1.04	1.06	1.04	1.08	1.47					
McLeod, Omar (JAM) (1994)	time	2.48	3.52	4.54	5.56	6.56	7.56	8.58	9.74	10.82	11.94	13.45	13.45	4 / 6	3.08	3.02	3.36
	reaction time	0.152															
	interval	7 steps	1.04	1.02	1.02	1.00	1.00	1.02	1.16	1.08	1.12	1.51					
	velocity	5.44	8.96	9.14	9.33	9.33	9.33	9.33	9.14	8.96	8.79	10.01	8.51		9.14	9.33	8.96
	velocity	5.53	8.96	9.14	9.33	9.33	9.33	9.33	9.14	8.96	8.79	10.01	8.51		9.14	9.33	8.96
	velocity	5.44	8.96	9.14	9.33	9.33	9.33	9.33	9.14	8.96	8.79	10.01	8.51		9.14	9.33	8.96
	velocity	5.53	8.96	9.14	9.33	9.33	9.33	9.33	9.14	8.96	8.79	10.01	8.51		9.14	9.33	8.96
	velocity	5.44	8.96	9.14	9.33	9.33	9.33	9.33	9.14	8.96	8.79	10.01	8.51		9.14	9.33	8.96
	velocity	5.53	8.96	9.14	9.33	9.33	9.33	9.33	9.14	8.96	8.79	10.01	8.51		9.14	9.33	8.96



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=opGMzTfxOmU>

2018 Meeting de Paris (Paris, FRA) (TV Analysis)

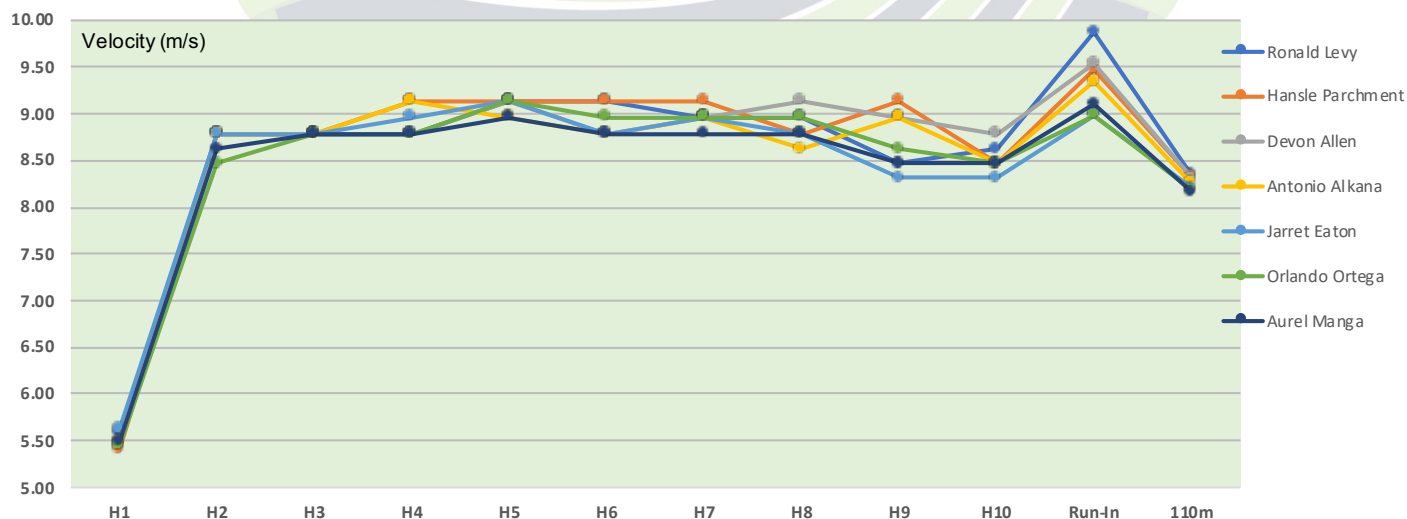
110m Hurdles

Date: 2018.06.30

Wind: 1.5 m/s

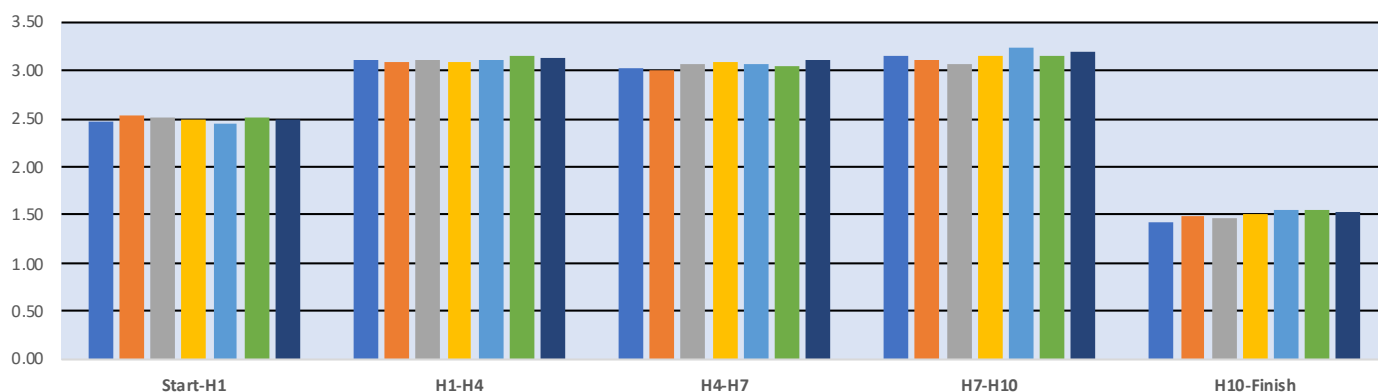
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Levy, Ronald (JAM) (1992)	time	2.46	3.50	4.54	5.58	6.58	7.58	8.60	9.62	10.70	11.76		13.18	3 / 1			
	reaction time	0.123													3.12	3.02	3.16
	interval velocity	7 steps	1.04	1.04	1.04	1.00	1.00	1.02	1.02	1.08	1.06	1.42			8.79	9.08	8.68
Parchment, Hansle (JAM) (1990)	time	2.54	3.58	4.62	5.62	6.62	7.62	8.62	9.66	10.66	11.74		13.22	6 / 2			
	reaction time	0.160													3.08	3.00	3.12
	interval velocity	7 steps	1.04	1.04	1.00	1.00	1.00	1.04	1.00	1.08	1.08	1.48			8.90	9.14	8.79
Allen, Devon (USA) (1994)	time	2.52	3.56	4.60	5.64	6.64	7.68	8.70	9.70	10.72	11.76		13.23	1 / 3			
	reaction time	0.123													3.12	3.06	3.06
	interval velocity	5.44	8.79	8.79	8.79	9.14	8.79	8.96	9.14	8.96	8.79	9.54			8.79	8.96	8.96
Alkana, Antonio (RSA) (1990)	time	2.50	3.54	4.58	5.58	6.60	7.64	8.66	9.72	10.74	11.82		13.32	7 / 4			
	reaction time	0.138													3.08	3.08	3.16
	interval velocity	5.49	8.79	8.79	9.14	8.96	8.79	8.96	8.62	8.96	8.46	9.35			8.90	8.90	8.68
Eaton, Jarret (USA) (1989)	time	2.44	3.48	4.52	5.54	6.54	7.58	8.60	9.64	10.74	11.84		13.40	2 / 5			
	reaction time	0.129													3.10	3.06	3.24
	interval velocity	5.62	8.79	8.79	8.96	9.14	8.79	8.96	8.79	8.31	8.31	8.99			8.85	8.96	8.46
Ortega, Orlando (ESP) (1991)	time	2.52	3.60	4.64	5.68	6.68	7.70	8.72	9.74	10.80	11.88		13.44	5 / 6			
	reaction time	0.135													3.16	3.04	3.16
	interval velocity	5.44	8.46	8.79	8.79	9.14	8.96	8.96	8.96	8.62	8.46	8.99			8.68	9.02	8.68
Manga, Aurel (FRA) (1992)	time	2.50	3.56	4.60	5.64	6.66	7.70	8.74	9.78	10.86	11.94		13.48	8 / 7			
	reaction time	0.157													3.14	3.10	3.20
	interval velocity	7 steps	1.06	1.04	1.04	1.02	1.04	1.04	1.04	1.08	1.08	1.54			8.73	8.85	8.57



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=IOC7vLHoBrl>

2018 USATF Championships (Des Moines, IA) (TV Analysis)

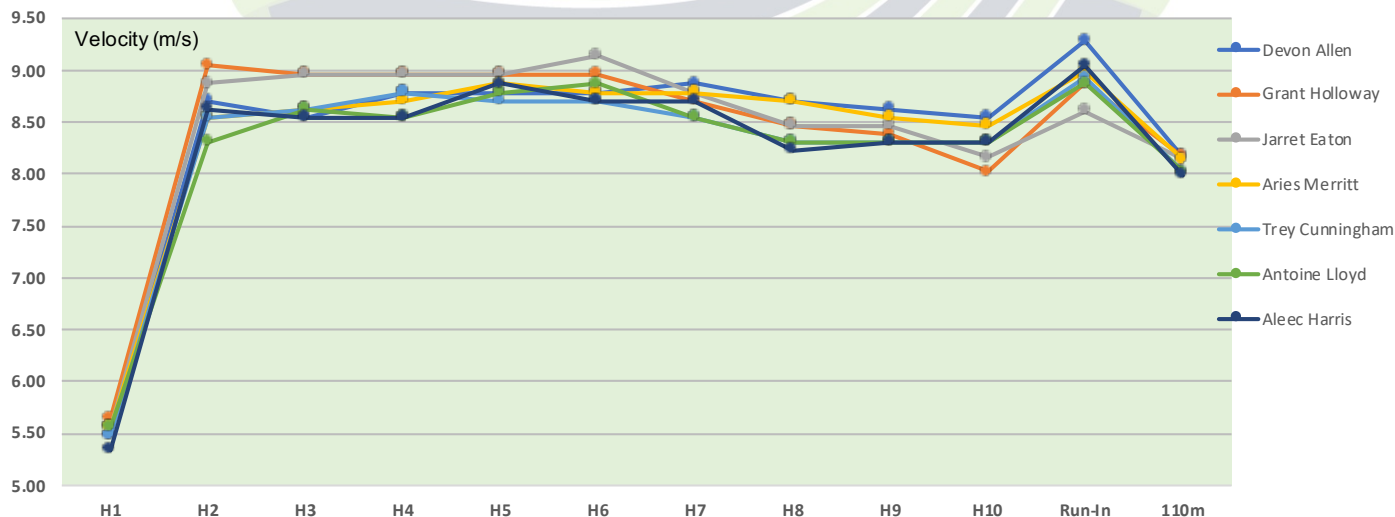
110m Hurdles

Date: 2018.06.24

Wind: -1.8 m/s

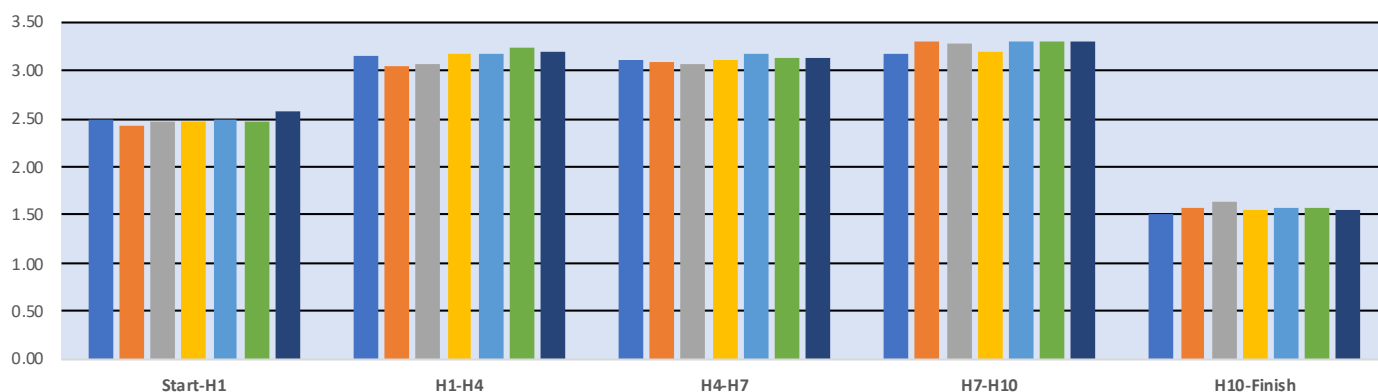
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Allen, Devon (USA) (1994)	time	2.50	3.55	4.62	5.66	6.70	7.74	8.77	9.82	10.88	11.95		13.46	3 / 1			
	reaction time														3.16	3.11	3.18
	interval		1.05	1.07	1.04	1.04	1.04	1.03	1.05	1.06	1.07	1.51			8.68	8.82	8.62
Holloway, Grant (USA) (1997)	time	2.43	3.44	4.46	5.48	6.50	7.52	8.57	9.65	10.74	11.88		13.46	5 / 2			
	reaction time														3.05	3.09	3.31
	interval	7 steps	1.01	1.02	1.02	1.02	1.02	1.05	1.08	1.09	1.14	1.58			8.99	8.87	8.28
Eaton, Jarret (USA) (1989)	time	2.47	3.50	4.52	5.54	6.56	7.56	8.60	9.68	10.76	11.88		13.51	7 / 3			
	reaction time														3.07	3.06	3.28
	interval	7 steps	1.03	1.02	1.02	1.02	1.00	1.04	1.08	1.08	1.12	1.63			8.93	8.96	8.36
Merritt, Aries (USA) (1985)	time	2.47	3.54	4.60	5.65	6.68	7.72	8.76	9.81	10.88	11.96		13.52	4 / 4			
	reaction time														3.18	3.11	3.20
	interval	7 steps	1.07	1.06	1.05	1.03	1.04	1.04	1.05	1.07	1.08	1.56			8.62	8.82	8.57
Cunningham, Trey (USA) (1998)	time	2.50	3.57	4.63	5.67	6.72	7.77	8.84	9.94	11.04	12.14		13.71	1 / 5			
	reaction time														3.17	3.17	3.30
	interval		1.07	1.06	1.04	1.05	1.05	1.07	1.10	1.10	1.10	1.57			8.65	8.65	8.31
Lloyd, Antoine (USA) (1996)	time	2.47	3.57	4.63	5.70	6.74	7.77	8.84	9.94	11.04	12.14		13.72	2 / 6			
	reaction time														3.23	3.14	3.30
	interval	7 steps	1.10	1.06	1.07	1.04	1.03	1.07	1.10	1.10	1.10	1.58			8.49	8.73	8.31
Harris, Aleec (USA) (1990)	time	2.57	3.63	4.70	5.77	6.80	7.85	8.90	10.01	11.11	12.21		13.76	6 / 7			
	reaction time														3.20	3.13	3.31
	interval		1.06	1.07	1.07	1.03	1.05	1.05	1.11	1.10	1.10	1.55			8.57	8.76	8.28
	velocity																
		5.49	8.70	8.54	8.79	8.79	8.79	8.87	8.70	8.62	8.54	9.28	8.17				



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=aqINU-8015Y>

2018 Meeting International de Montreuil (Montreuil, FRA) (TV Analysis)

110m Hurdles

Date: 2018.06.19

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
Shubenkov, Sergey (ANA) (1990)	time	2.62	3.64	4.64	5.62	6.60	7.58	8.56	9.56	10.58	11.62	12.99		5 / 1			
	reaction time	0.143													3.00	2.94	3.06
	interval	7 steps	1.02	1.00	0.98	0.98	0.98	0.98	1.00	1.02	1.04	1.37			9.14	9.33	8.96
Constantino, Gabriel (BRA) (1995)	time	2.64	3.66	4.68	5.68	6.68	7.68	8.70	9.74	10.78	11.86	13.23		1 / 2			
	reaction time	0.165										AR PB			3.04	3.02	3.16
	interval	7 steps	1.02	1.02	1.00	1.00	1.00	1.02	1.04	1.04	1.08	1.37			9.02	9.08	8.68
Martinot-Lagarde, Pascal (FRA) (199)	time	2.58	3.62	4.66	5.68	6.68	7.68	8.70	9.72	10.74	11.86	13.28		4 / 3			
	reaction time	0.156													3.10	3.02	3.16
	interval	7 steps	1.04	1.04	1.02	1.00	1.00	1.02	1.02	1.02	1.12	1.42			8.85	9.08	8.68
	velocity	5.24	8.96	9.14	9.33	9.33	9.33	9.33	9.14	8.96	8.79	10.23	8.47				
	velocity	5.20	8.96	8.96	9.14	9.14	9.14	8.96	8.79	8.79	8.46	10.23	8.31				
	velocity	5.32	8.79	8.79	8.96	9.14	9.14	8.96	8.96	8.96	8.16	9.87	8.28				

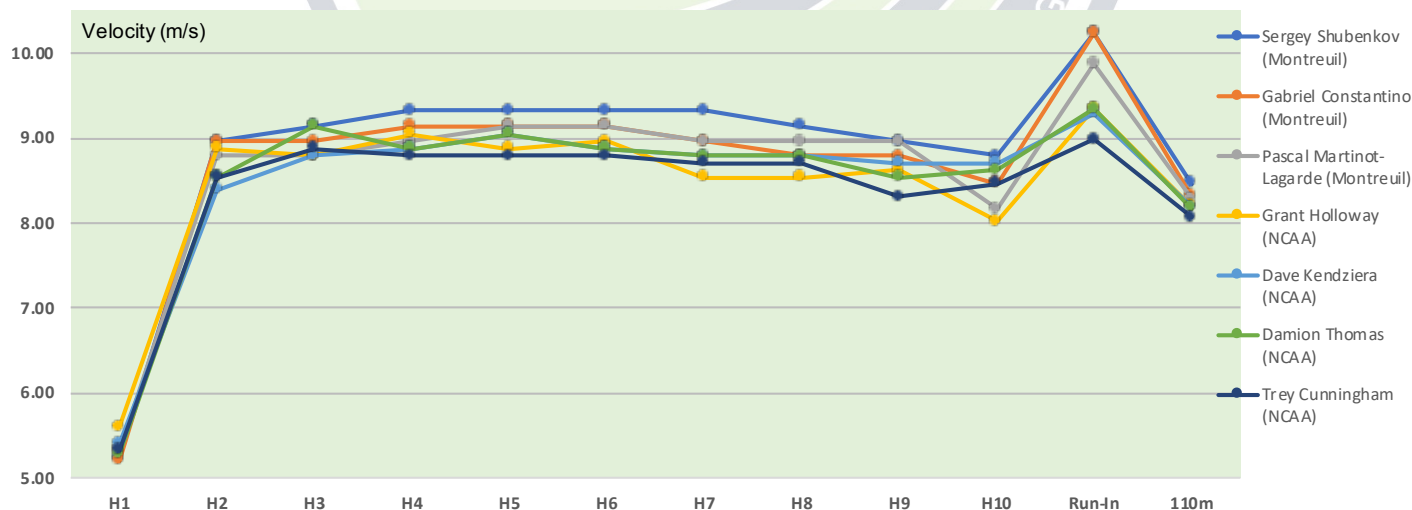
2018 NCAA Championships (Eugene, OR) (TV Analysis)

Date: 2018.06.08

Wind: -1.1 m/s

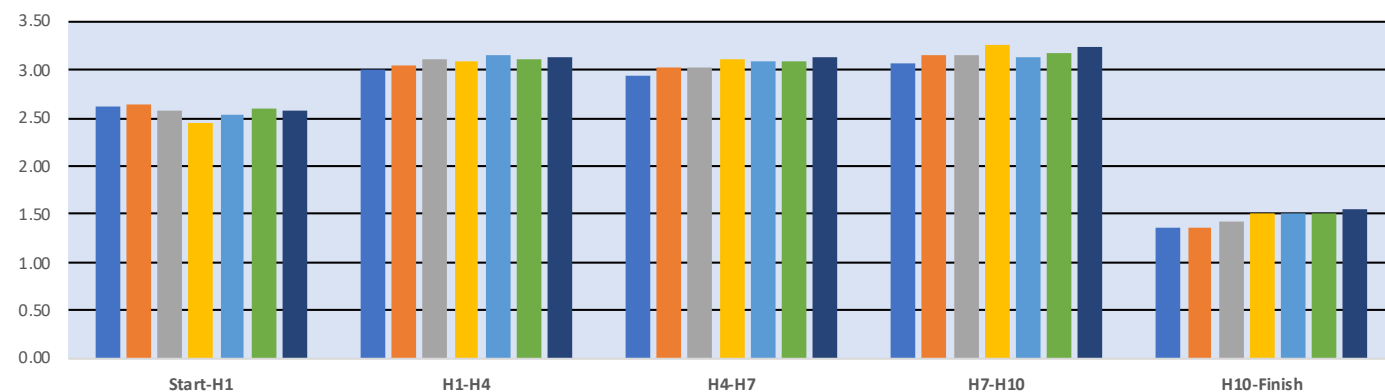
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Holloway, Grant (USA) (1997)	time	2.45	3.48	4.52	5.53	6.56	7.58	8.65	9.72	10.78	11.92	13.42		4 / 1			
	reaction time											1.50			3.08	3.12	3.27
	interval	7 steps	1.03	1.04	1.01	1.03	1.02	1.07	1.07	1.06	1.14	1.50			8.90	8.79	8.39
Kendziera, Dave (USA) (1994)	time	2.54	3.63	4.67	5.70	6.71	7.74	8.78	9.82	10.87	11.92	13.43		6 / 2			
	reaction time														3.16	3.08	3.14
	interval	7 steps	1.09	1.04	1.03	1.01	1.03	1.04	1.04	1.05	1.05	1.51			8.68	8.90	8.73
Thomas, Damion (JAM) (1999)	time	2.60	3.67	4.67	5.70	6.71	7.74	8.78	9.82	10.89	11.95	13.45		3 / 3			
	reaction time														3.10	3.08	3.17
	interval		1.07	1.00	1.03	1.01	1.03	1.04	1.04	1.07	1.06	1.50			8.85	8.90	8.65
Cunningham, Trey (USA) (1998)	time	2.58	3.65	4.68	5.72	6.76	7.80	8.85	9.90	11.00	12.08	13.64		8 / 4			
	reaction time														3.14	3.13	3.23
	interval		1.07	1.03	1.04	1.04	1.04	1.05	1.05	1.10	1.08	1.56			8.73	8.76	8.49
	velocity	5.32	8.54	8.87	8.79	8.79	8.79	8.70	8.70	8.31	8.46	8.99	8.06				
	velocity	5.32	8.54	8.87	8.79	8.79	8.79	8.70	8.70	8.31	8.46	8.99	8.06				



Time Intervals (s)

Hurdle Phases



Meeting International de Montreuil

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: Gun Flash

Source: <https://www.youtube.com/watch?v=-YiXnRE-JMI>

NCAA Championships

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=6c-UDfeUs-I>

2018 Prefontaine Classic (Eugene, OR) (TV Analysis)

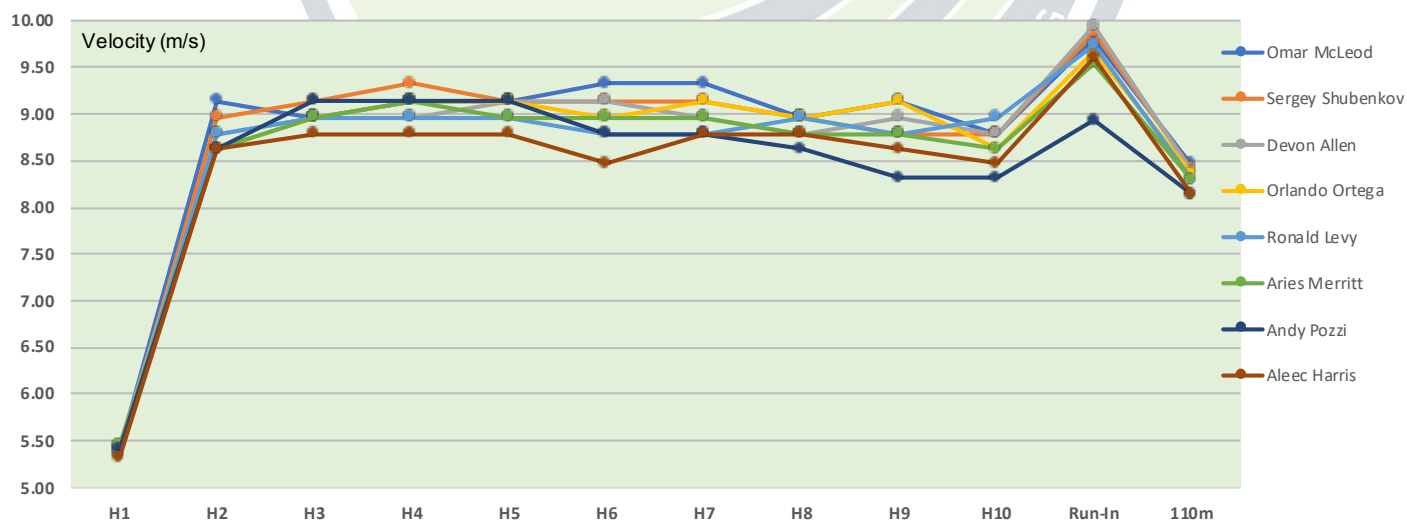
110m Hurdles

Date: 2018.05.26

Wind: 3.0 m/s

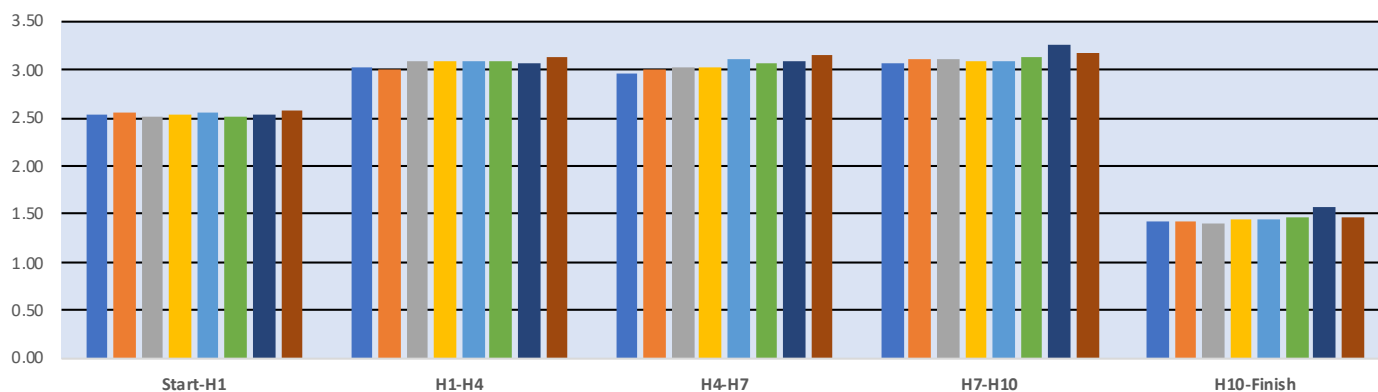
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
McLeod, Omar (JAM) (1994)	time		2.54	3.54	4.56	5.56	6.56	7.54	8.52	9.54	10.54	11.58		13.01	4 / 1			
	reaction time	0.176											1.43			3.02	2.96	3.06
	interval velocity		5.40	9.14	8.96	9.14	9.14	9.33	9.33	8.96	9.14	8.79	9.80	8.46		9.08	9.26	8.96
Shubenkov, Sergey (ANA) (1990)	time		2.56	3.58	4.58	5.56	6.56	7.56	8.56	9.58	10.62	11.66		13.08	6 / 2			
	reaction time	0.173											1.42			3.00	3.00	3.10
	interval velocity		5.36	8.96	9.14	9.33	9.14	9.14	9.14	8.96	8.79	8.79	9.87	8.41		9.14	9.14	8.85
Allen, Devon (USA) (1994)	time		2.52	3.56	4.58	5.60	6.60	7.60	8.62	9.66	10.68	11.72		13.13	8 / 3			
	reaction time	0.122											1.41			3.08	3.02	3.10
	interval velocity		5.44	8.79	8.96	8.96	9.14	9.14	8.96	8.79	8.96	8.79	9.94	8.38		8.90	9.08	8.85
Ortega, Orlando (ESP) (1991)	time		2.54	3.60	4.62	5.62	6.62	7.64	8.64	9.66	10.66	11.72		13.17	5 / 4			
	reaction time	0.158											1.45			3.08	3.02	3.08
	interval velocity		5.40	8.62	8.96	9.14	9.14	8.96	9.14	8.96	9.14	8.62	9.67	8.35		8.90	9.08	8.90
Levy, Ronald (JAM) (1992)	time		2.56	3.60	4.62	5.64	6.66	7.70	8.74	9.76	10.80	11.82		13.26	2 / 5			
	reaction time	0.171											1.44			3.08	3.10	3.08
	interval velocity		5.36	8.79	8.96	8.96	8.96	8.79	8.79	8.96	8.79	8.96	9.74	8.30		8.90	8.85	8.90
Merritt, Aries (USA) (1985)	time		2.52	3.58	4.60	5.60	6.62	7.64	8.66	9.70	10.74	11.80		13.27	7 / 6			
	reaction time	0.144											1.47			3.08	3.06	3.14
	interval velocity		5.44	8.62	8.96	9.14	8.96	8.96	8.96	8.79	8.79	8.62	9.54	8.29		8.90	8.96	8.73
Pozzi, Andy (GBR) (1992)	time		2.54	3.60	4.60	5.60	6.60	7.64	8.68	9.74	10.84	11.94		13.51	3 / 7			
	reaction time	0.164											1.57			3.06	3.08	3.26
	interval velocity		5.40	8.62	9.14	9.14	9.14	8.79	8.79	8.62	8.31	8.31	8.93	8.14		8.96	8.90	8.41
Harris, Aleec (USA) (1990)	time		2.58	3.64	4.68	5.72	6.76	7.84	8.88	9.92	10.98	12.06		13.52	1 / 8			
	reaction time	0.170											1.46			3.14	3.16	3.18
	interval velocity		5.32	8.62	8.79	8.79	8.79	8.46	8.79	8.79	8.62	8.46	9.60	8.14		8.73	8.68	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=EuHd_8e-1YE

2018 Shanghai Diamond League (Shanghai, CHN) (TV Analysis)

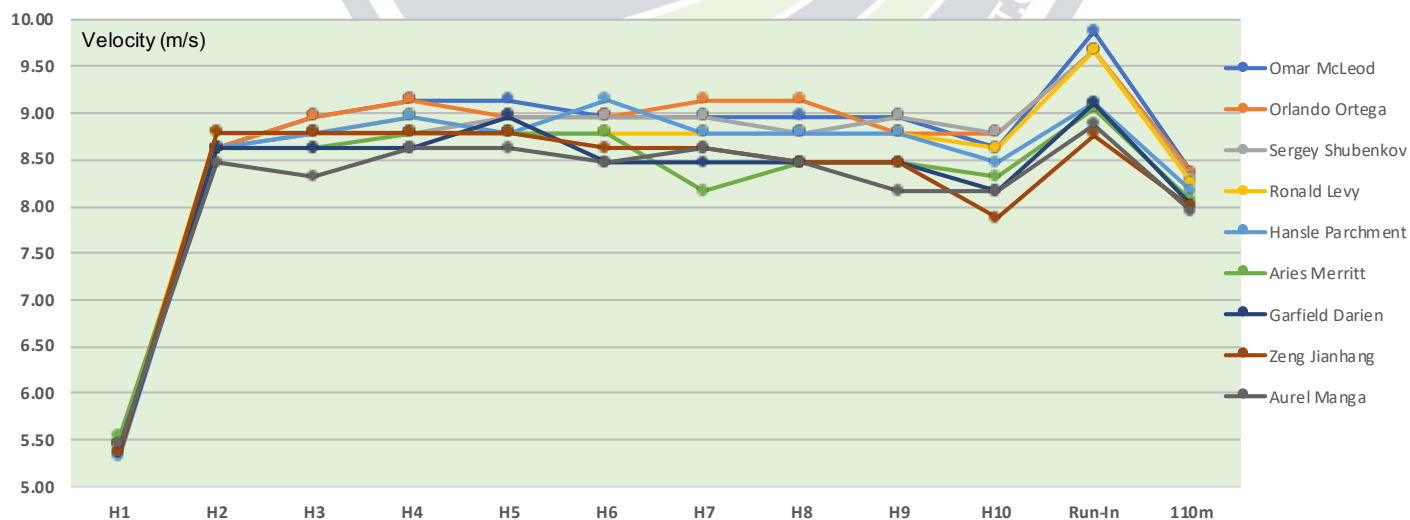
110m Hurdles

Date: 2018.05.12

Wind: 0.2 m/s

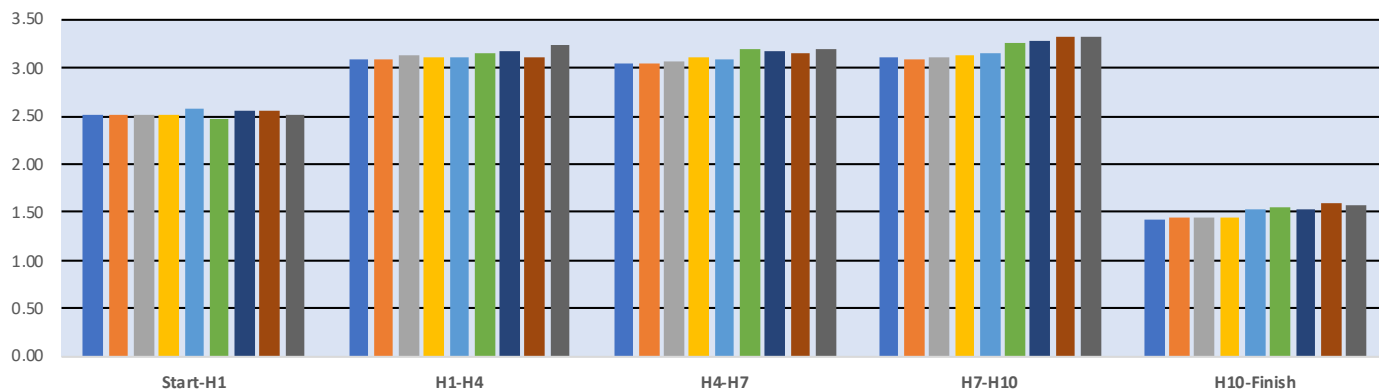
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
McLeod, Omar (JAM) (1994)	time		2.52	3.58	4.60	5.60	6.60	7.62	8.64	9.66	10.68	11.74		13.16	5 / 1			
	reaction time	0.119														3.08	3.04	3.10
	interval			1.06	1.02	1.00	1.00	1.02	1.02	1.02	1.02	1.06	1.42			8.90	9.02	8.85
Ortega, Orlando (ESP) (1991)	time		2.52	3.58	4.60	5.60	6.62	7.64	8.64	9.64	10.68	11.72		13.17	8 / 2			
	reaction time	0.135														3.08	3.04	3.08
	interval		7 steps	1.06	1.02	1.00	1.02	1.02	1.00	1.00	1.04	1.04	1.45			8.90	9.02	8.90
Shubenkov, Sergey (ANA) (1990)	time		2.52	3.58	4.62	5.66	6.68	7.70	8.72	9.76	10.78	11.82		13.27	6 / 3			
	reaction time	0.148														3.14	3.06	3.10
	interval		7 steps	1.06	1.04	1.04	1.02	1.02	1.02	1.04	1.02	1.04	1.45			8.73	8.96	8.85
Levy, Ronald (JAM) (1992)	time		2.52	3.56	4.60	5.62	6.66	7.70	8.74	9.78	10.82	11.88		13.33	4 / 4			
	reaction time	0.122														3.10	3.12	3.14
	interval		7 steps	1.04	1.04	1.02	1.04	1.04	1.04	1.04	1.04	1.06	1.45			8.85	8.79	8.73
Parchment, Hansle (JAM) (1990)	time		2.58	3.64	4.68	5.70	6.74	7.74	8.78	9.82	10.86	11.94		13.48	2 / 5			
	reaction time	0.137														3.12	3.08	3.16
	interval		7 steps	1.06	1.04	1.02	1.04	1.00	1.04	1.04	1.04	1.08	1.54			8.79	8.90	8.68
Merritt, Aries (USA) (1985)	time		2.48	3.54	4.60	5.64	6.68	7.72	8.84	9.92	11.00	12.10		13.65	7 / 6			
	reaction time	0.126														3.16	3.20	3.26
	interval		7 steps	1.06	1.06	1.04	1.04	1.04	1.12	1.08	1.08	1.10	1.55			8.68	8.57	8.41
Darien, Garfield (FRA) (1987)	time		2.56	3.62	4.68	5.74	6.76	7.84	8.92	10.00	11.08	12.20		13.74	3 / 7			
	reaction time	0.144														3.18	3.18	3.28
	interval		7 steps	1.06	1.06	1.06	1.02	1.08	1.08	1.08	1.08	1.12	1.54			8.62	8.62	8.36
Zeng Jianhang (CHN) (1998)	time		2.56	3.60	4.64	5.68	6.72	7.78	8.84	9.92	11.00	12.16		13.76	1 / 8			
	reaction time	0.148														3.12	3.16	3.32
	interval			1.04	1.04	1.04	1.04	1.06	1.06	1.08	1.08	1.16	1.60			8.79	8.68	8.26
Manga, Aurel (FRA) (1992)	time		2.52	3.60	4.70	5.76	6.82	7.90	8.96	10.04	11.16	12.28		13.86	9 / 9			
	reaction time	0.147														3.24	3.20	3.32
	interval		7 steps	1.08	1.10	1.06	1.06	1.08	1.06	1.08	1.12	1.12	1.58			8.46	8.57	8.26
	velocity		5.44	8.46	8.31	8.62	8.62	8.46	8.62	8.46	8.16	8.16	8.87	7.94				



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=22c8sBTOH3c>

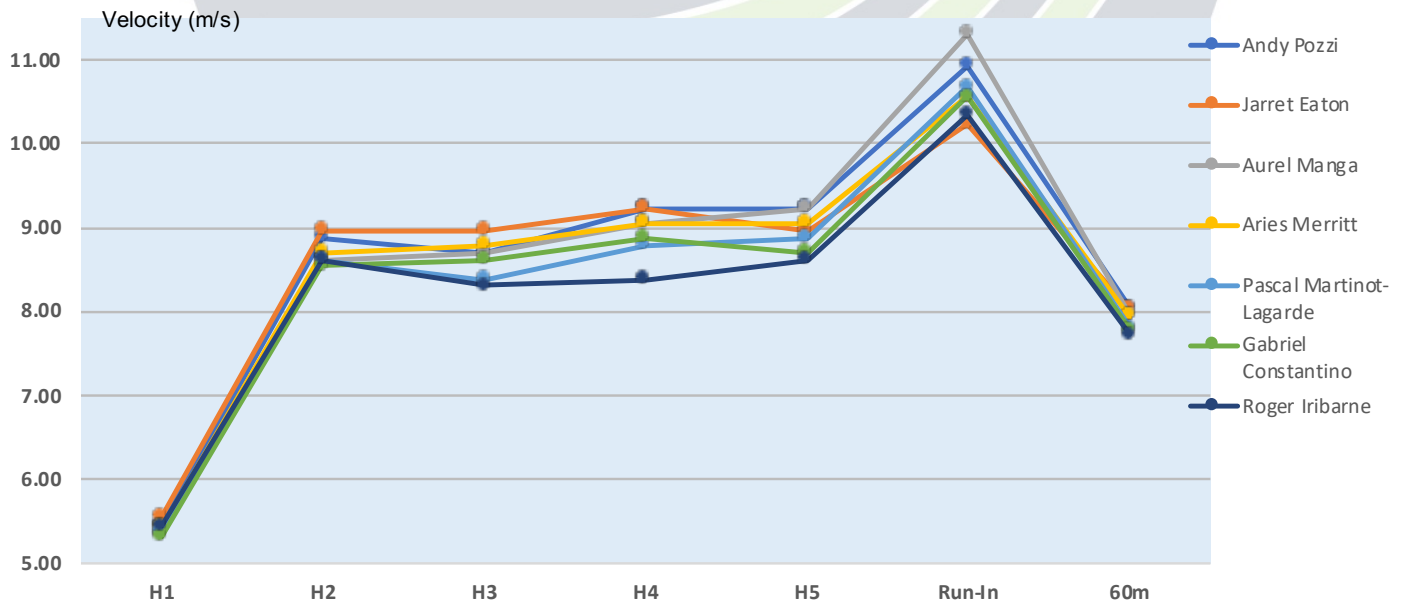
2018 IAAF World Indoor Championships (Birmingham, GBR)

60m Hurdles

Date: 2018.03.04

FINAL

			H1	H2	H3	H4	H5	Run-In	60m	Lane / Place
Pozzi, Andrew (GBR) (1992)	time		2.51	3.54	4.59	5.58	6.57		7.46	4 / 1
	reaction time	0.143	7 steps	1.03	1.05	0.99	0.99	0.89		
	velocity		5.47	8.87	8.70	9.23	9.23	10.92	8.04	
Eaton, Jarret (USA) (1989)	time		2.47	3.49	4.51	5.50	6.52		7.47	7 / 2
	reaction time	0.129	7 steps	1.02	1.02	0.99	1.02	0.95		
	velocity		5.55	8.96	8.96	9.23	8.96	10.23	8.03	
Manga, Aurel (FRA) (1992)	time		2.57	3.63	4.68	5.69	6.68		7.54	5 / 3
	reaction time	0.169	7 steps	1.06	1.05	1.01	0.99	0.86		
	velocity		5.34	8.62	8.70	9.05	9.23	11.30	7.96	
Merritt, Aries (USA) (1985)	time		2.53	3.58	4.62	5.63	6.64		7.56	1 / 4
	reaction time	0.141	7 steps	1.05	1.04	1.01	1.01	0.92		
	velocity		5.42	8.70	8.79	9.05	9.05	10.57	7.94	
Martinot-Lagarde, Pascal (FRA) (1991)	time		2.55	3.61	4.70	5.74	6.77		7.68	3 / 5
	reaction time	0.154	7 steps	1.06	1.09	1.04	1.03	0.91		
	velocity		5.38	8.62	8.39	8.79	8.87	10.68	7.81	
Constantino, Gabriel (BRA) (1995)	time		2.58	3.65	4.71	5.74	6.79		7.71	2 / 6
	reaction time	0.176	7 steps	1.07	1.06	1.03	1.05	0.92		
	velocity		5.32	8.54	8.62	8.87	8.70	10.57	7.78	
Iribarne, Roger (CUB) (1996)	time		2.52	3.58	4.68	5.77	6.83		7.77	8 / 7
	reaction time	0.172	7 steps	1.06	1.10	1.09	1.06	0.94		
	velocity		5.44	8.62	8.31	8.39	8.62	10.34	7.72	
Trajkovic, Milan (CYP) (1992)	0.084								DQ	6 / --



Source: Walker, J., Pollitt, L., Paradisis, G.P., Besodis, I., Bissas, A. and Merlino, S. (2019). Biomechanical Report for the IAAF World Indoor Championships 2018: 60 Metres Hurdles Men. Birmingham, UK: International Association of Athletics Federations. p. 32.

<https://www.worldathletics.org/about-iaaf/documents/research-centre>

Women's 100m Hurdles

2018 Top 10 Times - Women's 100m Hurdles

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 - 2019 Müller Anniversary Games (London, GBR) (TV Analysis)			Henson (2020) - Athlete First: 2018 year end hurdle report															
date	22-Jul	time	2.44	3.46	4.44	5.40	6.36	7.28	8.24	9.20	10.18	11.18		12.36	6 / 1			
reaction time	0.169	interval		1.02	0.98	0.96	0.96	0.92	0.96	0.96	0.98	1.00	1.18			2.96	2.84	2.94
wind	0.6 m/s	velocity	5.33	8.33	8.67	8.85	8.85	9.24	8.85	8.85	8.67	8.50	8.90	8.09		8.61	8.98	8.67
McNeal, Brianna (USA) (1991)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2018 Bauhaus Athletics (Stockholm, SWE) (TV Analysis)			Henson (2020) - Athlete First: 2018 year end hurdle report															
date	10-Jun	time	2.48	3.48	4.44	5.40	6.36	7.32	8.28	9.24	10.24	11.24		12.38	5 / 1			
reaction time	0.138	interval		1.00	0.96	0.96	0.96	0.96	0.96	0.96	1.00	1.00	1.14			2.92	2.88	2.96
wind	1.3 m/s	velocity	5.24	8.50	8.85	8.85	8.85	8.85	8.85	8.85	8.50	8.50	9.21	8.08		8.73	8.85	8.61
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 - 2018 South Eastern Conference Championships (Knoxville, TN) (TV Analysis)			Henson (2020) - Athlete First: 2018 year end hurdle report															
date	13-May	time	2.45	3.46	4.46	5.40	6.36	7.32	8.27	9.23	10.20	11.18		12.40	5 / 1			
reaction time		interval		1.01	1.00	0.94	0.96	0.96	0.95	0.96	0.97	0.98	1.22	AR PB		2.95	2.87	2.91
wind	1.2 m/s	velocity	5.31	8.42	8.50	9.04	8.85	8.85	8.95	8.85	8.76	8.67	8.61	8.06		8.64	8.89	8.76
Talay, Alina (BLR) (1989)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2018 Liese Prokop Memorial (St. Pölten, AUT)			Henson (2021) - Athlete First: 2018 year end hurdle report															
date	31-May	time	2.52	3.52	4.50	5.46	6.42	7.38	8.34	9.30	10.26	11.26		12.41	4 / 1			
reaction time		interval		1.00	0.98	0.96	0.96	0.96	0.96	0.96	0.96	1.00	1.15	NR PB		2.94	2.88	2.92
wind	0.5 m/s	velocity	5.16	8.50	8.67	8.85	8.85	8.85	8.85	8.85	8.85	8.50	9.13	8.06		8.67	8.85	8.73
McNeal, Brianna (USA) (1991)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Heat 2 - 2018 Müller Anniversary Games (London, GBR)																		
date	22-Jul	time												12.41	6 / 1			
reaction time	0.134	interval	No Information Available															
wind	0.2 m/s	velocity																
McNeal, Brianna (USA) (1991)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2018 Mt. SAC Relays (Torrance, CA)																		
date	21-Apr	time												12.43	/ 1			
reaction time		interval	No Information Available															
wind	1.5 m/s	velocity																
McNeal, Brianna (USA) (1991)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2018 Spitzen Leichtathletik (Luzern, SUI) (TV Analysis)																		
date	9-Jul	time	2.48	3.46	4.44	5.42	6.40	7.36	8.32	9.28	10.26	11.28		12.44	4 / 1			
reaction time		interval		0.98	0.98	0.98	0.98	0.96	0.96	0.96	0.98	1.02	1.16			2.94	2.90	2.96
wind	0.9 m/s	velocity	5.24	8.67	8.67	8.67	8.67	8.85	8.85	8.85	8.67	8.33	9.05	8.04		8.67	8.79	8.61
Harrison, Kendra (USA) (1992)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Heat 1 - 2018 USATF National Champinships (Des Moines, IA)																		
date	22-Jun	time												12.46	/ 1			
reaction time		interval	No Information Available															
wind	0.8 m/s	velocity																
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 - 2018 USATF National Champinships (Des Moines, IA) (TV Analysis)			Henson (2020) - Athlete First: 2018 year end hurdle report															
date	23-Jun	time	2.40	3.40	4.38	5.37	6.34	7.31	8.24	9.21	10.16	11.16		12.46	5 / 1			
reaction time		interval		1.00	0.98	0.99	0.97	0.97	0.93	0.97	0.95	1.00	1.30			2.97	2.87	2.92
wind	-1.4 m/s	velocity	5.42	8.50	8.67	8.59	8.76	8.76	9.14	8.76	8.95	8.50	8.08	8.03		8.59	8.89	8.73
McNeal, Brianna (USA) (1991)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2019 Müller Anniversary Games (London, GBR) (TV Analysis)																		
date	22-Jul	time	2.48	3.50	4.48	5.44	6.40	7.38	8.36	9.34	10.32	11.32		12.47	4 / 2			
reaction time	0.152	interval		1.02	0.98	0.96	0.96	0.98	0.98	0.98	0.98	1.00	1.15			2.96	2.92	2.96
wind	0.6 m/s	velocity	5.24	8.33	8.67	8.85	8.85	8.67	8.67	8.67	8.67	8.50	9.13	8.02		8.61	8.73	8.61
McNeal, Brianna (USA) (1991)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2018 Bauhaus Athletics (Stockholm, SWE) (TV Analysis)			Henson (2020) - Athlete First: 2018 year end hurdle report															
date	10-Jun	time	2.52	3.52	4.50	5.48	6.44	7.40	8.36	9.32	10.30	11.32		12.48	6 / 2			
reaction time	0.135	interval		1.00	0.98	0.98	0.96	0.96	0.96	0.96	0.98	1.02	1.16	PB		2.96	2.88	2.96
wind	1.3 m/s	velocity	5.16	8.50	8.67	8.67	8.85	8.85	8.85	8.85	8.67	8.33	9.05	8.01		8.61	8.85	8.61

2018 IAAF Continental Cup (Ostrava, CZE) (TV Analysis)

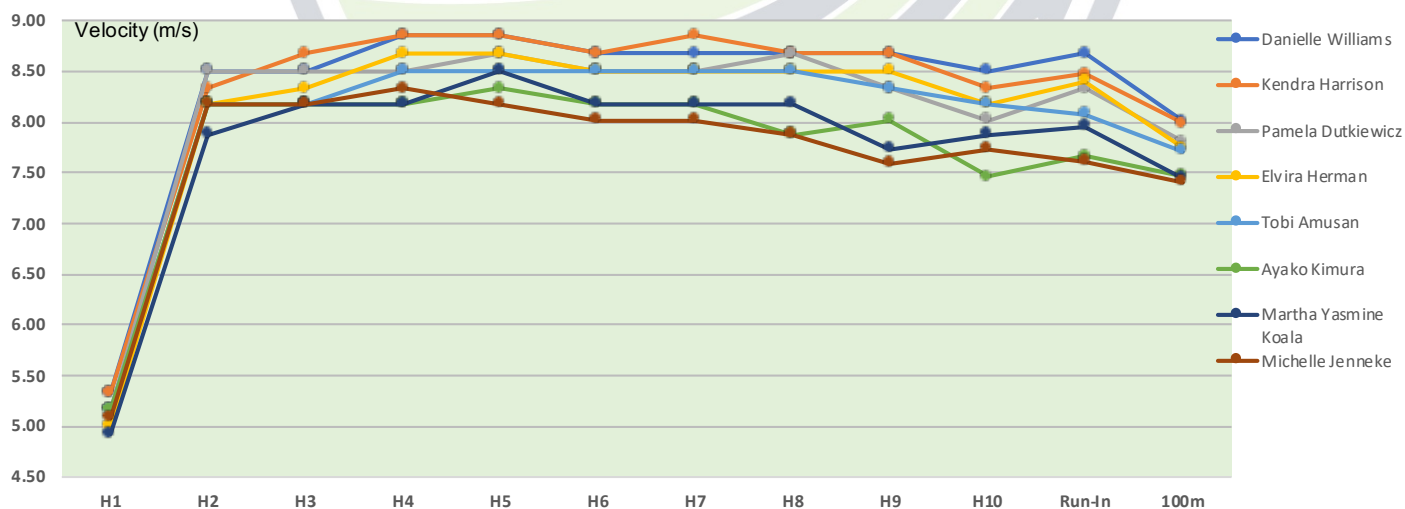
100m Hurdles

Date: 2018.09.08

Wind: -0.1 m/s

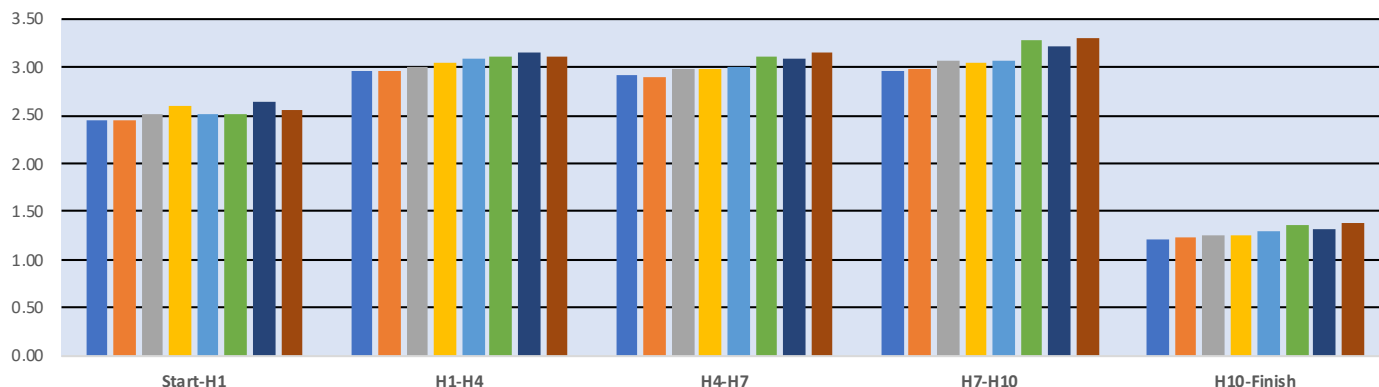
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Williams, Danielle (JAM) (1992)	time	2.44	3.44	4.44	5.40	6.36	7.34	8.32	9.30	10.28	11.28		12.49	7 / 1			
	reaction time	0.127										1.21			2.96	2.92	2.96
	interval velocity		1.00	1.00	0.96	0.96	0.98	0.98	0.98	0.98	1.00	1.21			8.61	8.73	8.61
Harrison, Kendra (USA) (1992)	time	2.44	3.46	4.44	5.40	6.36	7.34	8.30	9.28	10.26	11.28		12.52	3 / 2			
	reaction time	0.174										1.24			2.96	2.90	2.98
	interval velocity		1.02	0.98	0.96	0.96	0.98	0.96	0.98	0.98	1.02	1.24			8.61	8.79	8.56
Dutkiewicz, Pamela (GER) (1991)	time	2.52	3.52	4.52	5.52	6.50	7.50	8.50	9.48	10.50	11.56		12.82	2 / 3			
	reaction time	0.163										1.26			3.00	2.98	3.06
	interval velocity		1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.02	1.06	1.26			8.50	8.56	8.33
Herman, Elvira (BLR) (1997)	time	2.60	3.64	4.66	5.64	6.62	7.62	8.62	9.62	10.62	11.66		12.91	6 / 4			
	reaction time	0.173										1.25			3.04	2.98	3.04
	interval velocity		1.04	1.02	0.98	0.98	1.00	1.00	1.00	1.00	1.04	1.25			8.39	8.56	8.39
Amusan, Tobi (NGR) (1997)	time	2.52	3.56	4.60	5.60	6.60	7.60	8.60	9.60	10.62	11.66		12.96	4 / 5			
	reaction time	0.167										1.30			3.08	3.00	3.06
	interval velocity		1.04	1.04	1.00	1.00	1.00	1.00	1.00	1.02	1.04	1.30			8.28	8.50	8.33
Kimura, Ayako (JPN) (1988)	time	2.52	3.56	4.60	5.64	6.66	7.70	8.74	9.82	10.88	12.02		13.39	5 / 6			
	reaction time	0.166										1.37			3.12	3.10	3.28
	interval velocity		1.04	1.04	1.04	1.02	1.04	1.04	1.08	1.06	1.14	1.37			8.17	8.23	7.77
Koala, Martha Yasmine (BUR) (1994)	time	2.64	3.72	4.76	5.80	6.80	7.84	8.88	9.92	11.02	12.10		13.42	8 / 7			
	reaction time	0.157										1.32			3.16	3.08	3.22
	interval velocity		1.08	1.04	1.04	1.00	1.04	1.04	1.04	1.10	1.08	1.32			8.07	8.28	7.92
Jenneke, Michelle (AUS) (1993)	time	2.56	3.60	4.64	5.66	6.70	7.76	8.82	9.90	11.02	12.12		13.50	1 / 8			
	reaction time	0.158										1.38			3.10	3.16	3.30
	interval velocity		1.04	1.04	1.02	1.04	1.06	1.06	1.08	1.12	1.10	1.38			8.23	8.07	7.73



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=1dp82u0D6260>

2018 AG Memorial van Damme (Brussels, BEL) (TV Analysis)

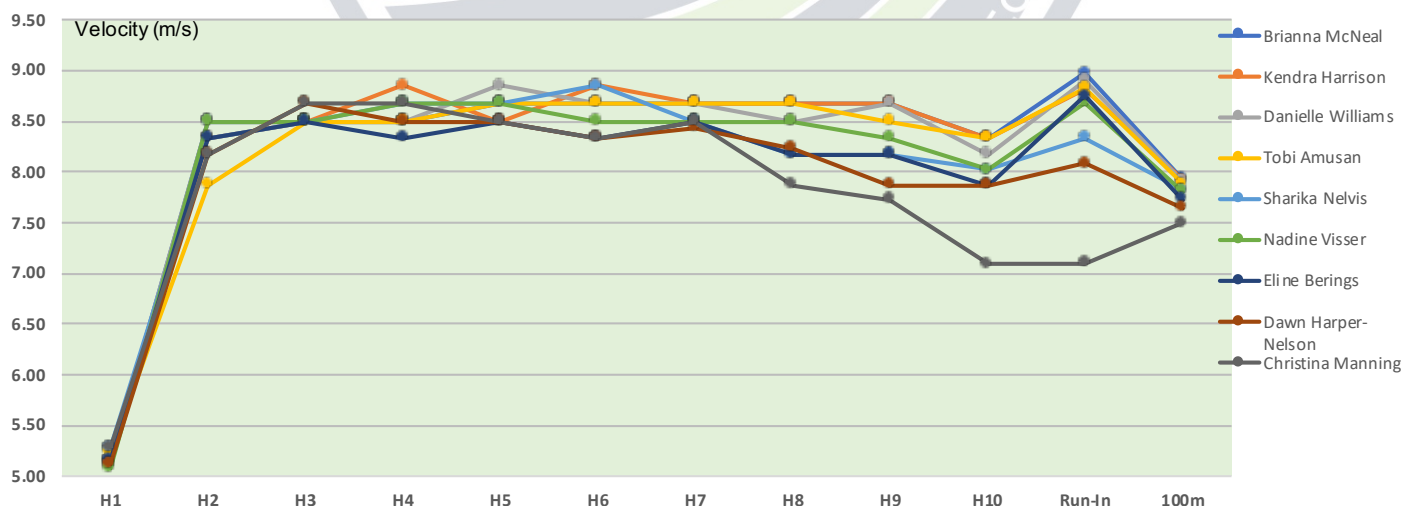
100m Hurdles

Date: 2018.08.31

Wind: 0.1 m/s

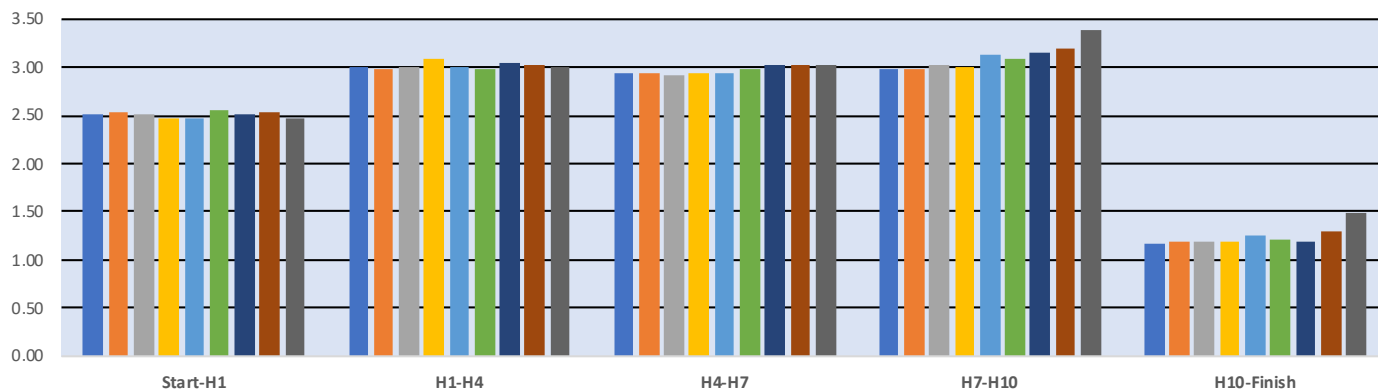
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
McNeal, Brianna (USA) (1991)	time	2.52	3.52	4.52	5.52	6.50	7.48	8.46	9.44	10.42	11.44		12.61	6 / 1	3.00	2.94	2.98
	reaction time	0.196										1.17					
	interval velocity	5.16	8.50	8.50	8.50	8.67	8.67	8.67	8.67	8.67	8.33	8.97	7.93				
Harrison, Kendra (USA) (1992)	time	2.54	3.56	4.56	5.52	6.52	7.48	8.46	9.44	10.42	11.44		12.63	4 / 2	2.98	2.94	2.98
	reaction time	0.205										1.19					
	interval velocity	5.12	8.33	8.50	8.85	8.50	8.85	8.67	8.67	8.67	8.33	8.82	7.92				
Williams, Danielle (JAM) (1992)	time	2.52	3.52	4.52	5.52	6.48	7.46	8.44	9.44	10.42	11.46		12.64	5 / 3	3.00	2.92	3.02
	reaction time	0.143										1.18					
	interval velocity	5.16	8.50	8.50	8.50	8.85	8.67	8.67	8.50	8.67	8.17	8.90	7.91				
Amusan, Tobi (NGR) (1997)	time	2.48	3.56	4.56	5.56	6.54	7.52	8.50	9.48	10.48	11.50		12.69	2 / 4	3.08	2.94	3.00
	reaction time	0.134										1.19					
	interval velocity	5.24	7.87	8.50	8.50	8.67	8.67	8.67	8.67	8.50	8.33	8.82	7.88				
Nelvis, Sharika (USA) (1990)	time	2.46	3.48	4.48	5.46	6.44	7.40	8.40	9.44	10.48	11.54		12.80	3 / 5	3.00	2.94	3.14
	reaction time	0.142										1.26					
	interval velocity	5.28	8.33	8.50	8.67	8.67	8.85	8.50	8.17	8.17	8.02	8.33	7.81				
Visser, Nadine (NED) (1995)	time	2.56	3.56	4.56	5.54	6.52	7.52	8.52	9.52	10.54	11.60		12.81	8 / 6	2.98	2.98	3.08
	reaction time	0.151										1.21					
	interval velocity	5.08	8.50	8.50	8.67	8.67	8.50	8.50	8.33	8.02	8.68	7.81					
Berings, Eline (BEL) (1986)	time	2.52	3.54	4.54	5.56	6.56	7.58	8.58	9.62	10.66	11.74		12.94	9 / 7	3.04	3.02	3.16
	reaction time	0.107										1.20					
	interval velocity	5.16	8.33	8.50	8.33	8.50	8.33	8.50	8.17	8.17	7.87	8.75	7.73				
Harper-Nelson, Dawn (USA) (1984)	time	2.54	3.58	4.56	5.56	6.56	7.58	8.59	9.62	10.70	11.78		13.08	1 / 8	3.02	3.03	3.19
	reaction time	0.154										1.30					
	interval velocity	5.12	8.17	8.67	8.50	8.50	8.33	8.43	8.24	7.87	7.87	8.08	7.65				
Manning, Christina (USA) (1990)	time	2.46	3.50	4.48	5.46	6.46	7.48	8.48	9.56	10.66	11.86		13.34	7 / 9	3.00	3.02	3.38
	reaction time	0.118										1.48					
	interval velocity	5.28	8.17	8.67	8.67	8.50	8.33	8.50	7.87	7.73	7.08	7.09	7.50				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1280 x 720 @ 25fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=WsmNEW2QQw8>

2018 Müller Anniversary Games (London, GBR) (TV Analysis)

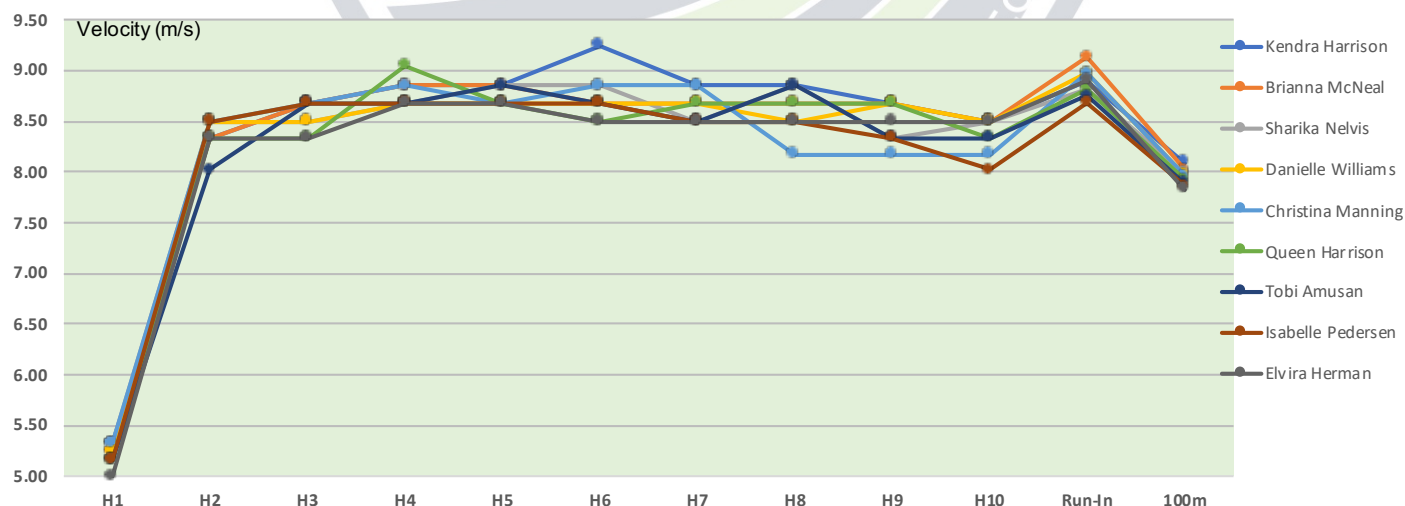
100m Hurdles

Date: 2018.07.22

Wind: 0.6 m/s

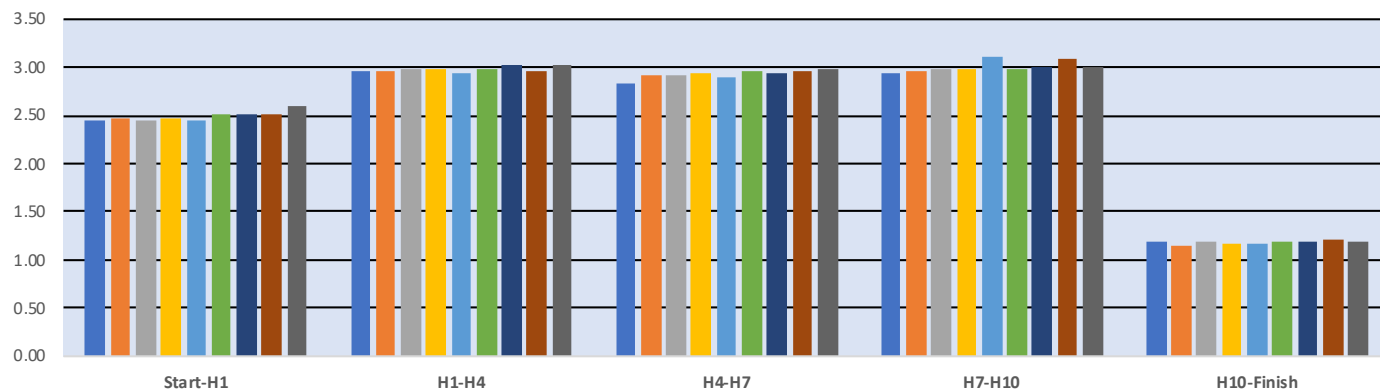
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Harrison, Kendra (USA) (1992)	time	2.44	3.46	4.44	5.40	6.36	7.28	8.24	9.20	10.18	11.18		12.36	6 / 1			
	reaction time	0.169										1.18			2.96	2.84	2.94
	interval		1.02	0.98	0.96	0.96	0.92	0.96	0.96	0.98	1.00	1.18			8.61	8.98	8.67
McNeal, Brianna (USA) (1991)	time	2.48	3.50	4.48	5.44	6.40	7.38	8.36	9.34	10.32	11.32		12.47	4 / 2			
	reaction time	0.152										1.15			2.96	2.92	2.96
	interval		1.02	0.98	0.96	0.96	0.98	0.98	0.98	0.98	1.00	1.15			8.61	8.73	8.61
Nelvis, Sharika (USA) (1990)	time	2.44	3.44	4.44	5.42	6.38	7.34	8.34	9.30	10.32	11.32		12.51	9 / 3			
	reaction time	0.139										1.19			2.98	2.92	2.98
	interval		1.00	1.00	0.98	0.96	0.96	1.00	0.96	1.02	1.00	1.19			8.56	8.73	8.56
Williams, Danielle (JAM) (1992)	time	2.48	3.48	4.48	5.46	6.44	7.42	8.40	9.40	10.38	11.38		12.55	5 / 4			
	reaction time	0.133										1.17			2.98	2.94	2.98
	interval		1.00	1.00	0.98	0.98	0.98	0.98	1.00	0.98	1.00	1.17			8.56	8.67	8.56
Manning, Christina (USA) (1990)	time	2.44	3.44	4.42	5.38	6.36	7.32	8.28	9.32	10.36	11.40		12.57	7 / 5			
	reaction time	0.136										1.17			2.94	2.90	3.12
	interval		1.00	0.98	0.96	0.98	0.96	0.96	1.04	1.04	1.04	1.17			8.67	8.79	8.17
Harrison, Queen (USA) (1988)	time	2.52	3.54	4.56	5.50	6.48	7.48	8.46	9.44	10.42	11.44		12.63	3 / 6			
	reaction time	0.167										1.19			2.98	2.96	2.98
	interval		1.02	1.02	0.94	0.98	1.00	0.98	0.98	0.98	1.02	1.19			8.56	8.61	8.56
Amusan, Tobi (NGR) (1997)	time	2.52	3.58	4.56	5.54	6.50	7.48	8.48	9.44	10.46	11.48		12.68	8 / 7			
	reaction time	0.151										1.20			3.02	2.94	3.00
	interval		1.06	0.98	0.98	0.96	0.98	1.00	0.96	1.02	1.02	1.20			8.44	8.67	8.50
Pedersen, Isabelle (NOR) (1992)	time	2.52	3.52	4.50	5.48	6.46	7.44	8.44	9.44	10.46	11.52		12.73	2 / 8			
	reaction time	0.172										1.21			2.96	2.96	3.08
	interval		1.00	0.98	0.98	0.98	0.98	1.00	1.00	1.02	1.06	1.21			8.61	8.61	8.28
Herman, Elvira (BLR) (1997)	time	2.60	3.62	4.64	5.62	6.60	7.60	8.60	9.60	10.60	11.60		12.78	1 / 9			
	reaction time	0.147										1.18			3.02	2.98	3.00
	interval		1.02	1.02	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.18			8.44	8.56	8.50



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=popGNKbATSk>

2018 Meeting International Mohammed VI d'Athlétisme (Rabat, MAR) (TV Analysis)

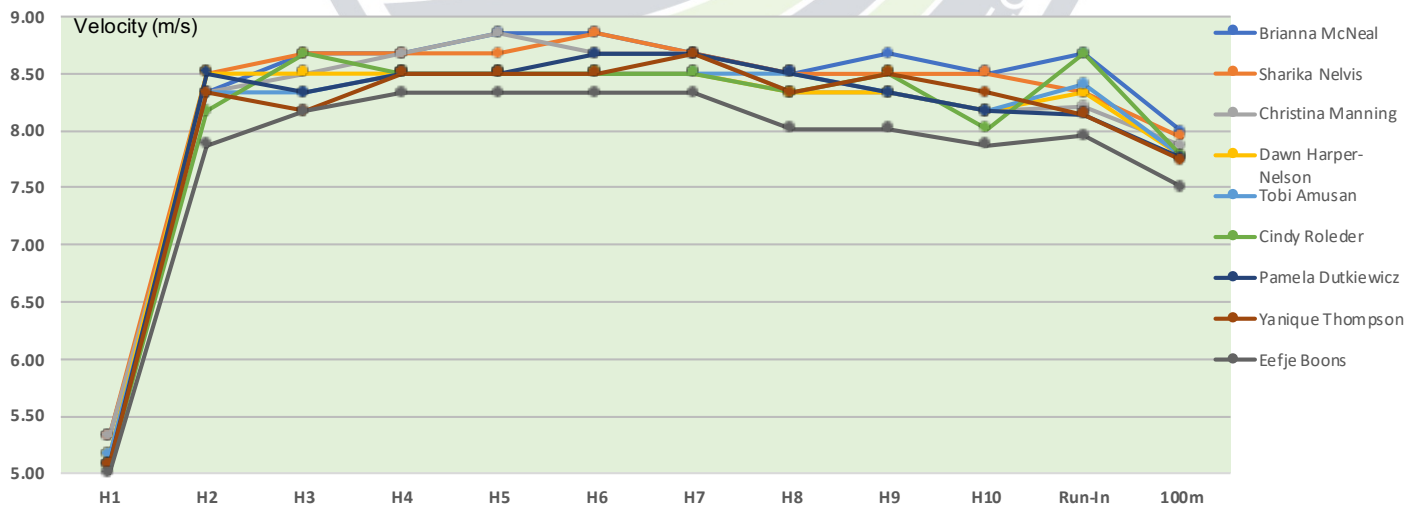
100m Hurdles

Date: 2018.07.13

Wind: 0.1 m/s

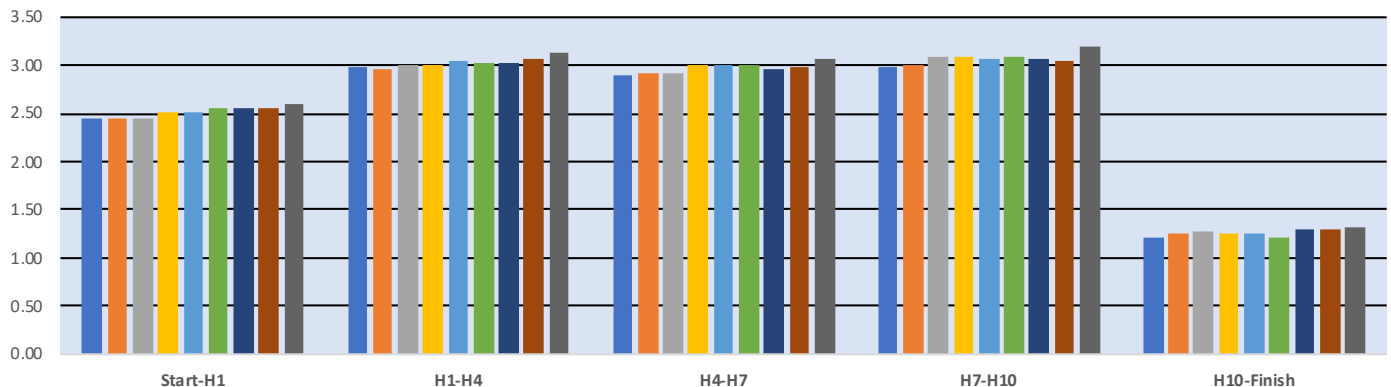
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
McNeal, Brianna (USA) (1991)	time		2.44	3.46	4.44	5.42	6.38	7.34	8.32	9.32	10.30	11.30		12.51	5 / 1			
	reaction time	0.131														2.98	2.90	2.98
	interval velocity		5.33	8.33	8.67	8.67	8.85	8.85	8.67	8.50	8.67	8.50	8.68	7.99		8.56	8.79	8.56
Nelvis, Sharika (USA) (1990)	time		2.44	3.44	4.42	5.40	6.38	7.34	8.32	9.32	10.32	11.32		12.58	6 / 2			
	reaction time	0.139														2.96	2.92	3.00
	interval velocity		5.33	8.50	8.67	8.67	8.67	8.85	8.67	8.50	8.50	8.50	8.33	7.95		8.61	8.73	8.50
Manning, Christina (USA) (1990)	time		2.44	3.46	4.46	5.44	6.40	7.38	8.36	9.38	10.40	11.44		12.72	3 / 3			
	reaction time	0.151														3.00	2.92	3.08
	interval velocity		5.33	8.33	8.50	8.67	8.85	8.67	8.67	8.33	8.33	8.17	8.20	7.86		8.50	8.73	8.28
Harper-Nelson, Dawn (USA) (1984)	time		2.52	3.52	4.52	5.52	6.52	7.52	8.52	9.54	10.56	11.60		12.86	2 / 4			
	reaction time	0.170														3.00	3.00	3.08
	interval velocity		5.16	8.50	8.50	8.50	8.50	8.50	8.50	8.33	8.33	8.17	8.33	7.78		8.50	8.50	8.28
Amusan, Tobi (NGR) (1997)	time		2.52	3.54	4.56	5.56	6.56	7.56	8.56	9.56	10.58	11.62		12.87	8 / 5			
	reaction time	0.190														3.04	3.00	3.06
	interval velocity		5.16	8.33	8.33	8.50	8.50	8.50	8.50	8.50	8.33	8.17	8.40	7.77		8.39	8.50	8.33
Roleder, Cindy (GER) (1989)	time		2.56	3.60	4.58	5.58	6.58	7.58	8.58	9.60	10.60	11.66		12.87	7 / 6			
	reaction time	0.128														3.02	3.00	3.08
	interval velocity		5.08	8.17	8.67	8.50	8.50	8.50	8.50	8.33	8.50	8.02	8.68	7.77		8.44	8.50	8.28
Dutkiewicz, Pamela (GER) (1991)	time		2.56	3.56	4.58	5.58	6.58	7.56	8.54	9.54	10.56	11.60		12.89	4 / 6			
	reaction time	0.168														3.02	2.96	3.06
	interval velocity		5.08	8.50	8.33	8.50	8.50	8.67	8.67	8.50	8.33	8.17	8.14	7.76		8.44	8.61	8.33
Thompson, Yanique (JAM) (1996)	time		2.56	3.58	4.62	5.62	6.62	7.62	8.60	9.62	10.62	11.64		12.93	1 / 8			
	reaction time	0.155														3.06	2.98	3.04
	interval velocity		5.08	8.33	8.17	8.50	8.50	8.50	8.67	8.33	8.50	8.33	8.14	7.73		8.33	8.56	8.39
Boons, Eefje (NED) (1994)	time		2.60	3.68	4.72	5.74	6.76	7.78	8.80	9.86	10.92	12.00		13.32	9 / 9			
	reaction time	0.150														3.14	3.06	3.20
	interval velocity		5.00	7.87	8.17	8.33	8.33	8.33	8.33	8.02	8.02	7.87	7.95	7.51		8.12	8.33	7.97



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 25fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=wOg8pA-AeGc>

2018 Spitzen Leichtathletik (Luzern, SUI) (TV Analysis)

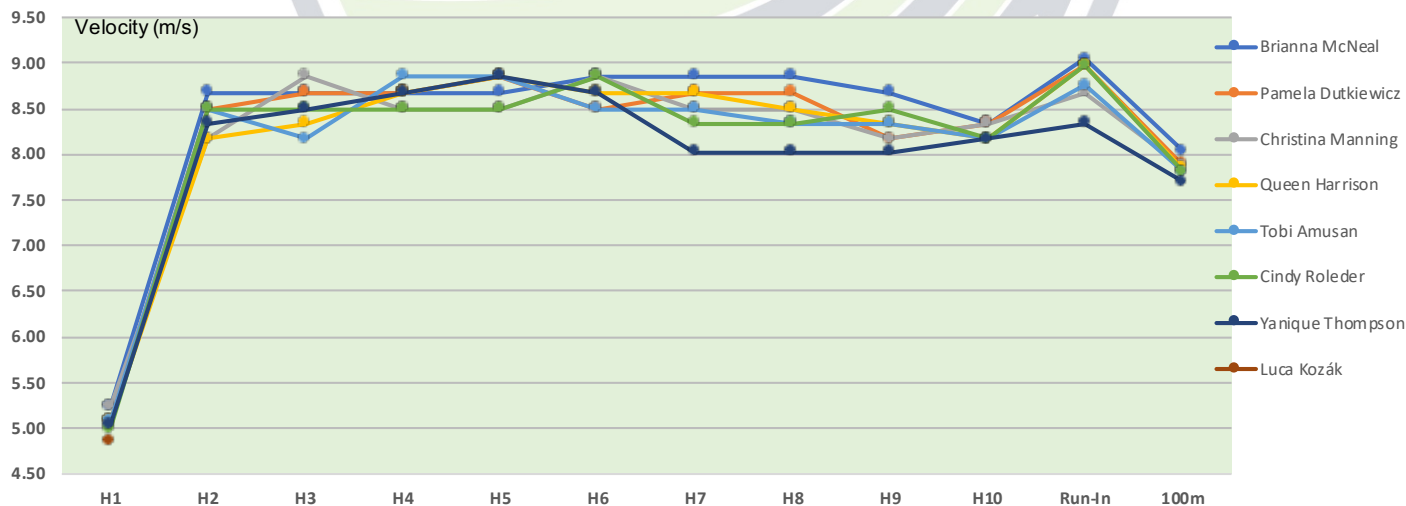
100m Hurdles

Date: 2018.07.09

Wind: 0.9 m/s

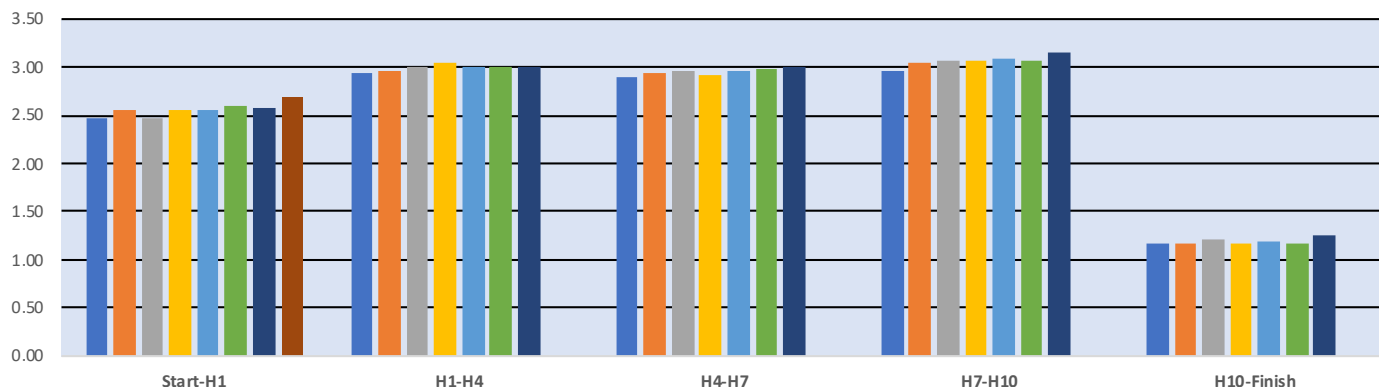
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
McNeal, Brianna (USA) (1991)	time	2.48	3.46	4.44	5.42	6.40	7.36	8.32	9.28	10.26	11.28		12.44	4 / 1			
	reaction time														2.94	2.90	2.96
	interval velocity		0.98	0.98	0.98	0.98	0.96	0.96	0.96	0.98	1.02	1.16			8.67	8.79	8.61
Dutkiewicz, Pamela (GER) (1991)	time	2.56	3.56	4.54	5.52	6.48	7.48	8.46	9.44	10.48	11.50		12.67	2 / 2			
	reaction time														2.96	2.94	3.04
	interval velocity		1.00	0.98	0.98	0.96	1.00	0.98	0.98	1.04	1.02	1.17			8.61	8.67	8.39
Manning, Christina (USA) (1990)	time	2.48	3.52	4.48	5.48	6.48	7.44	8.44	9.44	10.48	11.50		12.71	6 / 3			
	reaction time														3.00	2.96	3.06
	interval velocity		1.04	0.96	1.00	1.00	0.96	1.00	1.00	1.04	1.02	1.21			8.50	8.61	8.33
Harrison, Queen (USA) (1988)	time	2.56	3.60	4.62	5.60	6.56	7.54	8.52	9.52	10.54	11.58		12.75	5 / 4			
	reaction time														3.04	2.92	3.06
	interval velocity		1.04	1.02	0.98	0.96	0.98	0.98	1.00	1.02	1.04	1.17			8.39	8.73	8.33
Amusan, Tobi (NGR) (1997)	time	2.56	3.56	4.60	5.56	6.52	7.52	8.52	9.54	10.56	11.60		12.80	3 / 5			
	reaction time														3.00	2.96	3.08
	interval velocity		1.00	1.04	0.96	0.96	1.00	1.00	1.02	1.02	1.04	1.20			8.50	8.61	8.28
Roleder, Cindy (GER) (1989)	time	2.60	3.60	4.60	5.60	6.60	7.56	8.58	9.60	10.60	11.64		12.81	7 / 6			
	reaction time														3.00	2.98	3.06
	interval velocity		1.00	1.00	1.00	1.00	0.96	1.02	1.02	1.00	1.04	1.17			8.50	8.56	8.33
Thompson, Yanique (JAM) (1996)	time	2.58	3.60	4.60	5.58	6.54	7.52	8.58	9.64	10.70	11.74		13.00	1 / 7			
	reaction time														3.00	3.00	3.16
	interval velocity		1.02	1.00	0.98	0.96	0.98	1.06	1.06	1.06	1.04	1.26			8.50	8.50	8.07
Kozák, Luca (HUN) (1996)	time	2.68											dnf	8 / 8			
	reaction time																
	interval velocity		4.85														



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=HcgggXAibPI>

2018 USATF National Championships (Des Moines, IA) (TV Analysis)

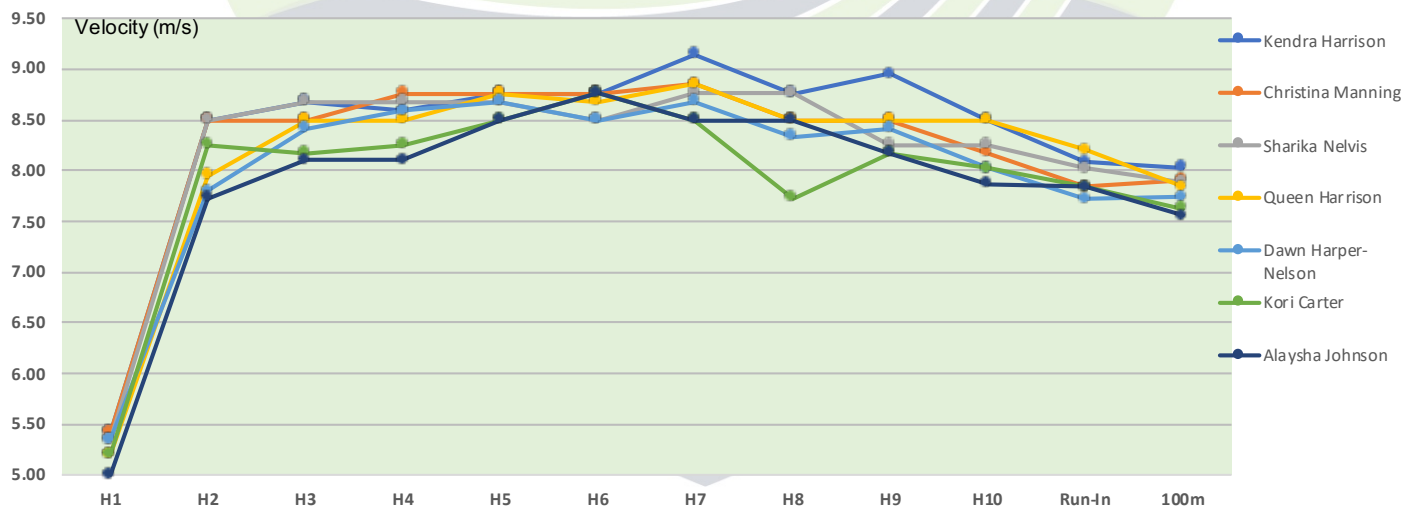
100m Hurdles

Date: 2018.06.23

Wind: -1.4 m/s

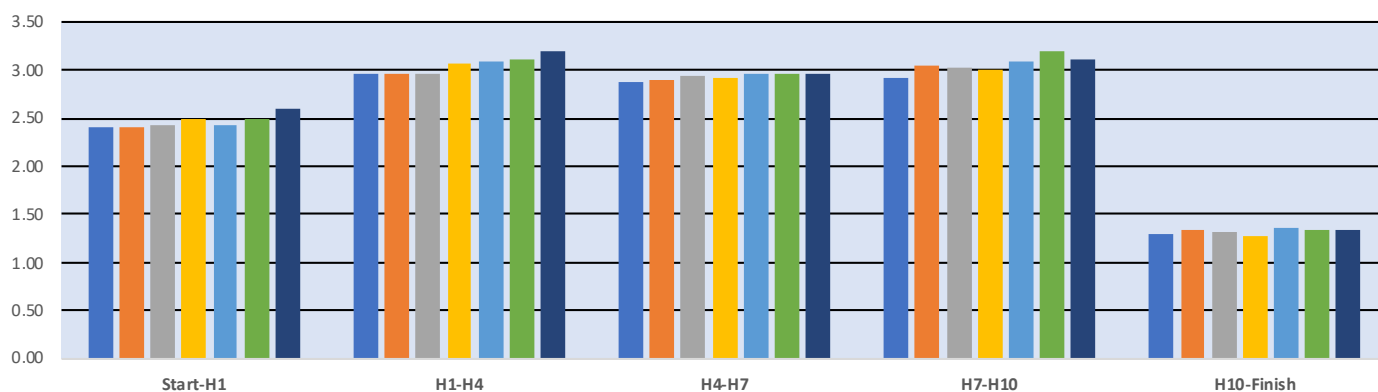
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Harrison, Kendra (USA) (1992)	time	2.40	3.40	4.38	5.37	6.34	7.31	8.24	9.21	10.16	11.16		12.46	5 / 1			
	reaction time														2.97	2.87	2.92
	interval		1.00	0.98	0.99	0.97	0.97	0.93	0.97	0.95	1.00	1.30			8.59	8.89	8.73
Manning, Christina (USA) (1990)	time	2.40	3.40	4.40	5.37	6.34	7.31	8.27	9.27	10.27	11.31		12.65	4 / 2			
	reaction time														2.97	2.90	3.04
	interval		1.00	1.00	0.97	0.97	0.97	0.96	1.00	1.00	1.04	1.34			8.59	8.79	8.39
Nelvis, Sharika (USA) (1990)	time	2.43	3.43	4.41	5.39	6.37	7.37	8.34	9.31	10.34	11.37		12.68	3 / 3			
	reaction time														2.96	2.95	3.03
	interval		1.00	0.98	0.98	0.98	1.00	0.97	0.97	1.03	1.03	1.31			8.61	8.64	8.42
Harrison, Queen (USA) (1988)	time	2.50	3.57	4.57	5.57	6.54	7.52	8.48	9.48	10.48	11.48		12.76	6 / 4			
	reaction time														3.07	2.91	3.00
	interval		1.07	1.00	1.00	0.97	0.98	0.96	1.00	1.00	1.00	1.28			8.31	8.76	8.50
Harper-Nelson, Dawn (USA) (1984)	time	2.43	3.52	4.53	5.52	6.50	7.50	8.48	9.50	10.51	11.57		12.93	7 / 5			
	reaction time														3.09	2.96	3.09
	interval		1.09	1.01	0.99	0.98	1.00	0.98	1.02	1.01	1.06	1.36			8.25	8.61	8.25
Carter, Kori (USA) (1992)	time	2.50	3.53	4.57	5.60	6.60	7.57	8.57	9.67	10.71	11.77		13.11	2 / 6			
	reaction time														3.10	2.97	3.20
	interval		1.03	1.04	1.03	1.00	0.97	1.00	1.10	1.04	1.06	1.34			8.23	8.59	7.97
Johnson, Alaysha (USA) (1996)	time	2.60	3.70	4.75	5.80	6.80	7.77	8.77	9.77	10.81	11.89		13.23	8 / 7			
	reaction time														3.20	2.97	3.12
	interval		1.10	1.05	1.05	1.00	0.97	1.00	1.00	1.04	1.08	1.34			7.97	8.59	8.17
	velocity	5.42	8.50	8.67	8.59	8.76	8.76	9.14	8.76	8.95	8.50	8.08	8.03				



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=GcW-P34-VZA>

2018 Bauhaus Athletics (Stockholm, SWE) (TV Analysis)

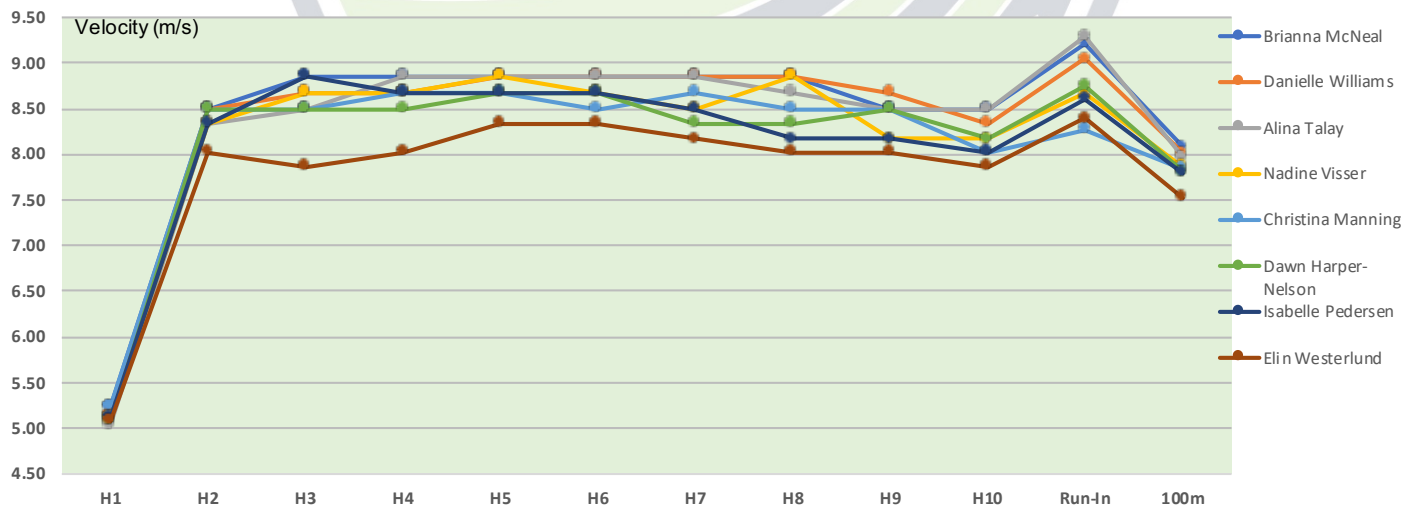
100m Hurdles

Date: 2018.06.10

Wind: 1.3 m/s

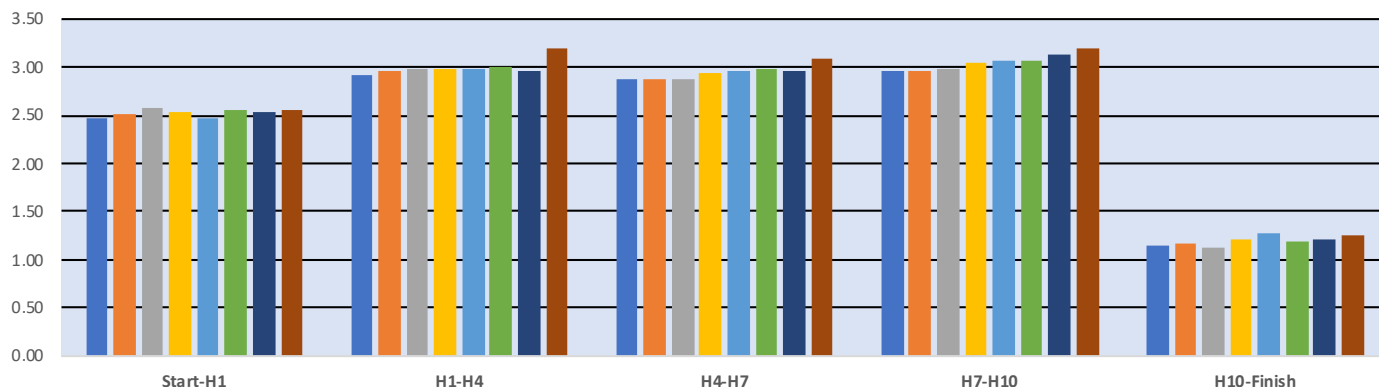
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
McNeal, Brianna (USA) (1991)	time	2.48	3.48	4.44	5.40	6.36	7.32	8.28	9.24	10.24	11.24		12.38	5 / 1			
	reaction time	0.138										1.14			2.92	2.88	2.96
	interval velocity		1.00	0.96	0.96	0.96	0.96	0.96	0.96	1.00	1.00	1.14	8.08		8.73	8.85	8.61
Williams, Danielle (JAM) (1992)	time	2.52	3.52	4.50	5.48	6.44	7.40	8.36	9.32	10.30	11.32		12.48	6 / 2			
	reaction time	0.135										1.16			2.96	2.88	2.96
	interval velocity		1.00	0.98	0.98	0.96	0.96	0.96	0.96	0.98	1.02	1.16	8.01		8.61	8.85	8.61
Talay, Alina (BLR) (1989)	time	2.58	3.60	4.60	5.56	6.52	7.48	8.44	9.42	10.42	11.42		12.55	4 / 3			
	reaction time	0.132										1.13			2.98	2.88	2.98
	interval velocity		1.02	1.00	0.96	0.96	0.96	0.96	0.98	1.00	1.00	1.13	7.97		8.56	8.85	8.56
Visser, Nadine (NED) (1995)	time	2.54	3.56	4.54	5.52	6.48	7.46	8.46	9.42	10.46	11.50		12.71	1 / 4			
	reaction time	0.135										1.21			2.98	2.94	3.04
	interval velocity		1.02	0.98	0.98	0.96	0.98	1.00	0.96	1.04	1.04	1.21	7.87		8.56	8.67	8.39
Manning, Christina (USA) (1990)	time	2.48	3.48	4.48	5.46	6.44	7.44	8.42	9.42	10.42	11.48		12.75	3 / 5			
	reaction time	0.148										1.27			2.98	2.96	3.06
	interval velocity		1.00	1.00	0.98	0.98	1.00	0.98	1.00	1.00	1.06	1.27	7.84		8.56	8.61	8.33
Harper-Nelson, Dawn (USA) (1984)	time	2.56	3.56	4.56	5.56	6.54	7.52	8.54	9.56	10.56	11.60		12.80	7 / 6			
	reaction time	0.173										1.20			3.00	2.98	3.06
	interval velocity		1.00	1.00	1.00	0.98	0.98	1.02	1.02	1.00	1.04	1.20	7.81		8.50	8.56	8.33
Pedersen, Isabelle (NOR) (1992)	time	2.54	3.56	4.52	5.50	6.48	7.46	8.46	9.50	10.54	11.60		12.82	2 / 7			
	reaction time	0.167										1.22			2.96	2.96	3.14
	interval velocity		1.02	0.96	0.98	0.98	0.98	1.00	1.04	1.04	1.06	1.22	7.80		8.61	8.61	8.12
Westerlund, Elin (SWE) (1990)	time	2.56	3.62	4.70	5.76	6.78	7.80	8.84	9.90	10.96	12.04		13.29	8 / 8			
	reaction time	0.148										1.25			3.20	3.08	3.20
	interval velocity		1.06	1.08	1.06	1.02	1.02	1.04	1.06	1.06	1.08	1.25	7.52		7.97	8.28	7.97



Time Intervals (s)

Hurdle Phases



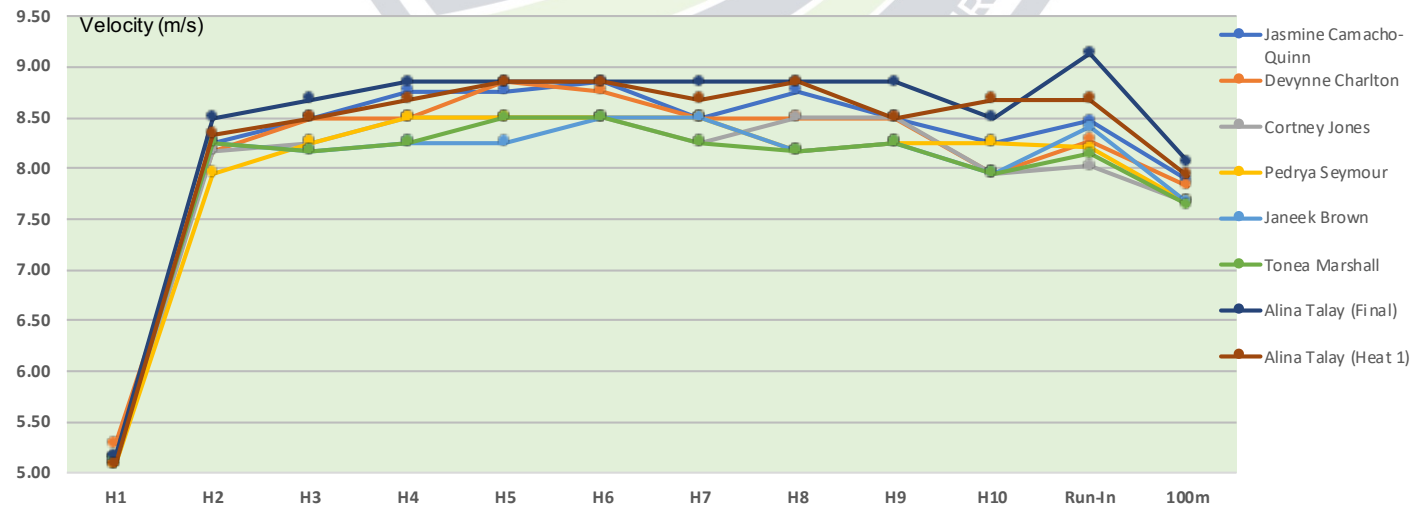
Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 25fps
 Timing From: First Movement
 Source: https://www.youtube.com/watch?v=zpTp2eh_W9Y

2018 NCAA Championships (Eugene, OR) (TV Analysis)

100m Hurdles		Date: 2018.06.09	Wind: 0.9 m/s											FINAL			
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Camacho-Quinn, Jasmine (PUR) (199)	time	2.53	3.56	4.56	5.53	6.50	7.46	8.46	9.43	10.43	11.46		12.70	5 / 1			
	reaction time														3.00	2.93	3.00
	interval		1.03	1.00	0.97	0.97	0.96	1.00	0.97	1.00	1.03	1.24			8.50	8.70	8.50
	velocity	5.14	8.25	8.50	8.76	8.76	8.85	8.50	8.76	8.50	8.25	8.47	7.87				
Charlton, Devynne (BAH) (1995)	time	2.46	3.50	4.50	5.50	6.46	7.43	8.43	9.43	10.43	11.50		12.77	8 / 2			
	reaction time														3.04	2.93	3.07
	interval		1.04	1.00	1.00	0.96	0.97	1.00	1.00	1.00	1.07	1.27			8.39	8.70	8.31
	velocity	5.28	8.17	8.50	8.50	8.85	8.76	8.50	8.50	8.50	7.94	8.27	7.83				
Jones, Cortney (USA) (1999)	time	2.56	3.60	4.63	5.63	6.63	7.63	8.66	9.66	10.66	11.73		13.04	2 / 3			
	reaction time														3.07	3.03	3.07
	interval		1.04	1.03	1.00	1.00	1.00	1.03	1.00	1.00	1.07	1.31			8.31	8.42	8.31
	velocity	5.08	8.17	8.25	8.50	8.50	8.50	8.25	8.50	8.50	7.94	8.02	7.67				
Seymour, Pedrya (BAH) (1995)	time	2.56	3.63	4.66	5.66	6.66	7.66	8.66	9.70	10.73	11.76		13.04	6 / 4			
	reaction time														3.10	3.00	3.10
	interval		1.07	1.03	1.00	1.00	1.00	1.04	1.03	1.03	1.28				8.23	8.50	8.23
	velocity	5.08	7.94	8.25	8.50	8.50	8.50	8.50	8.17	8.25	8.25	8.20	7.67				
Brown, Janeek (JAM) (1998)	time	2.53	3.56	4.60	5.63	6.66	7.66	8.66	9.70	10.73	11.80		13.05	7 / 5			
	reaction time														3.10	3.03	3.14
	interval		1.03	1.04	1.03	1.03	1.00	1.00	1.04	1.03	1.07	1.25			8.23	8.42	8.12
	velocity	5.14	8.25	8.17	8.25	8.25	8.50	8.50	8.17	8.25	7.94	8.40	7.66				
Marshall, Tonea (USA) (1998)	time	2.53	3.56	4.60	5.63	6.63	7.63	8.66	9.70	10.73	11.80		13.09	1 / 6			
	reaction time														3.10	3.03	3.14
	interval		1.03	1.04	1.03	1.00	1.00	1.03	1.04	1.03	1.07	1.29			8.23	8.42	8.12
	velocity	5.14	8.25	8.17	8.25	8.50	8.50	8.25	8.17	8.25	7.94	8.14	7.64				

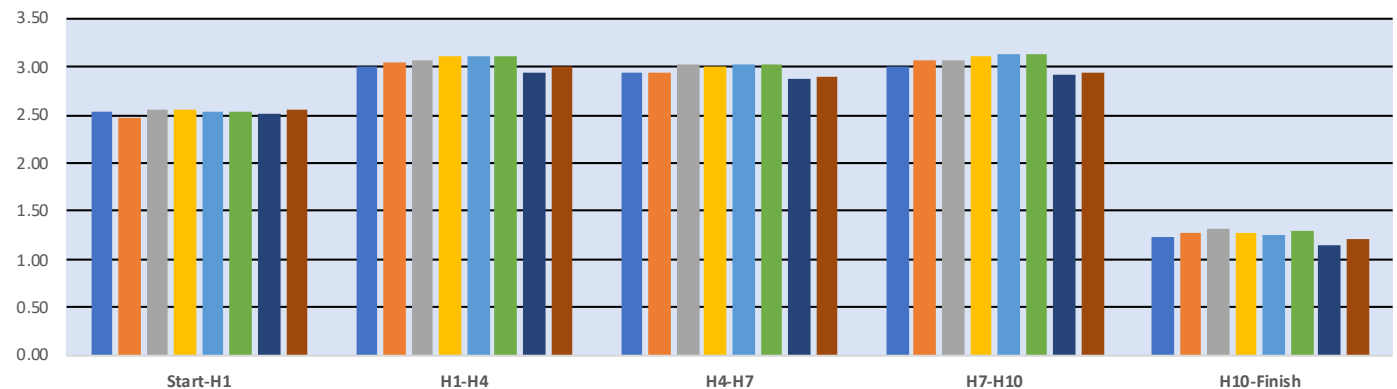
2018 Leise Prokop Memorial (St. Pölten, AUT) (TV Analysis)

100m Hurdles		Date: 2018.05.31	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
Talay, Alina (BLR) (1989)	time	2.52	3.52	4.50	5.46	6.42	7.38	8.34	9.30	10.26	11.26		12.41	4 / 1			
	reaction time														2.94	2.88	2.92
	interval		1.00	0.98	0.96	0.96	0.96	0.96	0.96	0.96	1.00	1.15	NR PB		8.67	8.85	8.73
	velocity	5.16	8.50	8.67	8.85	8.85	8.85	8.85	8.85	8.85	8.50	9.13	8.06				
		Date: 2018.05.31	Wind: 0.1 m/s											Heat 1			
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Talay, Alina (BLR) (1989)	time	2.56	3.58	4.58	5.56	6.52	7.48	8.46	9.42	10.42	11.40		12.61	3 / 1			
	reaction time														3.00	2.90	2.94
	interval		1.02	1.00	0.98	0.96	0.96	0.98	0.96	1.00	0.98	1.21	NR PB		8.50	8.79	8.67
	velocity	5.08	8.33	8.50	8.67	8.85	8.85	8.67	8.85	8.50	8.67	8.68	7.93				



Time Intervals (s)

Hurdle Phases



2020.03.27 NCAA Championships

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=1SqugcziP7I>

2021.02.10 Leise Prokop Memorial

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 50fps

Timing From: First Movement

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

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

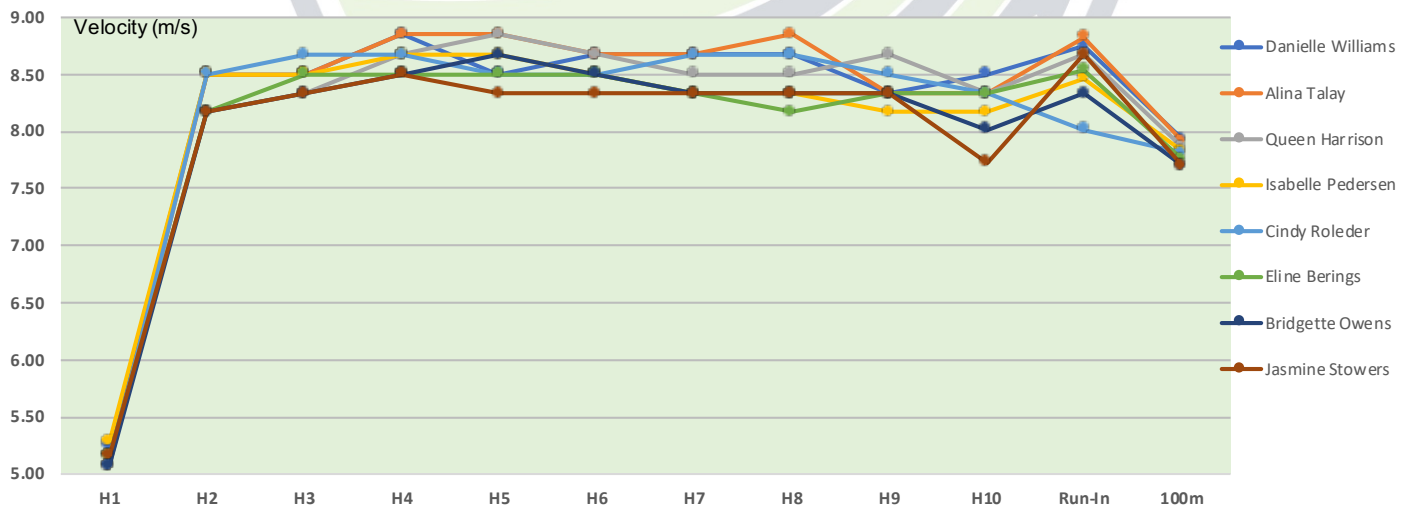
100m Hurdles

Date: 2018.06.07

Wind: 1.1 m/s

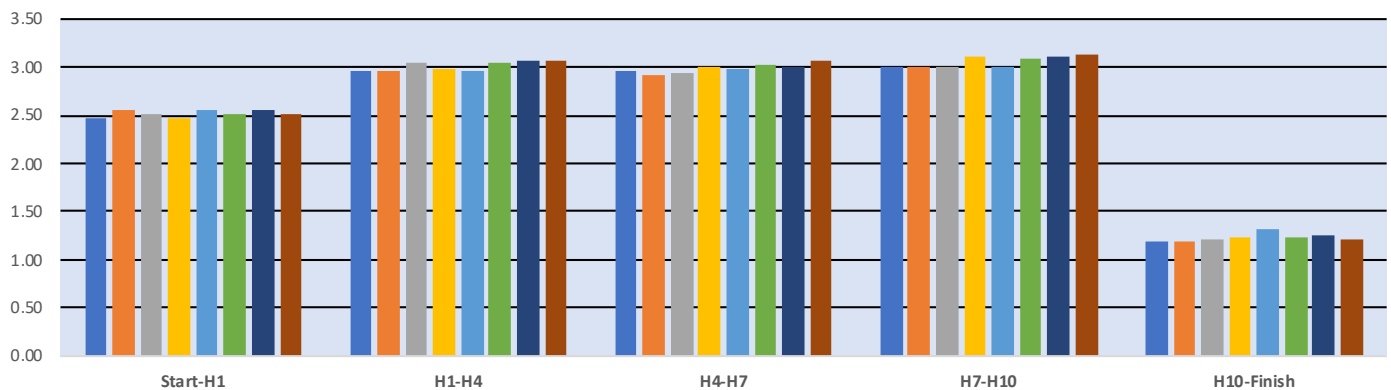
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Williams, Danielle (JAM) (1992)	time	2.48	3.48	4.48	5.44	6.44	7.42	8.40	9.38	10.40	11.40		12.60	3 / 1			
	reaction time	0.130													2.96	2.96	3.00
	interval velocity		1.00	1.00	0.96	1.00	0.98	0.98	0.98	1.02	1.00	1.20			8.61	8.61	8.50
Talay, Alina (BLR) (1989)	time	2.56	3.56	4.56	5.52	6.48	7.46	8.44	9.40	10.42	11.44		12.63	5 / 2			
	reaction time	0.231													2.96	2.92	3.00
	interval velocity		1.00	1.00	0.96	0.96	0.98	0.98	0.96	1.02	1.02	1.19			8.61	8.73	8.50
Harrison, Queen (USA) (1988)	time	2.52	3.56	4.58	5.56	6.52	7.50	8.50	9.50	10.48	11.50		12.71	7 / 3			
	reaction time	0.155													3.04	2.94	3.00
	interval velocity		1.04	1.02	0.98	0.96	0.98	1.00	1.00	0.98	1.02	1.21			8.39	8.67	8.50
Pedersen, Isabelle (NOR) (1992)	time	2.46	3.46	4.46	5.44	6.42	7.42	8.44	9.46	10.50	11.54		12.78	4 / 4			
	reaction time	0.150													2.98	3.00	3.10
	interval velocity		1.00	1.00	0.98	0.98	1.00	1.02	1.02	1.04	1.04	1.24			8.56	8.50	8.23
Roleder, Cindy (GER) (1989)	time	2.56	3.56	4.54	5.52	6.52	7.52	8.50	9.48	10.48	11.50		12.81	2 / 5			
	reaction time	0.152													2.96	2.98	3.00
	interval velocity		1.00	0.98	0.98	1.00	1.00	0.98	0.98	1.00	1.02	1.31			8.61	8.56	8.50
Berings, Eline (BEL) (1986)	time	2.52	3.56	4.56	5.56	6.56	7.56	8.58	9.62	10.64	11.66		12.89	8 / 6			
	reaction time	0.121													3.04	3.02	3.08
	interval velocity		1.04	1.00	1.00	1.00	1.00	1.02	1.04	1.02	1.02	1.23			8.39	8.44	8.28
Owens, Bridgette (USA) (1992)	time	2.56	3.60	4.62	5.62	6.60	7.60	8.62	9.64	10.66	11.72		12.98	1 / 7			
	reaction time	0.232													3.06	3.00	3.10
	interval velocity		1.04	1.02	1.00	0.98	1.00	1.02	1.02	1.02	1.06	1.26			8.33	8.50	8.23
Stowers, Jasmine (USA) (1991)	time	2.52	3.56	4.58	5.58	6.60	7.62	8.64	9.66	10.68	11.78		12.99	6 / 8			
	reaction time	0.157													3.06	3.06	3.14
	interval velocity		1.04	1.02	1.00	1.02	1.02	1.02	1.02	1.02	1.10	1.21			8.33	8.33	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=43rQaTwy41M>

2018 Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis)

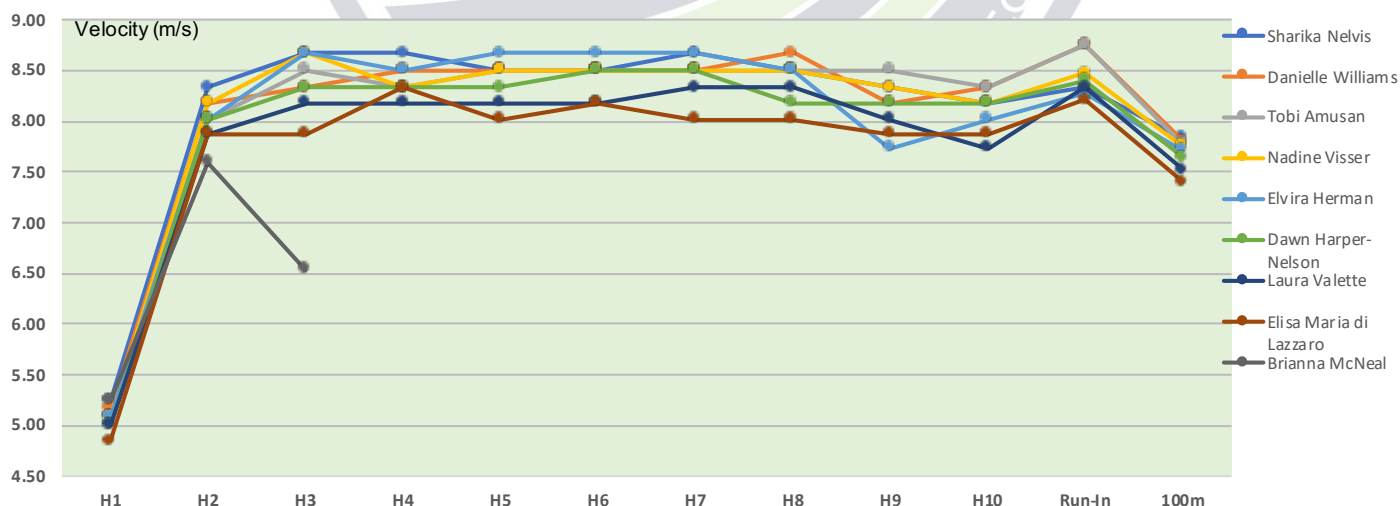
100m Hurdles

Date: 2018.06.31

Wind: 0.0 m/s

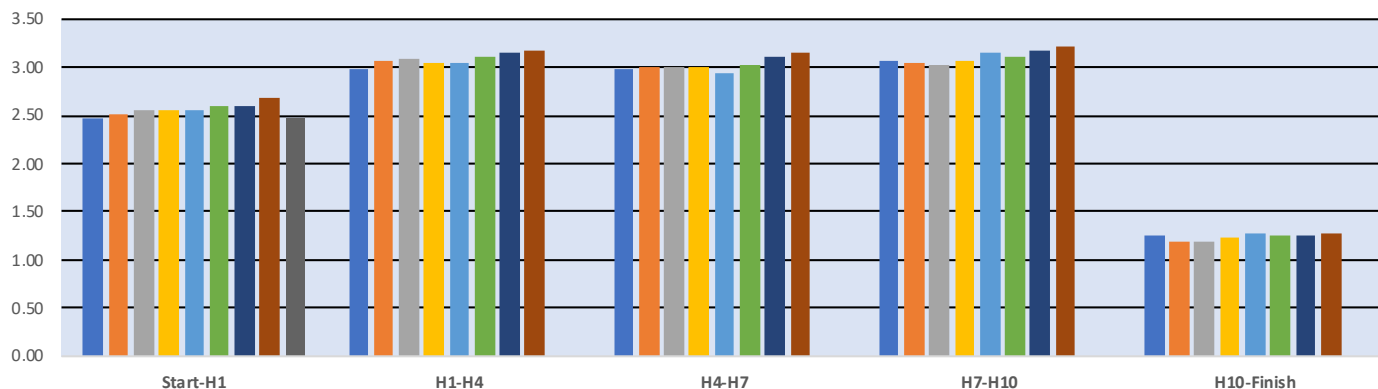
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Nelvis, Sharika (USA) (1990)	time	2.48	3.50	4.48	5.46	6.46	7.46	8.44	9.44	10.46	11.50		12.76	6 / 1			
	reaction time	0.138													2.98	2.98	3.06
	interval velocity		1.02	0.98	0.98	1.00	1.00	0.98	1.00	1.02	1.04	1.26			8.56	8.56	8.33
Williams, Danielle (JAM) (1992)	time	2.52	3.56	4.58	5.58	6.58	7.58	8.58	9.56	10.60	11.62		12.82	4 / 2			
	reaction time	0.125													3.06	3.00	3.04
	interval velocity		1.04	1.02	1.00	1.00	1.00	1.00	0.98	1.04	1.02	1.20			8.33	8.50	8.39
Amusan, Tobi (NGR) (1997)	time	2.56	3.62	4.62	5.64	6.64	7.64	8.64	9.64	10.64	11.66		12.86	3 / 3			
	reaction time	0.158													3.08	3.00	3.02
	interval velocity		1.06	1.00	1.02	1.00	1.00	1.00	1.00	1.00	1.02	1.20			8.28	8.50	8.44
Visser, Nadine (NED) (1995)	time	2.56	3.60	4.58	5.60	6.60	7.60	8.60	9.60	10.62	11.66		12.90	8 / 4			
	reaction time	0.156													3.04	3.00	3.06
	interval velocity		1.04	0.98	1.02	1.00	1.00	1.00	1.00	1.02	1.04	1.24			8.39	8.50	8.33
Herman, Elvira (BLR) (1997)	time	2.56	3.62	4.60	5.60	6.58	7.56	8.54	9.54	10.64	11.70		12.97	2 / 5			
	reaction time	0.155													3.04	2.94	3.16
	interval velocity		1.06	0.98	1.00	0.98	0.98	0.98	1.00	1.10	1.06	1.27			8.39	8.67	8.07
Harper-Nelson, Dawn (USA) (1984)	time	2.60	3.66	4.68	5.70	6.72	7.72	8.72	9.76	10.80	11.84		13.09	7 / 6			
	reaction time	0.177													3.10	3.02	3.12
	interval velocity		1.06	1.02	1.02	1.02	1.00	1.00	1.04	1.04	1.04	1.25			8.23	8.44	8.17
Valette, Laura (FRA) (1997)	time	2.60	3.68	4.72	5.76	6.80	7.84	8.86	9.88	10.94	12.04		13.30	9 / 7			
	reaction time	0.138													3.16	3.10	3.18
	interval velocity		1.08	1.04	1.04	1.04	1.04	1.02	1.02	1.06	1.10	1.26			8.07	8.23	8.02
di Lazzaro, Elisa Maria (ITA) (1998)	time	2.68	3.76	4.84	5.86	6.92	7.96	9.02	10.08	11.16	12.24		13.52	1 / 8			
	reaction time	0.168													3.18	3.16	3.22
	interval velocity		1.08	1.08	1.02	1.06	1.04	1.06	1.06	1.08	1.08	1.28			8.02	8.07	7.92
McNeal, Brianna (USA) (1991)	time	2.48	3.60	4.90									15.80	5 / 9			
	reaction time	0.155															
	interval velocity		1.12	1.30													
	velocity		5.24	7.59	6.54												



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=0Cw8blwvrvw>

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

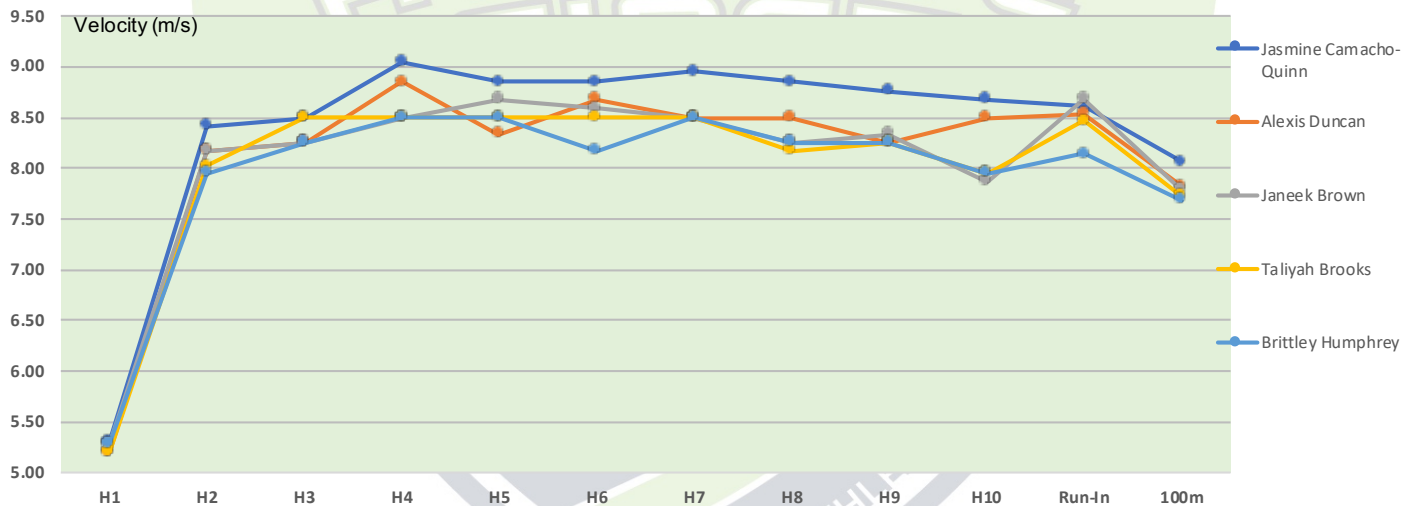
100m Hurdles

Date: 2018.05.13

Wind: 1.2 m/s

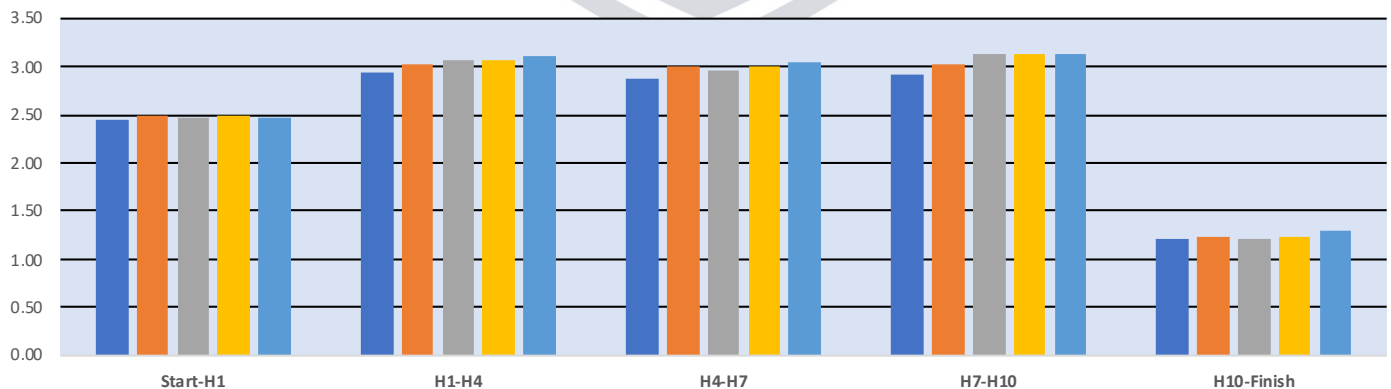
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Camacho-Quinn, Jasmine (PUR) (199)	time	2.45	3.46	4.46	5.40	6.36	7.32	8.27	9.23	10.20	11.18		12.40	5 / 1			
	reaction time												AR PB		2.95	2.87	2.91
	interval velocity		1.01	1.00	0.94	0.96	0.96	0.95	0.96	0.97	0.98	1.22	8.06		8.64	8.89	8.76
Duncan, Alexis (USA) (1998)	time	2.50	3.54	4.57	5.53	6.55	7.53	8.53	9.53	10.56	11.56		12.79	4 / 2			
	reaction time												PB		3.03	3.00	3.03
	interval velocity		1.04	1.03	0.96	1.02	0.98	1.00	1.00	1.03	1.00	1.23	7.82		8.42	8.50	8.42
Brown, Janeek (JAM) (1998)	time	2.46	3.50	4.53	5.53	6.51	7.50	8.50	9.53	10.55	11.63		12.84	6 / 3			
	reaction time												PB		3.07	2.97	3.13
	interval velocity		1.04	1.03	1.00	0.98	0.99	1.00	1.03	1.02	1.08	1.21	7.79		8.31	8.59	8.15
Brooks, Taliyah (USA) (1995)	time	2.50	3.56	4.56	5.56	6.56	7.56	8.56	9.60	10.63	11.70		12.94	7 / 4			
	reaction time												PB		3.06	3.00	3.14
	interval velocity		1.06	1.00	1.00	1.00	1.00	1.00	1.04	1.03	1.07	1.24	7.73		8.33	8.50	8.12
Humphrey, Brittley (USA) (1998)	time	2.46	3.53	4.56	5.56	6.56	7.60	8.60	9.63	10.66	11.73		13.02	1 / 5			
	reaction time												PB		3.10	3.04	3.13
	interval velocity		1.07	1.03	1.00	1.00	1.04	1.00	1.03	1.03	1.07	1.29	7.68		8.23	8.39	8.15



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=fm4vp0xRpDE>

2018 Shanghai Diamond League (Shanghai, CHN) (TV Analysis)

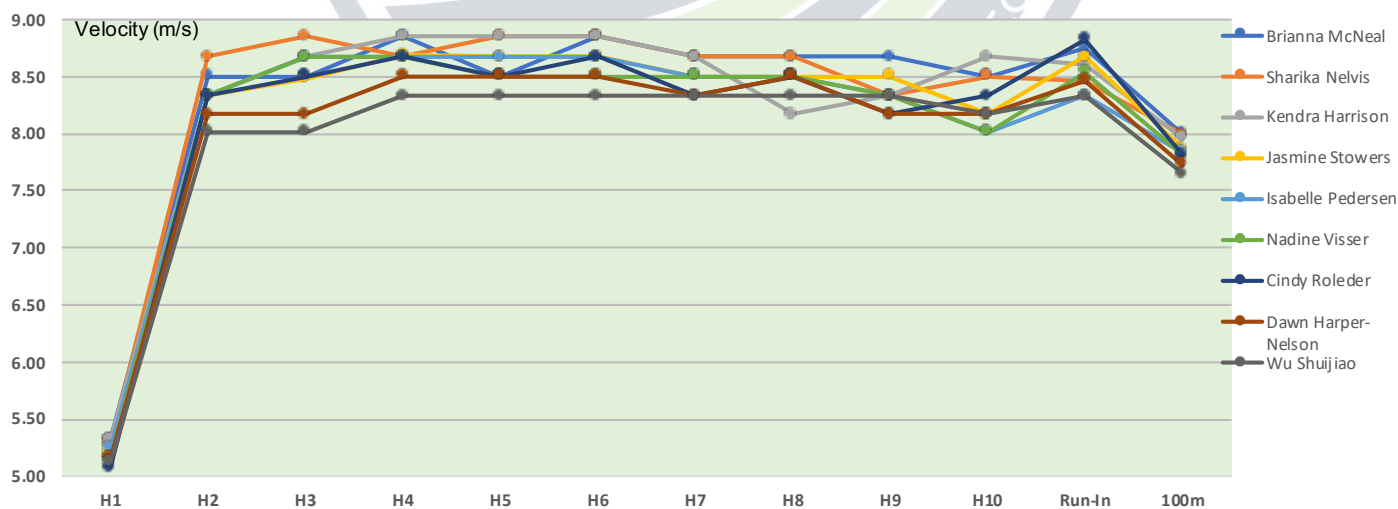
100m Hurdles

Date: 2018.05.12

Wind: 0.9 m/s

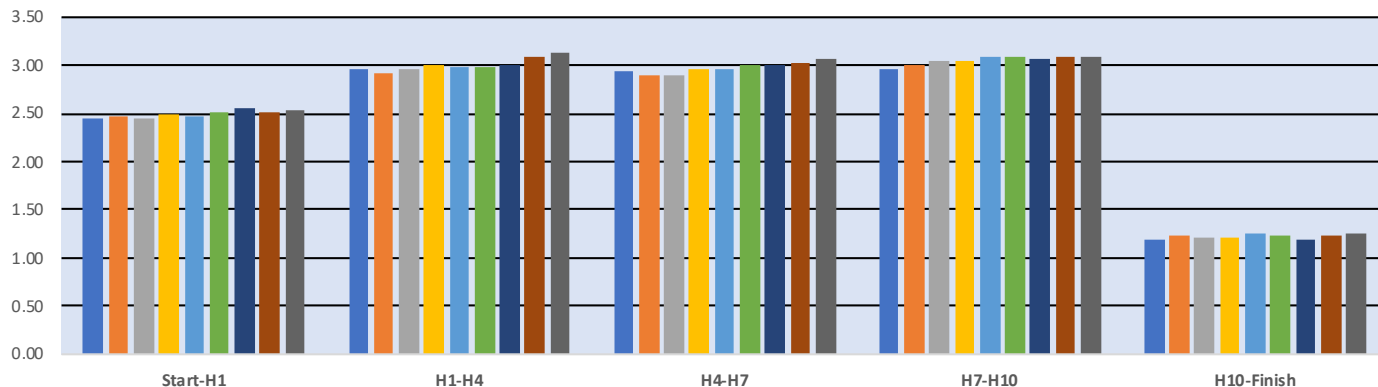
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
McNeal, Brianna (USA) (1991)	time		2.44	3.44	4.44	5.40	6.40	7.36	8.34	9.32	10.30	11.30		12.50	4 / 1			
	reaction time	0.156											1.20			2.96	2.94	2.96
	interval velocity		5.33	8.50	8.50	8.85	8.50	8.85	8.67	8.67	8.67	8.50	8.75	8.00		8.61	8.67	8.61
Nelvis, Sharika (USA) (1990)	time		2.46	3.44	4.40	5.38	6.34	7.30	8.28	9.26	10.28	11.28		12.52	6 / 2			
	reaction time	0.145											1.24			2.92	2.90	3.00
	interval velocity		5.28	8.67	8.85	8.67	8.85	8.85	8.67	8.67	8.33	8.50	8.47	7.99		8.73	8.79	8.50
Harrison, Kendra (USA) (1992)	time		2.44	3.46	4.44	5.40	6.36	7.32	8.30	9.34	10.36	11.34		12.56	5 / 3			
	reaction time	0.152											1.22			2.96	2.90	3.04
	interval velocity		5.33	8.33	8.67	8.85	8.85	8.85	8.67	8.17	8.33	8.67	8.61	7.96		8.61	8.79	8.39
Stowers, Jasmine (USA) (1991)	time		2.50	3.52	4.52	5.50	6.48	7.46	8.46	9.46	10.46	11.50		12.71	7 / 4			
	reaction time	0.150											1.21			3.00	2.96	3.04
	interval velocity		5.20	8.33	8.48	8.69	8.67	8.67	8.50	8.50	8.50	8.17	8.68	7.87		8.50	8.61	8.39
Pedersen, Isabelle (NOR) (1992)	time		2.48	3.50	4.48	5.46	6.44	7.42	8.42	9.42	10.44	11.50		12.76	2 / 5			
	reaction time	0.173											1.26			2.98	2.96	3.08
	interval velocity		5.24	8.33	8.67	8.67	8.67	8.67	8.50	8.50	8.33	8.02	8.33	7.84		8.56	8.61	8.28
Visser, Nadine (NED) (1995)	time		2.52	3.54	4.52	5.50	6.50	7.50	8.50	9.50	10.52	11.58		12.81	3 / 6			
	reaction time	0.137											1.23			2.98	3.00	3.08
	interval velocity		5.16	8.33	8.67	8.67	8.50	8.50	8.50	8.50	8.33	8.02	8.54	7.81		8.56	8.50	8.28
Roleder, Cindy (GER) (1989)	time		2.56	3.58	4.58	5.56	6.56	7.54	8.56	9.56	10.60	11.62		12.81	1 / 7			
	reaction time	0.130											1.19			3.00	3.00	3.06
	interval velocity		5.08	8.33	8.50	8.67	8.50	8.67	8.33	8.50	8.17	8.33	8.82	7.81		8.50	8.50	8.33
Harper-Nelson, Dawn (USA) (1984)	time		2.52	3.56	4.60	5.60	6.60	7.60	8.62	9.62	10.66	11.70		12.94	8 / 8			
	reaction time	0.140											1.24			3.08	3.02	3.08
	interval velocity		5.16	8.17	8.17	8.50	8.50	8.50	8.33	8.50	8.17	8.17	8.47	7.73		8.28	8.44	8.28
Wu Shujiao (CHN) (1991)	time		2.54	3.60	4.66	5.68	6.70	7.72	8.74	9.76	10.78	11.82		13.08	9 / 9			
	reaction time	0.156											1.26			3.14	3.06	3.08
	interval velocity		5.12	8.02	8.02	8.33	8.33	8.33	8.33	8.33	8.33	8.17	8.33	7.65		8.12	8.33	8.28



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=NI7jmplkLQE>

2018 Doha Diamond League (Doha, QAT) (TV Analysis)

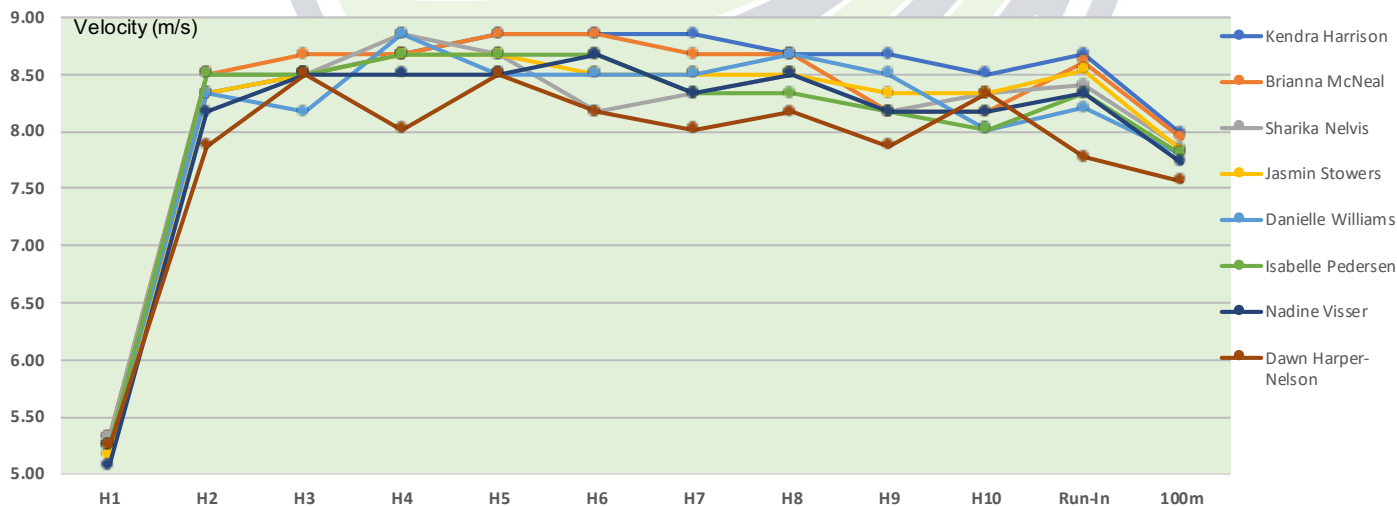
100m Hurdles

Date: 2018.05.04

Wind: 0.5 m/s

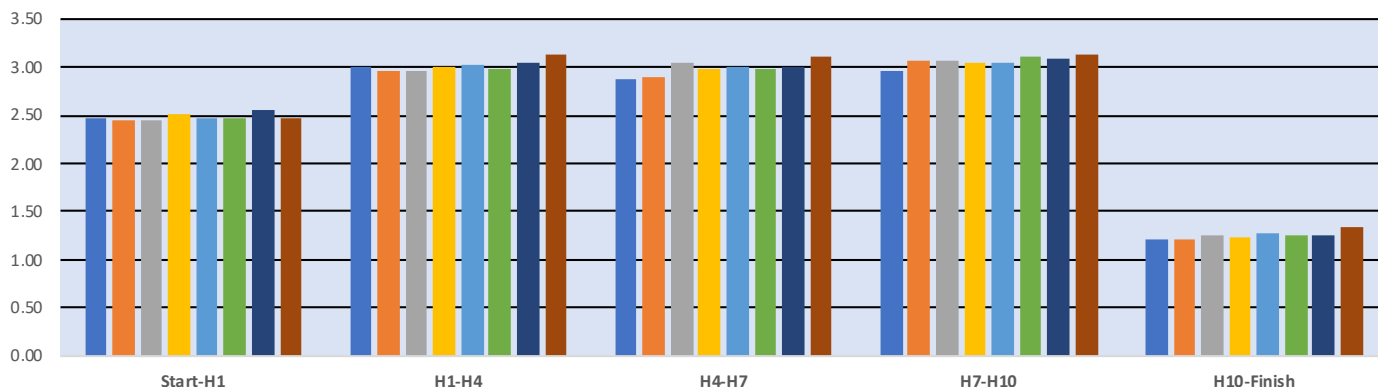
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	100m	Lane/Place	H1-H4	H4-H7	H7-H10
Harrison, Kendra (USA) (1992)	time	2.48	3.50	4.50	5.48	6.44	7.40	8.36	9.34	10.32	11.32		12.53	5 / 1			
	reaction time	0.154													3.00	2.88	2.96
	interval velocity		1.02	1.00	0.98	0.96	0.96	0.96	0.98	0.98	1.00	1.21			8.50	8.85	8.61
McNeal, Brianna (USA) (1991)	time	2.44	3.44	4.42	5.40	6.36	7.32	8.30	9.28	10.32	11.36		12.58	4 / 2			
	reaction time	0.155													2.96	2.90	3.06
	interval velocity		1.00	0.98	0.98	0.96	0.96	0.98	0.98	1.04	1.04	1.22			8.61	8.79	8.33
Nelvis, Sharika (USA) (1990)	time	2.44	3.44	4.44	5.40	6.38	7.42	8.44	9.44	10.48	11.50		12.75	3 / 3			
	reaction time	0.153													2.96	3.04	3.06
	interval velocity		1.00	1.00	0.96	0.98	1.04	1.02	1.00	1.04	1.02	1.25			8.61	8.39	8.33
Stowers, Jasmin (USA) (1991)	time	2.52	3.54	4.54	5.52	6.50	7.50	8.50	9.50	10.52	11.54		12.77	2 / 4			
	reaction time	0.137													3.00	2.98	3.04
	interval velocity		1.02	1.00	0.98	0.98	1.00	1.00	1.00	1.02	1.02	1.23			8.50	8.56	8.39
Williams, Danielle (JAM) (1992)	time	2.48	3.50	4.54	5.50	6.50	7.50	8.50	9.48	10.48	11.54		12.82	7 / 5			
	reaction time	0.124													3.02	3.00	3.04
	interval velocity		1.02	1.04	0.96	1.00	1.00	1.00	0.98	1.00	1.06	1.28			8.44	8.50	8.39
Pedersen, Isabelle (NOR) (1992)	time	2.48	3.48	4.48	5.46	6.44	7.42	8.44	9.46	10.50	11.56		12.82	1 / 6			
	reaction time	0.181													2.98	2.98	3.12
	interval velocity		1.00	1.00	0.98	0.98	0.98	1.02	1.02	1.04	1.06	1.26			8.56	8.56	8.17
Visser, Nadine (NED) (1995)	time	2.56	3.60	4.60	5.60	6.60	7.58	8.60	9.60	10.64	11.68		12.94	8 / 7			
	reaction time	0.160													3.04	3.00	3.08
	interval velocity		1.04	1.00	1.00	1.00	0.98	1.02	1.00	1.04	1.04	1.26			8.39	8.50	8.28
Harper-Nelson, Dawn (USA) (1984)	time	2.48	3.56	4.56	5.62	6.62	7.66	8.72	9.76	10.84	11.86		13.21	6 / 8			
	reaction time	0.152													3.14	3.10	3.14
	interval velocity		1.08	1.00	1.06	1.00	1.04	1.06	1.04	1.08	1.02	1.35			8.12	8.23	8.12
	velocity	5.24	7.87	8.50	8.02	8.50	8.17	8.02	8.17	7.87	8.33	7.78	7.57				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

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

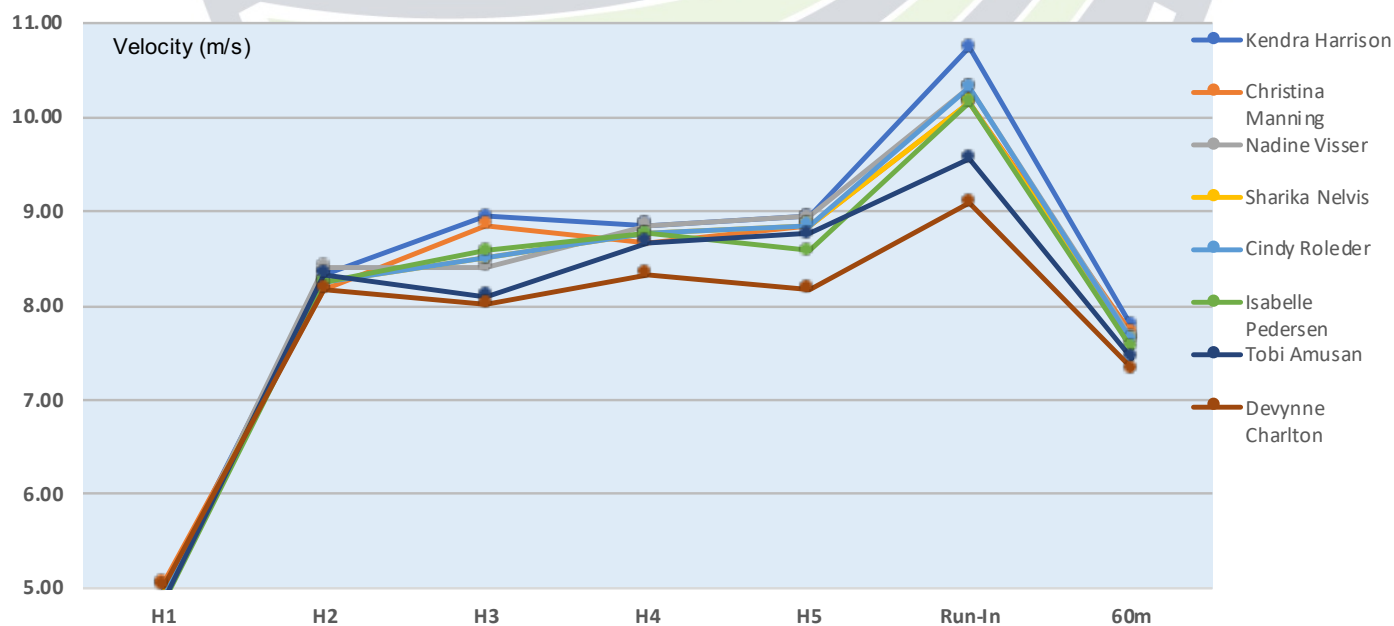
2018 IAAF World Indoor Championships (Birmingham, GBR)

60m Hurdles

Date: 2018.03.03

FINAL

			H1	H2	H3	H4	H5	Run-In	60m	Lane / Place
Harrison, Kendra (USA) (1992)	time		2.61	3.63	4.58	5.54	6.49		7.70	5 / 1
	reaction time	0.168						1.21	CR / AR	
	interval velocity		4.98	8.33	8.95	8.85	8.95	10.74	7.79	
Manning, Christina (USA) (1990)	time		2.57	3.61	4.57	5.55	6.51		7.79	6 / 2
	reaction time	0.137						1.28		
	interval velocity		5.06	8.17	8.85	8.67	8.85	10.16	7.70	
Visser, Nadine (NED) (1995)	time		2.65	3.66	4.67	5.63	6.58		7.84	4 / 3
	reaction time	0.153						1.26		
	interval velocity		4.91	8.42	8.42	8.85	8.95	10.32	7.65	
Nelvis, Sharika (USA) (1990)	time		2.62	3.65	4.65	5.62	6.58		7.86	3 / 4
	reaction time	0.163						1.28		
	interval velocity		4.96	8.25	8.50	8.76	8.85	10.16	7.63	
Roleder, Cindy (GER) (1989)	time		2.65	3.68	4.68	5.65	6.61		7.87	7 / 5
	reaction time	0.141						1.26		
	interval velocity		4.91	8.25	8.50	8.76	8.85	10.32	7.62	
Pedersen, Isabelle (NOR) (1992)	time		2.68	3.71	4.70	5.67	6.66		7.94	2 / 6
	reaction time	0.168						1.28		
	interval velocity		4.85	8.25	8.59	8.76	8.59	10.16	7.56	
Amusan, Tobi (NGR) (1997)	time		2.67	3.69	4.74	5.72	6.69		8.05	1 / 7
	reaction time	0.149						1.36		
	interval velocity		4.87	8.33	8.10	8.67	8.76	9.56	7.45	
Charlton, Devynne (BAH) (1995)	time		2.59	3.63	4.69	5.71	6.75		8.18	8 / 8
	reaction time	0.158						1.43		
	interval velocity		5.02	8.17	8.02	8.33	8.17	9.09	7.33	



Source: Walker, J., Pollitt, L., Paradisis, G.P., Besodis, I., Bissas, A. and Merlino, S. (2019). Biomechanical Report for the IAAF World Indoor Championships 2018: 60 Metres Hurdles Women. Birmingham, UK: International Association of Athletics Federations. p. 32.

<https://www.worldathletics.org/about-iaaf/documents/research-centre>

Men's 400m Hurdles

2018 Top 10 Times - Men's 400m Hurdles

Samba, Abderrahmane (QAT) (1995)														H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 Meeting de Paris (Paris, FRA) (TV Analysis)														Henson (2020) - Athlete First: 2018 year end hurdle report												5 / 1				
date 30-Jun time														5.88	9.48	13.12	16.84	20.60	24.52	28.68	32.88	37.36	41.84							
reaction time 0.209 interval														3.60	3.64	3.72	3.76	3.92	4.16	4.20	4.48	4.48	5.14	AR PB		10.96	11.84	13.16		
														velocity	7.65	9.72	9.62	9.41	9.31	8.93	8.41	8.33	7.81	7.81	7.78	8.51		9.58	8.87	7.98
H1 lead leg R														strides	21	13	13	13	13	13	13	14	14	14	17.2	158.2				
Benjamin, Rai (ANT) (1997)														H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 NCAA Championships (Eugene, OR) (TV Analysis)														Henson (2020) - Athlete First: 2018 year end hurdle report												5 / 1				
date 8-Jun time														5.83	9.56	13.33	17.06	21.00	25.00	29.03	33.23	37.46	41.90							
reaction time interval														3.73	3.77	3.73	3.94	4.00	4.03	4.20	4.23	4.44	5.12	AR PB		11.23	11.97	12.87		
														velocity	7.72	9.38	9.28	9.38	8.88	8.75	8.68	8.33	8.27	7.88	7.81	8.51		9.35	8.77	8.16
H1 lead leg R														strides	20	13	13	13	13	13	13	13	13	13	16.2	153.2				
Samba, Abderrahmane (QAT) (1995)														H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 IAAF Continental Cup (Ostrava, CZE)														Henson (2021) - Athlete First: 2018 year end hurdle report												3 / 1				
date 8-Sep time														5.84	9.52	13.28	17.04	20.96	24.96	29.16	33.48	37.96	42.32							
reaction time 0.219 interval														3.68	3.76	3.76	3.92	4.00	4.20	4.32	4.48	4.36	5.05			11.20	12.12	13.16		
														velocity	7.71	9.51	9.31	9.31	8.93	8.75	8.33	8.10	7.81	8.03	7.92	8.44		9.38	8.66	7.98
H1 lead leg R														strides	21	13	13	13	13	13	13	14	14	14	17.5	158.5				
Samba, Abderrahmane (QAT) (1995)														H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 Bauhaus Athletics (Stockholm, SWE) (TV Analysis)														Henson (2020) - Athlete First: 2018 year end hurdle report												5 / 1				
date 10-Jun time														5.88	9.60	13.40	17.24	21.20	25.28	29.40	33.76	37.96	42.28							
reaction time 0.194 interval														3.72	3.80	3.84	3.96	4.08	4.12	4.36	4.20	4.32	5.13	AR PB		11.36	12.16	12.88		
														velocity	7.65	9.41	9.21	9.11	8.84	8.58	8.50	8.03	8.33	8.10	7.80	8.44		9.24	8.63	8.15
H1 lead leg R														strides	21	13	13	13	13	13	13	14	14	14	17.5	158.5				
Samba, Abderrahmane (QAT) (1995)														H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 Athletissima (Lausanne, SUI) (TV Analysis)														Henson (2020) - Athlete First: 2018 year end hurdle report												5 / 1				
date 5-Jul time														5.76	9.40	13.12	16.84	20.72	24.80	28.92	33.24	37.72	42.24							
reaction time 0.183 interval														3.64	3.72	3.72	3.88	4.08	4.12	4.32	4.48	4.52	5.18			11.08	12.08	13.32		
														velocity	7.81	9.62	9.41	9.41	9.02	8.58	8.50	8.10	7.81	7.74	7.72	8.44		9.48	8.69	7.88
H1 lead leg R														strides	21	13	13	13	13	13	13	13	14	14	17.2	157.2				
Samba, Abderrahmane (QAT) (1995)														H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis)														Henson (2020) - Athlete First: 2018 year end hurdle report												4 / 1				
date 31-May time														5.76	9.44	13.20	17.04	20.92	25.04	29.24	33.56	37.96	42.36							
reaction time 0.158 interval														3.68	3.76	3.84	3.88	4.12	4.20	4.32	4.40	4.40	5.12	AR PB		11.28	12.20	13.12		
														velocity	7.81	9.51	9.31	9.11	9.02	8.50	8.33	8.10	7.95	7.95	7.81	8.42		9.31	8.61	8.00
H1 lead leg R														strides	21	13	13	13	13	13	13	13	14	14	17	157				
McMaster, Kyron (IVB) (1997)														H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 Meeting de Paris (Paris, FRA) (TV Analysis)														Henson (2020) - Athlete First: 2018 year end hurdle report												6 / 2				
date 30-Jun time														5.64	9.24	12.88	16.64	20.48	24.48	28.64	32.96	37.44	42.04							
reaction time 0.183 interval														3.60	3.64	3.76	3.84	4.00	4.16	4.32	4.48	4.60	5.50	NR PB		11.00	12.00	13.40		
														velocity	7.98	9.72	9.62	9.31	9.11	8.75	8.41	8.10	7.81	7.61	7.27	8.41		9.55	8.75	7.84
H1 lead leg R														strides	20	12	13	13	13	13	13	14	14	14	17	156				
Samba, Abderrahmane (QAT) (1995)														H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 Doha Diamond League (Doha, QAT) (TV Analysis)														Henson (2020) - Athlete First: 2018 year end hurdle report												4 / 1				
date 4-May time														5.80	9.44	13.16	16.96	20.92	24.96	29.16	33.48	37.88	42.36							
reaction time 0.192 interval														3.64	3.72	3.80	3.96	4.04	4.20	4.32	4.40	4.48	5.21	NR PB		11.16	12.20	13.20		
														velocity	7.76	9.62	9.41	9.21	8.84	8.66	8.33	8.10	7.95	7.81	7.68	8.41		9.41	8.61	7.95
H1 lead leg R														strides	20	13	13	13	13	13	13	13	14	14	17.5	142.5				
Samba, Abderrahmane (QAT) (1995)														H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 Bislett Games (Oslo, NOR) (TV Analysis)														Henson (2020) - Athlete First: 2018 year end hurdle report												5 / 1				
date 7-Jun time														5.76	9.36	13.08	16.92	20.88	25.04	29.28	33.72	38.00	42.40							
reaction time 0.189 interval														3.60	3.72	3.84	3.96	4.16	4.24	4.44	4.28	4.40	5.20			11.16	12.36	13.12		
														velocity	7.81	9.72	9.41	9.11	8.84	8.41	8.25	7.88	8.18	7.95	7.69	8.40		9.41	8.50	8.00
H1 lead leg R														strides	21	13	13	13	13	13	14	14	14	14	17.2	159.2				
McMaster, Kyron (IVB) (1997)														H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10	
FINAL - 2018 Central American and Caribbean Games (Barranquilla, COL)														Henson (2020) - Athlete First: 2018 year end hurdle report												/ 1				
date 31-Jul time																														
reaction time 0.169 interval														No Information Available																
														velocity																
H1 lead leg														strides																

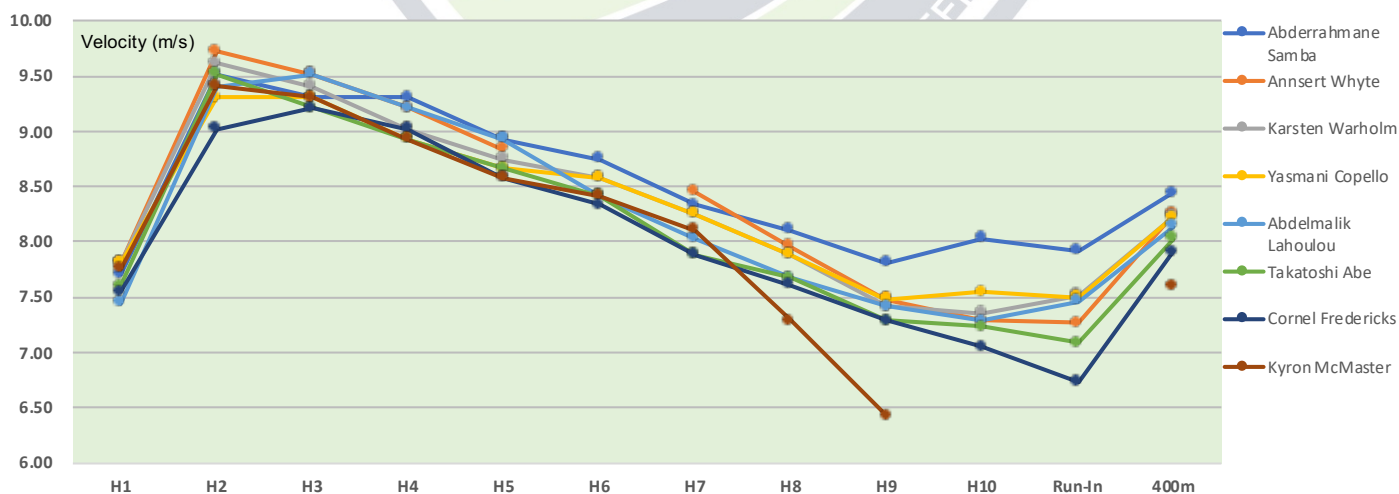
2018 IAAF Continental Cup (Ostrava, CZE) (TV Analysis)

Men's 400m Hurdles

Date 2018.09.08

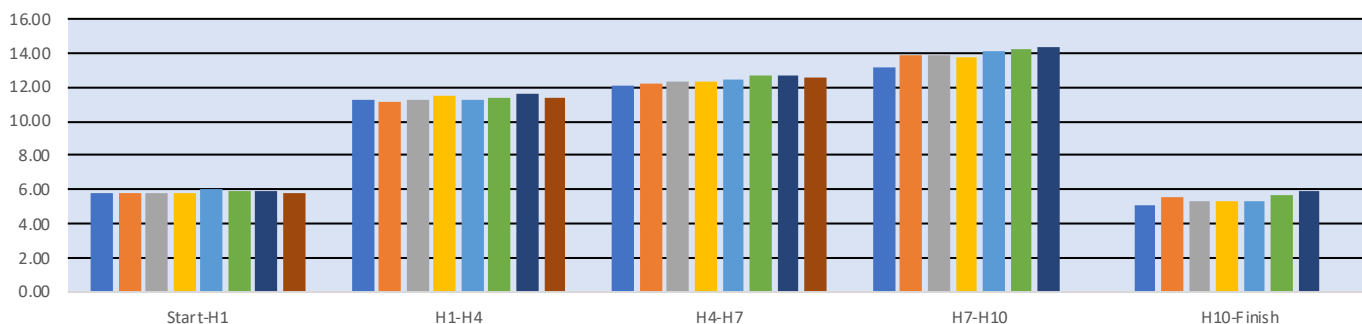
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Samba, Abderrahmane (QAT) (1995)	time		5.84	9.52	13.28	17.04	20.96	24.96	29.16	33.48	37.96	42.32		47.37	3 / 1			
	reaction time	0.219																
	interval velocity		7.71	3.68	3.76	3.76	3.92	4.00	4.20	4.32	4.48	4.36	5.05			11.20	12.12	13.16
	H1 lead leg	R														9.38	8.66	7.98
	strides		21	13	13	13	13	13	13	14	14	14	17.5	158.5				
Whyte, Annsert (JAM) (1987)	time		5.76	9.36	13.04	16.84	20.80		29.08	33.48	38.16	42.96		48.46	1 / 2			
	reaction time	0.168																
	interval velocity		7.81	3.60	3.68	3.80	3.96		8.28	4.40	4.68	4.80	5.50			11.08	12.24	13.88
	H1 lead leg	L														9.48	8.58	7.56
	strides			13	13	13	13		14	14	15	15	18.5	128.5				
Warholm, Karsten (NOR) (1996)	time		5.76	9.40	13.12	17.00	21.00	25.08	29.32	33.76	38.48	43.24		48.56	4 / 3			
	reaction time	0.175																
	interval velocity		7.81	3.64	3.72	3.88	4.00	4.08	4.24	4.44	4.72	4.76	5.32			11.24	12.32	13.92
	H1 lead leg	L														9.34	8.52	7.54
	strides		20	13	13	13	13	13	13	13	15	15	18	159				
Copello, Yasmani (TUR) (1987)	time		5.76	9.52	13.28	17.20	21.24	25.32	29.56	34.00	38.68	43.32		48.65	8 / 4			
	reaction time	0.184																
	interval velocity		7.81	3.76	3.76	3.92	4.04	4.08	4.24	4.44	4.68	4.64	5.33			11.44	12.36	13.76
	H1 lead leg	R														9.18	8.50	7.63
	strides		20	13	13	13	13	13	13	13	14	14	17.5	143.5				
Lahoulou, Abdelmalik (ALG) (1992)	time		6.04	9.76	13.44	17.24	21.16	25.32	29.68	34.24	38.96	43.76		49.12	6 / 5			
	reaction time	0.179																
	interval velocity		7.45	3.72	3.68	3.80	3.92	4.16	4.36	4.56	4.72	4.80	5.36			11.20	12.44	14.08
	H1 lead leg	L														9.38	8.44	7.46
	strides		23	13	13	13	13	13	14	15	15	15	17.2	151.2				
Abe, Takatoshi (JPN) (1991)	time		5.92	9.60	13.40	17.32	21.36	25.52	29.96	34.52	39.32	44.16		49.80	7 / 6			
	reaction time	0.192																
	interval velocity		7.60	3.68	3.80	3.92	4.04	4.16	4.44	4.56	4.80	4.84	5.64			11.40	12.64	14.20
	H1 lead leg	R														9.21	8.31	7.39
	strides		20	13	13	13	13	13	14	14	15	15	17.5	147.5				
Fredericks, Cornel (RSA) (1990)	time		5.96	9.84	13.64	17.52	21.60	25.80	30.24	34.84	39.64	44.60		50.54	2 / 7			
	reaction time	0.139																
	interval velocity		7.55	3.88	3.80	3.88	4.08	4.20	4.44	4.60	4.80	4.96	5.94			11.56	12.72	14.36
	H1 lead leg	R														9.08	8.25	7.31
	strides		22	14	14	14	14	14	15	15	15	15	19.2	157.2				
McMaster, Kyron (IVB) (1997)	time		5.80	9.52	13.28	17.20	21.28	25.44	29.76	34.56	40.00			52.62	5 / 8			
	reaction time	0.166																
	interval velocity		7.76	3.72	3.76	3.92	4.08	4.16	4.32	4.80	5.44					11.40	12.56	
	H1 lead leg	R														9.21	8.36	
	strides		20	13	12	13	13	13	13	14	15	15		141				



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=1d082uID6260>

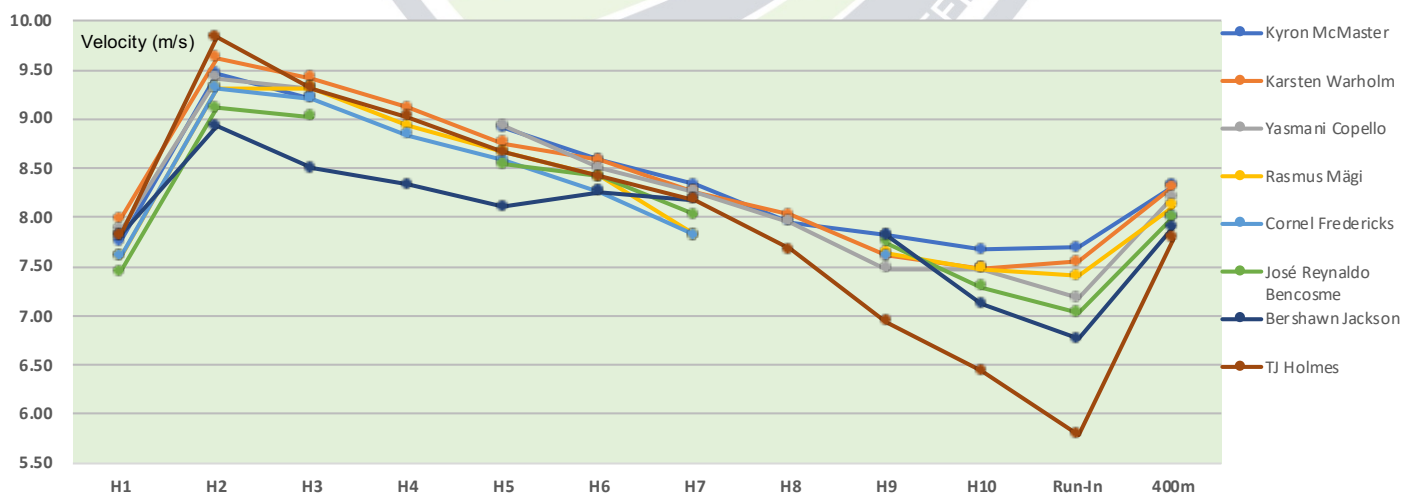
2018 Weltklasse (Zürich, SUI) (TV Analysis)

Men's 400m Hurdles

Date 2018.08.30

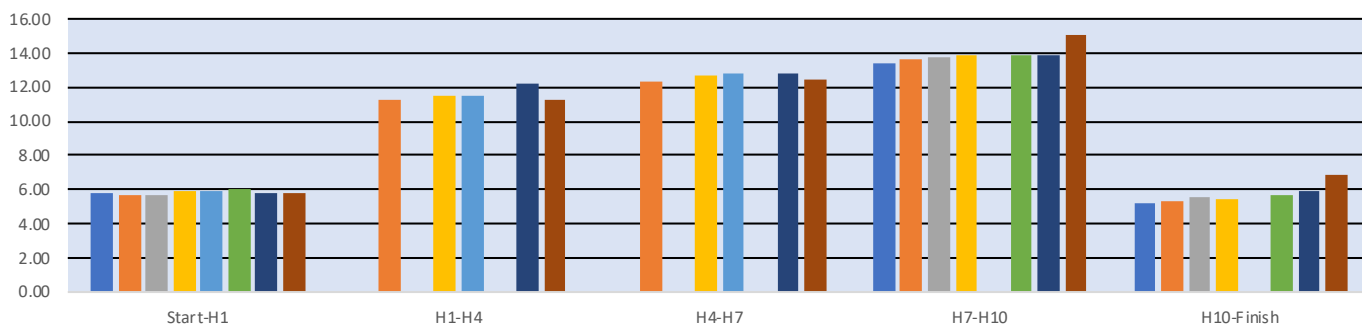
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McMaster, Kyron (IVB) (1997)	time		5.80	9.50	13.30		21.16	25.24	29.44	33.84	38.32	42.88		48.08	3 / 1			
	reaction time	0.178																13.44
	interval			3.70	3.80		7.86	4.08	4.20	4.40	4.48	4.56	5.20					7.81
	velocity		7.76	9.46	9.21		8.91	8.58	8.33	7.95	7.81	7.68	7.69	8.32				
Warholm, Karsten (NOR) (1996)	time		5.64	9.28	13.00	16.84	20.84	24.92	29.16	33.52	38.12	42.80		48.10	5 / 2			
	reaction time	0.135														11.20	12.32	13.64
	interval			3.64	3.72	3.84	4.00	4.08	4.24	4.36	4.60	4.68	5.30			9.38	8.52	7.70
	velocity		7.98	9.62	9.41	9.11	8.75	8.58	8.25	8.03	7.61	7.48	7.55	8.32				
Copello, Yasmani (TUR) (1987)	time		5.72	9.44	13.20		21.04	25.16	29.40	33.80	38.48	43.16		48.73	4 / 3			
	reaction time	0.158																13.76
	interval			3.72	3.76		7.84	4.12	4.24	4.40	4.68	4.68	5.57					7.63
	velocity		7.87	9.41	9.31		8.93	8.50	8.25	7.95	7.48	7.48	7.18	8.21				
Mägi, Rasmus (EST) (1992)	time		5.92	9.68	13.44	17.36	21.40	25.56	30.04		39.20	43.88		49.28	7 / 4			
	reaction time	0.176														11.44	12.68	13.84
	interval			3.76	3.76	3.92	4.04	4.16	4.48		9.16	4.68	5.40			9.18	8.28	7.59
	velocity		7.60	9.31	9.31	8.93	8.66	8.41	7.81		7.64	7.48	7.41	8.12				
Fredericks, Cornel (RSA) (1990)	time		5.92	9.68	13.48	17.44	21.52	25.76	30.24		39.44			49.96	8 / 5			
	reaction time	0.144														11.52	12.80	
	interval			3.76	3.80	3.96	4.08	4.24	4.48		9.20					9.11	8.20	
	velocity		7.60	9.31	9.21	8.84	8.58	8.25	7.81		7.61			8.01				
Bencosme, José Reynaldo (ITA) (1991)	time		6.04	9.88	13.76		21.96	26.12	30.48		39.52	44.32		50.01	1 / 6			
	reaction time	0.151																13.84
	interval			3.84	3.88		8.20	4.16	4.36		9.04	4.80	5.69					7.59
	velocity		7.45	9.11	9.02		8.54	8.41	8.03		7.74	7.29	7.03	8.00				
Jackson, Bershawn (USA) (1983)	time		5.76	9.68	13.80	18.00	22.32	26.56	30.84		39.80	44.72		50.63	2 / 7			
	reaction time	0.140														12.24	12.84	13.88
	interval			3.92	4.12	4.20	4.32	4.24	4.28		8.96	4.92	5.91			8.58	8.18	7.56
	velocity		7.81	8.93	8.50	8.33	8.10	8.25	8.18		7.81	7.11	6.77	7.90				
Holmes, TJ (USA) (1995)	time		5.76	9.32	13.08	16.96	21.00	25.16	29.44	34.00	39.04	44.48		51.39	6 / 8			
	reaction time	0.186														11.20	12.48	15.04
	interval			3.56	3.76	3.88	4.04	4.16	4.28	4.56	5.04	5.44	6.91			9.38	8.41	6.98
	velocity		7.81	9.83	9.31	9.02	8.66	8.41	8.18	7.68	6.94	6.43	5.79	7.78				
Holmes, TJ (USA) (1995)	time		5.76	9.32	13.08	16.96	21.00	25.16	29.44	34.00	39.04	44.48		51.39	6 / 8			
	reaction time	0.186														11.20	12.48	15.04
	interval			3.56	3.76	3.88	4.04	4.16	4.28	4.56	5.04	5.44	6.91			9.38	8.41	6.98
	velocity		7.81	9.83	9.31	9.02	8.66	8.41	8.18	7.68	6.94	6.43	5.79	7.78				



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=AlfvjgzXXK4>

2018 Müller Anniversary Games (London, GBR) (TV Analysis)

Men's 400m Hurdles

Date 2018.07.21

FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Warholm, Karsten (NOR) (1996)	time		5.72	9.36	13.12	17.00	20.92	24.92	29.04	33.28	37.68	42.32		47.65	7 / 1			
	reaction time	0.149																
	interval			3.64	3.76	3.88	3.92	4.00	4.12	4.24	4.40	4.64	5.33	NR PB		11.28	12.04	13.28
	velocity		7.87	9.62	9.31	9.02	8.93	8.75	8.50	8.25	7.95	7.54	7.50	8.39		9.31	8.72	7.91
Copello, Yasmani (TUR) (1987)	time		5.88	9.60			21.28	25.36	29.56	33.96	38.48	43.12		48.44	5 / 2			
	reaction time	0.151																
	interval			3.72			11.68	4.08	4.20	4.40	4.52	4.64	5.32					13.56
	velocity		7.65	9.41			8.99	8.58	8.33	7.95	7.74	7.54	7.52	8.26				7.74
Barr, Thomas (IRL) (1994)	time		6.04	9.84	13.76	17.76	21.80	25.96	30.40	34.80	39.28	43.80		48.99	8 / 3			
	reaction time	0.186																
	interval			3.80	3.92	4.00	4.04	4.16	4.44	4.40	4.48	4.52	5.19			11.72	12.64	13.40
	velocity		7.45	9.21	8.93	8.75	8.66	8.41	7.88	7.95	7.81	7.74	7.71	8.16		8.96	8.31	7.84
Kendziera, Dave (USA) (1994)	time		5.80	9.64			21.60	25.72	30.04	34.52	39.04	43.64		49.02	3 / 4			
	reaction time	0.167																
	interval			3.84			11.96	4.12	4.32	4.48	4.52	4.60	5.38					13.60
	velocity		7.76	9.11			8.78	8.50	8.10	7.81	7.74	7.61	7.43	8.16				7.72
Mägi, Rasmus (EST) (1992)	time		5.96	9.84	13.68	17.60	21.56	25.76	30.16	34.56	39.16	43.76		49.11	9 / 5			
	reaction time	0.158																
	interval			3.88	3.84	3.92	3.96	4.20	4.40	4.40	4.60	4.60	5.35			11.64	12.56	13.60
	velocity		7.55	9.02	9.11	8.93	8.84	8.33	7.95	7.95	7.61	7.61	7.48	8.14		9.02	8.36	7.72
Clement, Kerron (USA) (1985)	time		5.88	9.68			21.40	25.60	29.96	34.56	39.24	44.00		49.43	6 / 6			
	reaction time	0.205																
	interval			3.80			11.72	4.20	4.36	4.60	4.68	4.76	5.43					14.04
	velocity		7.65	9.21			8.96	8.33	8.03	7.61	7.48	7.35	7.37	8.09				7.48
Holmes, TJ (USA) (1995)	time		5.92	9.64			21.24	25.40	29.76	34.40	39.12	44.00		49.66	4 / 7			
	reaction time	0.211																
	interval			3.72			11.60	4.16	4.36	4.64	4.72	4.88	5.66					14.24
	velocity		7.60	9.41			9.05	8.41	8.03	7.54	7.42	7.17	7.07	8.05				7.37
Rodger, Sebastian (GBR) (1991)	time		6.08	10.00		18.16	22.36	26.56	31.00	35.56	40.20	45.08		50.84	1 / 8			
	reaction time	0.161																
	interval			3.92		8.16	4.20	4.20	4.44	4.56	4.64	4.88	5.76			12.08	12.84	14.08
	velocity		7.40	8.93		8.58	8.33	8.33	7.88	7.68	7.54	7.17	6.94	7.87		8.69	8.18	7.46
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			
	reaction time	0.180																
	interval			3.88														
	velocity		7.40	9.02														
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			
	reaction time	0.180																
	interval			3.88														
	velocity		7.40	9.02														
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			
	reaction time	0.180																
	interval			3.88														
	velocity		7.40	9.02														
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			
	reaction time	0.180																
	interval			3.88														
	velocity		7.40	9.02														
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			
	reaction time	0.180																
	interval			3.88														
	velocity		7.40	9.02														
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			
	reaction time	0.180																
	interval			3.88														
	velocity		7.40	9.02														
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			
	reaction time	0.180																
	interval			3.88														
	velocity		7.40	9.02														
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			
	reaction time	0.180																
	interval			3.88														
	velocity		7.40	9.02														
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			
	reaction time	0.180																
	interval			3.88														
	velocity		7.40	9.02														
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			
	reaction time	0.180																
	interval			3.88														
	velocity		7.40	9.02														
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			
	reaction time	0.180																
	interval			3.88														
	velocity		7.40	9.02														
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			
	reaction time	0.180																
	interval			3.88														
	velocity		7.40	9.02														
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			
	reaction time	0.180																
	interval			3.88														
	velocity		7.40	9.02														
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			
	reaction time	0.180																
	interval			3.88														
	velocity		7.40	9.02														
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			
	reaction time	0.180																
	interval			3.88														
	velocity		7.40	9.02														
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			
	reaction time	0.180																
	interval			3.88														
	velocity		7.40	9.02														
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			
	reaction time	0.180																
	interval			3.88														
	velocity		7.40	9.02														
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			
	reaction time	0.180																
	interval			3.88														
	velocity		7.40	9.02														
Green, Jack (GBR) (1991)	time		6.08	9.96										dnf	2 / --			

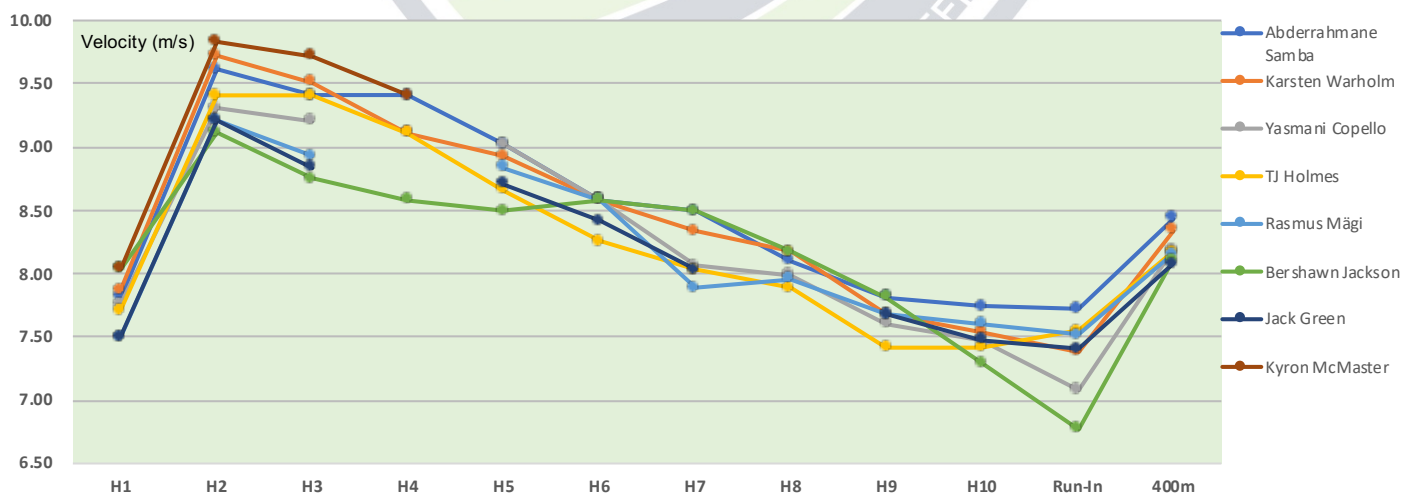
2018 Athletissima (Lausanne, SUI) (TV Analysis)

Men's 400m Hurdles

Date 2018.07.05

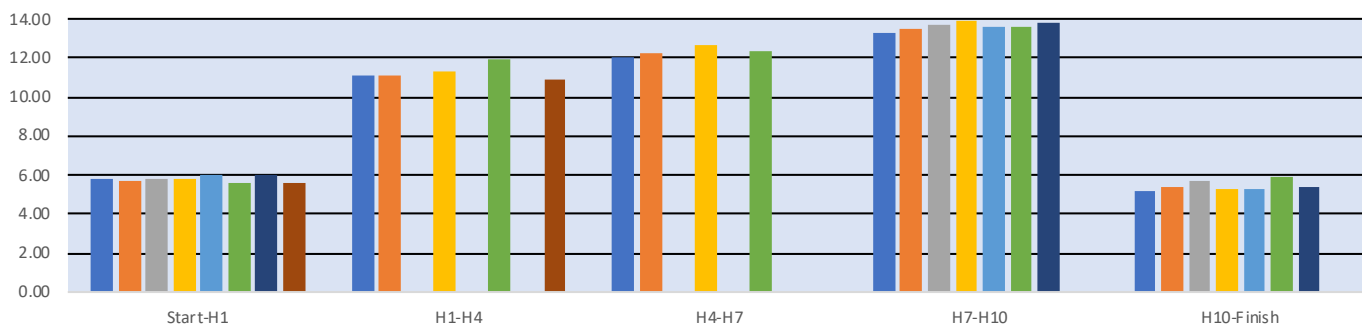
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Samba, Abderrahmane (QAT) (1995)	time		5.76	9.40	13.12	16.84	20.72	24.80	28.92	33.24	37.72	42.24		47.42	5 / 1			
	reaction time	0.183																
	interval			3.64	3.72	3.72	3.88	4.08	4.12	4.32	4.48	4.52	5.18			11.08	12.08	13.32
	velocity		7.81	9.62	9.41	9.41	9.02	8.58	8.50	8.10	7.81	7.74	7.72	8.44		9.48	8.69	7.88
	H1 lead leg	R																
	strides		21	13	13	13	13	13	13	13	14	14	17.2	157.2				
Warholm, Karsten (NOR) (1996)	time		5.72	9.32	13.00	16.84	20.76	24.84	29.04	33.32	37.88	42.52		47.94	6 / 2			
	reaction time	0.133																
	interval			3.60	3.68	3.84	3.92	4.08	4.20	4.28	4.56	4.64	5.42			11.12	12.20	13.48
	velocity		7.87	9.72	9.51	9.11	8.93	8.58	8.33	8.18	7.68	7.54	7.38	8.34		9.44	8.61	7.79
	H1 lead leg	L																
	strides		20	13	13	13	13	13	13	13	15	15	18	159				
Copello, Yasmani (TUR) (1987)	time		5.80	9.56	13.36		21.12	25.20	29.54	33.92	38.52	43.20		48.85	3 / 3			
	reaction time	0.183																
	interval			3.76	3.80		7.76	4.08	4.34	4.38	4.60	4.68	5.65					13.66
	velocity		7.76	9.31	9.21		9.02	8.58	8.06	7.99	7.61	7.48	7.08	8.19				7.69
	H1 lead leg	R																
	strides		20	13	13			13	14	14	14	14	18	133				
Holmes, TJ (USA) (1995)	time		5.84	9.56	13.28	17.12	21.16	25.40	29.76	34.20	38.92	43.64		48.94	7 / 4			
	reaction time	0.188																
	interval			3.72	3.72	3.84	4.04	4.24	4.36	4.44	4.72	4.72	5.30			11.28	12.64	13.88
	velocity		7.71	9.41	9.41	9.11	8.66	8.25	8.03	7.88	7.42	7.42	7.55	8.17		9.31	8.31	7.56
	H1 lead leg	L																
	strides		20	13	13	13	13	13	13	13	14	14	17	156				
Mägi, Rasmus (EST) (1992)	time		6.00	9.80	13.72		21.64	25.72	30.16	34.56	39.12	43.72		49.04	2 / 5			
	reaction time	0.159																
	interval			3.80	3.92		7.92	4.08	4.44	4.40	4.56	4.60	5.32					13.56
	velocity		7.50	9.21	8.93		8.84	8.58	7.88	7.95	7.68	7.61	7.52	8.16				7.74
	H1 lead leg	L																
	strides		21	13	13			13	14		14	14	17	119				
Jackson, Bershawn (USA) (1983)	time		5.60	9.44	13.44	17.52	21.64	25.72	29.84	34.12	38.60	43.40		49.31	8 / 6			
	reaction time	0.129																
	interval			3.84	4.00	4.08	4.12	4.08	4.12	4.28	4.48	4.80	5.91			11.92	12.32	13.56
	velocity		8.04	9.11	8.75	8.58	8.50	8.58	8.50	8.18	7.81	7.29	6.77	8.11		8.81	8.52	7.74
	H1 lead leg	L																
	strides		22	15	15	15	15	15	15	15	15	15	15	157				
Green, Jack (GBR) (1991)	time		6.00	9.80	13.76		21.80	25.96	30.32		39.44	44.12		49.52	1 / 7			
	reaction time	0.172																
	interval			3.80	3.96		8.04	4.16	4.36		9.12	4.68	5.40					13.80
	velocity		7.50	9.21	8.84		8.71	8.41	8.03		7.68	7.48	7.41	8.08				7.61
	H1 lead leg	R																
	strides		22	14	14		14	14	14		15	15	18.2	140.2				
McMaster, Kyron (IVB) (1997)	time		5.60	9.16	12.76	16.48								dnf	4 / --			
	reaction time	0.162																
	interval			3.56	3.60	3.72										10.88		
	velocity		8.04	9.83	9.72	9.41										9.65		
	H1 lead leg	L																
	strides		21	13	13	13								60				



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=rnSLq9vb1BQ>

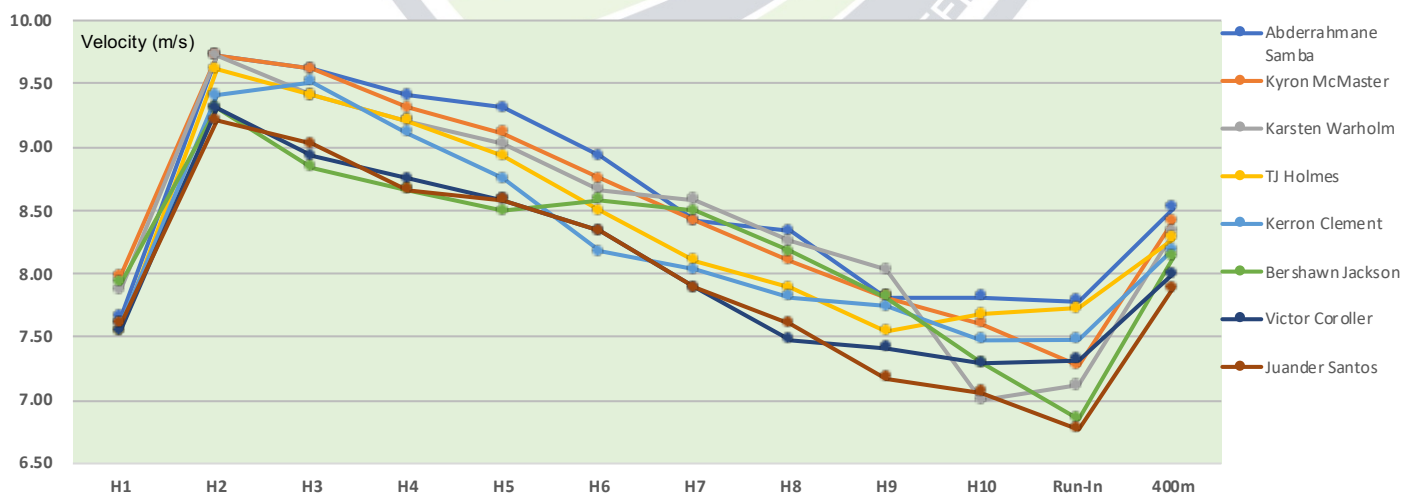
2018 Meeting de Paris (Paris, FRA) (TV Analysis)

Men's 400m Hurdles

Date 2018.06.30

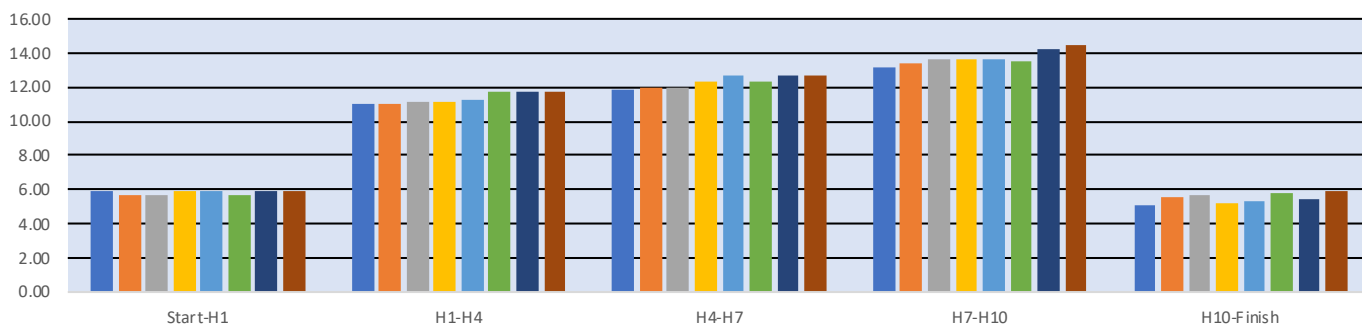
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Samba, Abderrahmane (QAT) (1995)	time		5.88	9.48	13.12	16.84	20.60	24.52	28.68	32.88	37.36	41.84		46.98	5 / 1			
	reaction time	0.209												AR PB		10.96	11.84	13.16
	interval velocity		7.65	3.60	3.64	3.72	3.76	3.92	4.16	4.20	4.48	4.48	5.14	8.51		9.58	8.87	7.98
	H1 lead leg	R	21	13	13	13	13	13	13	14	14	14	17.2	158.2				
McMaster, Kyron (IVB) (1997)	time		5.64	9.24	12.88	16.64	20.48	24.48	28.64	32.96	37.44	42.04		47.54	6 / 2			
	reaction time	0.183												NR PB		11.00	12.00	13.40
	interval velocity		7.98	3.60	3.64	3.76	3.84	4.00	4.16	4.32	4.48	4.60	5.50	8.41		9.55	8.75	7.84
	H1 lead leg	R	20	12	13	13	13	13	13	14	14	14	17	156				
Warholm, Karsten (NOR) (1996)	time		5.72	9.32	13.04	16.84	20.72	24.76	28.84	33.08	37.44	42.44		48.06	7 / 3			
	reaction time	0.158														11.12	12.00	13.60
	interval velocity		7.87	3.60	3.72	3.80	3.88	4.04	4.08	4.24	4.36	5.00	5.62	8.32		9.44	8.75	7.72
	H1 lead leg	L	20	13	13	13	13	13	13	13	13	15	17.7	156.7				
Holmes, TJ (USA) (1995)	time		5.96	9.60	13.32	17.12	21.04	25.16	29.48	33.92	38.56	43.12		48.30	4 / 4			
	reaction time	0.230														11.16	12.36	13.64
	interval velocity		7.55	3.64	3.72	3.80	3.92	4.12	4.32	4.44	4.64	4.56	5.18	8.28		9.41	8.50	7.70
	H1 lead leg	L	20	13	13	13	13	13	14	14	14	14	17	158				
Clement, Kerron (USA) (1985)	time		5.92	9.64	13.32	17.16	21.16	25.44	29.80	34.28	38.80	43.48		48.83	8 / 5			
	reaction time	0.233														11.24	12.64	13.68
	interval velocity		7.60	3.72	3.68	3.84	4.00	4.28	4.36	4.48	4.52	4.68	5.35	8.19		9.34	8.31	7.68
	H1 lead leg	R	20	13	13	13	13	13	13	13	13	13	16	153				
Jackson, Bershawn (USA) (1983)	time		5.68	9.44	13.40	17.44	21.56	25.64	29.76	34.04	38.52	43.32		49.16	2 / 6			
	reaction time	0.140														11.76	12.32	13.56
	interval velocity		7.92	3.76	3.96	4.04	4.12	4.08	4.12	4.28	4.48	4.80	5.84	8.14		8.93	8.52	7.74
	H1 lead leg	L	22	15	15	15	15	15	15	15	15	15	19	176				
Coroller, Victor (FRA) (1997)	time		5.96	9.72	13.64	17.64	21.72	25.92	30.36	35.04	39.76	44.56		50.03	3 / 7			
	reaction time	0.165														11.68	12.72	14.20
	interval velocity		7.55	3.76	3.92	4.00	4.08	4.20	4.44	4.68	4.72	4.80	5.47	8.00		8.99	8.25	7.39
	H1 lead leg	R	21	14	14	14	14	14	14	15	15	15	18.5	168.5				
Santos, Juander (DOM) (1995)	time		5.92	9.72	13.60	17.64	21.72	25.92	30.36	34.96	39.84	44.80		50.71	1 / 8			
	reaction time	0.168														11.72	12.72	14.44
	interval velocity		7.60	3.80	3.88	4.04	4.08	4.20	4.44	4.60	4.88	4.96	5.91	7.89		8.96	8.25	7.27
	H1 lead leg	L	22	14	14	14	14	14	15	15	16	16	19	173				



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=tNETJZXnd4g>

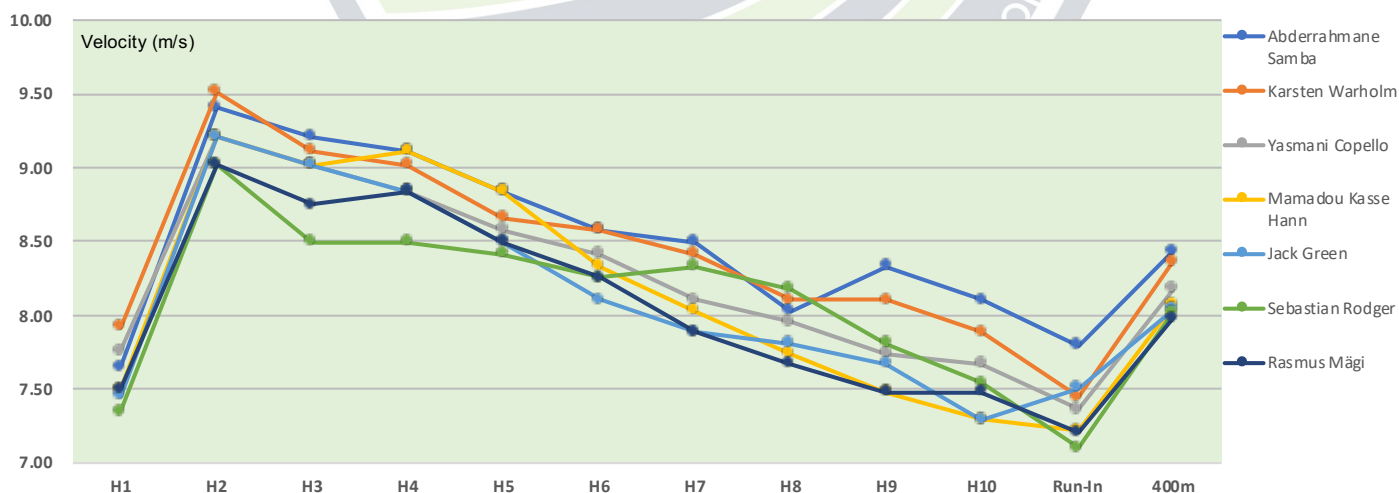
2018 Bauhaus Athletics (Stockholm, SWE) (TV Analysis)

Men's 400m Hurdles

Date 2018.06.10

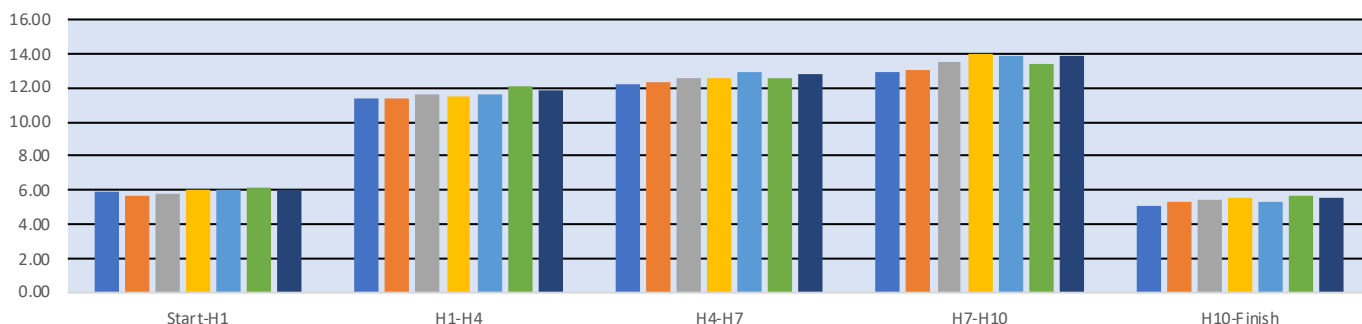
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Samba, Abderrahmane (QAT) (1995)	time		5.88	9.60	13.40	17.24	21.20	25.28	29.40	33.76	37.96	42.28		47.41	5 / 1			
	reaction time	0.194																
	interval velocity		7.65	3.72	3.80	3.84	3.96	4.08	4.12	4.36	4.20	4.32	5.13	AR PB		11.36	12.16	12.88
	H1 lead leg	R	21	13	13	13	13	13	13	14	14	14	17.5	158.5		9.24	8.63	8.15
Warholm, Karsten (NOR) (1996)	time		5.68	9.36	13.20	17.08	21.12	25.20	29.36	33.68	38.00	42.44		47.81	7 / 2			
	reaction time	0.134																
	interval velocity		7.92	3.68	3.84	3.88	4.04	4.08	4.16	4.32	4.32	4.44	5.37	NR PB		11.40	12.28	13.08
	H1 lead leg	L	20	13	13	13	13	13	13	13	15	15	18	159		9.21	8.55	8.03
Copello, Yasmani (TUR) (1987)	time		5.80	9.60	13.48	17.44	21.52	25.68	30.00	34.40	38.92	43.48		48.91	6 / 3			
	reaction time	0.202																
	interval velocity		7.76	3.80	3.88	3.96	4.08	4.16	4.32	4.40	4.52	4.56	5.43			11.64	12.56	13.48
	H1 lead leg	R	20	13	13	13	13	13	14	14	14	14	17.5	158.5		9.02	8.36	7.79
Hann, Mamadou Kasse (FRA) (1986)	time		6.00	9.80	13.68	17.52	21.48	25.68	30.04	34.56	39.24	44.04		49.58	3 / 4			
	reaction time	0.140																
	interval velocity		7.50	3.80	3.88	3.84	3.96	4.20	4.36	4.52	4.68	4.80	5.54			11.52	12.52	14.00
	H1 lead leg	L	21	13	13	13	13	14	14	15	15	15	17.7	163.7		9.11	8.39	7.50
Green, Jack (GBR) (1991)	time		6.04	9.84	13.72	17.68	21.80	26.12	30.56	35.04	39.60	44.40		49.73	8 / 5			
	reaction time	0.176																
	interval velocity		7.45	3.80	3.88	3.96	4.12	4.32	4.44	4.48	4.56	4.80	5.33			11.64	12.88	13.84
	H1 lead leg	R	22	14	14	13	14	15	15	15	15	16	153			9.02	8.15	7.59
Rodger, Sebastian (GBR) (1991)	time		6.12	10.00	14.12	18.24	22.40	26.64	30.84	35.12	39.60	44.24		49.87	1 / 6			
	reaction time	0.163																
	interval velocity		7.35	3.88	4.12	4.16	4.24	4.40	4.28	4.48	4.64	4.64	5.63			12.12	12.60	13.40
	H1 lead leg	R	22	14	14	14	14	14	14	15	15	15	19	170		8.66	8.33	7.84
Mägi, Rasmus (EST) (1992)	time		6.00	9.88	13.88	17.84	21.96	26.20	30.64	35.20	39.88	44.56		50.11	4 / 7			
	reaction time	0.135																
	interval velocity		7.50	3.88	4.00	3.96	4.12	4.24	4.44	4.56	4.68	4.68	5.55			11.84	12.80	13.92
	H1 lead leg	L	21	13	13	13	13	14	14	14	14	14	17.2	160.2		8.87	8.20	7.54



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=i-uj1nwy2fY>

Biomechanical Analysis

2018 NCAA Championships (Eugene, OR) (TV Analysis)

Men's 400m Hurdles

Date 2018.06.08

FINAL

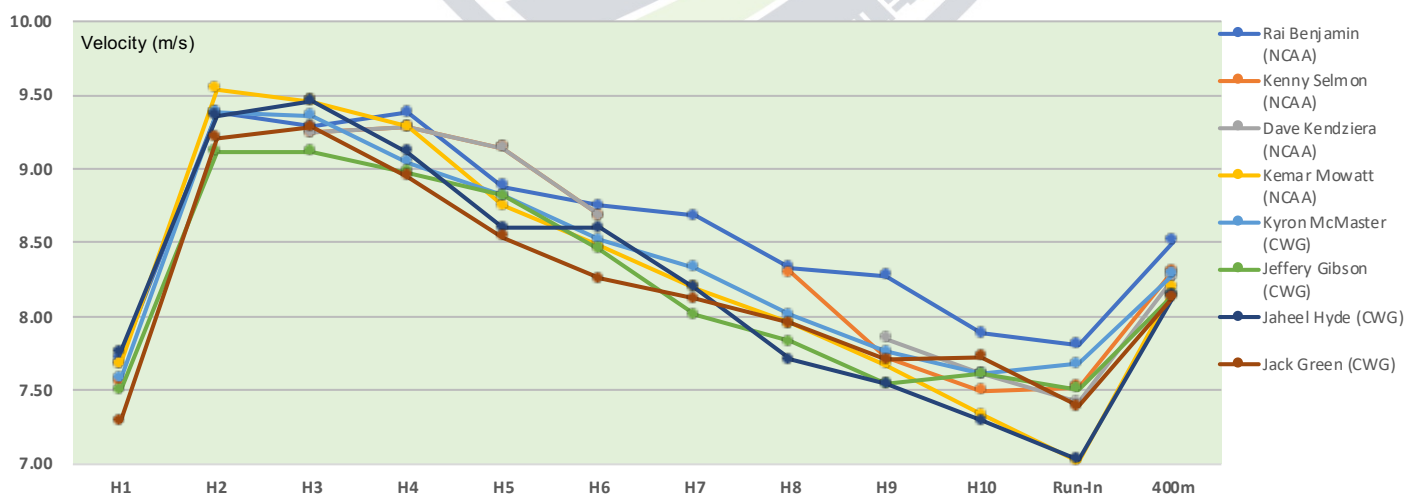
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Benjamin, Rai (ANT) (1997)	time		5.83	9.56	13.33	17.06	21.00	25.00	29.03	33.23	37.46	41.90		47.02	5 / 1			
	reaction time																	
	interval			3.73	3.77	3.73	3.94	4.00	4.03	4.20	4.23	4.44	5.12	AR PB		11.23	11.97	12.87
	velocity		7.72	9.38	9.28	9.38	8.88	8.75	8.68	8.33	8.27	7.88	7.81	8.51		9.35	8.77	8.16
Selmon, Kenny (USA) (1996)	time		5.96		13.53	17.30	21.13	25.16		33.60	38.13	42.80		48.12	4 / 2			
	reaction time																	
	interval				7.57	3.77	3.83	4.03		8.44	4.53	4.67	5.32	PB		11.34		
	velocity		7.55		9.25	9.28	9.14	8.68		8.29	7.73	7.49	7.52	8.31		9.26		
Kendziera, Dave (USA) (1994)	time		5.86		13.43	17.20	21.03	25.06			38.43	43.03		48.42	3 / 3			
	reaction time																	
	interval				7.57	3.77	3.83	4.03			13.37	4.60	5.39	PB		11.34		
	velocity		7.68		9.25	9.28	9.14	8.68			7.85	7.61	7.42	8.26		9.26		
Mowatt, Kemar (JAM) (1995)	time		5.86	9.53	13.23	17.00	21.00	25.13	29.40	33.80	38.36	43.13		48.83	6 / 4			
	reaction time																	
	interval			3.67	3.70	3.77	4.00	4.13	4.27	4.40	4.56	4.77	5.70			11.14	12.40	13.73
	velocity		7.68	9.54	9.46	9.28	8.75	8.47	8.20	7.95	7.68	7.34	7.02	8.19		9.43	8.47	7.65
	H1 lead leg	R																
	strides		20	13	13	13	13	13	13	13	13	13	16.2	153.2				

2018 Commonwealth Games (Gold Coast, AUS) (TV Analysis)

Date 2018.04.12

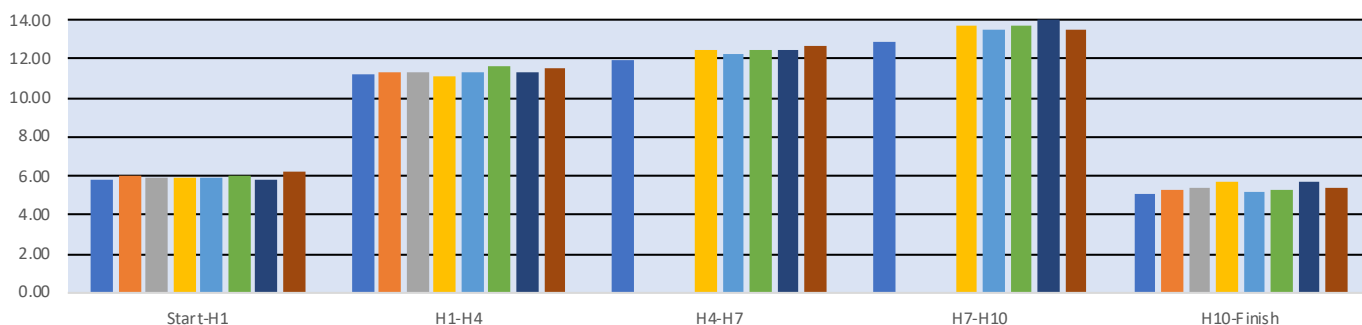
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McMaster, Kyron (IVB) (1997)	time		5.94	9.67	13.41	17.28	21.25	25.36	29.56	33.93	38.44	43.04		48.25	5 / 1			
	reaction time	0.156																
	interval			3.73	3.74	3.87	3.97	4.11	4.20	4.37	4.51	4.60	5.21			11.34	12.28	13.48
	velocity		7.58	9.38	9.36	9.04	8.82	8.52	8.33	8.01	7.76	7.61	7.68	8.29		9.26	8.55	7.79
Gibson, Jeffery (BAH) (1990)	time		6.00	9.84	13.68	17.58	21.55	25.69	30.06	34.53	39.17	43.77		49.10	8 / 2			
	reaction time	0.146																
	interval			3.84	3.84	3.90	3.97	4.14	4.37	4.47	4.64	4.60	5.33			11.58	12.48	13.71
	velocity		7.50	9.11	9.11	8.97	8.82	8.45	8.01	7.83	7.54	7.61	7.50	8.15		9.07	8.41	7.66
Hyde, Jaheel (JAM) (1997)	time		5.80	9.54	13.24	17.08	21.15	25.22	29.49	34.03	38.67	43.47		49.16	3 / 3			
	reaction time	0.157																
	interval			3.74	3.70	3.84	4.07	4.07	4.27	4.54	4.64	4.80	5.69			11.28	12.41	13.98
	velocity		7.76	9.36	9.46	9.11	8.60	8.60	8.20	7.71	7.54	7.29	7.03	8.14		9.31	8.46	7.51
Green, Jack (GBR) (1991)	time		6.17	9.97	13.74	17.65	21.75	25.99	30.30	34.70	39.24	43.77		49.18	7 / 4			
	reaction time	0.185																
	interval			3.80	3.77	3.91	4.10	4.24	4.31	4.40	4.54	4.53	5.41			11.48	12.65	13.47
	velocity		7.29	9.21	9.28	8.95	8.54	8.25	8.12	7.95	7.71	7.73	7.39	8.13		9.15	8.30	7.80
	H1 lead leg	R																
	strides		22	14	13	13	14	14	14	14	15	15	19.2	167.2				



Time Intervals (s)

Hurdle Phases



NCAA Championships

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=2VY3vRK4-dM>

Commonwealth Games

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: Gun Flash

Source: <https://www.youtube.com/watch?v=INBEwz0l1R8>

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

Men's 400m Hurdles

Date 2018.06.07

FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Samba, Abderrahmane (QAT) (1995)	time		5.76	9.36	13.08	16.92	20.88	25.04	29.28	33.72	38.00	42.40		47.60	5 / 1			
	reaction time	0.189																
	interval			3.60	3.72	3.84	3.96	4.16	4.24	4.44	4.28	4.40	5.20			11.16	12.36	13.12
	velocity		7.81	9.72	9.41	9.11	8.84	8.41	8.25	7.88	8.18	7.95	7.69	8.40		9.41	8.50	8.00
Warholm, Karsten (NOR) (1996)	time		5.68	9.24	12.96	16.80	20.80	24.88	29.16	33.48	37.92	42.64		48.22	7 / 2			
	reaction time	0.165																
	interval			3.56	3.72	3.84	4.00	4.08	4.28	4.32	4.44	4.72	5.58			11.12	12.36	13.48
	velocity		7.92	9.83	9.41	9.11	8.75	8.58	8.18	8.10	7.88	7.42	7.17	8.30		9.44	8.50	7.79
Copello, Yasmani (TUR) (1987)	time		5.84	9.48			21.16	25.20	29.44	33.84	38.28	43.00		48.54	4 / 3			
	reaction time	0.210																
	interval			3.64			11.68	4.04	4.24	4.40	4.44	4.72	5.54					13.56
	velocity		7.71	9.62			8.99	8.66	8.25	7.95	7.88	7.42	7.22	8.24				7.74
Holmes, TJ (USA) (1995)	time		5.76	9.36			20.84	24.96	29.36	33.84	38.56	43.24		48.64	3 / 4			
	reaction time	0.210																
	interval			3.60			11.48	4.12	4.40	4.48	4.72	4.68	5.40					13.88
	velocity		7.81	9.72			9.15	8.50	7.95	7.81	7.42	7.48	7.41	8.22				7.56
Clement, Kerron (USA) (1985)	time		5.84	9.56	13.32	17.20	21.32	25.64	30.04	34.56	39.20	43.84		49.30	6 / 5			
	reaction time	0.159														11.36	12.84	13.80
	interval			3.72	3.76	3.88	4.12	4.32	4.40	4.52	4.64	4.64	5.46			9.24	8.18	7.61
	velocity		7.71	9.41	9.31	9.02	8.50	8.10	7.95	7.74	7.54	7.54	7.33	8.11				
Mägi, Rasmus (EST) (1992)	time		5.88	9.60	13.36	17.20	21.28	25.48	30.00	34.44	39.08	43.80		49.35	8 / 6			
	reaction time	0.142														11.32	12.80	13.80
	interval			3.72	3.76	3.84	4.08	4.20	4.52	4.44	4.64	4.72	5.55			9.28	8.20	7.61
	velocity		7.65	9.41	9.31	9.11	8.58	8.33	7.74	7.88	7.54	7.42	7.21	8.11				
Hann, Mamadou Kasse (FRA) (1986)	time		5.92	9.72			21.48	25.68	30.08	34.48	39.16	43.96		49.50	2 / 7			
	reaction time	0.159																13.88
	interval			3.80			11.76	4.20	4.40	4.40	4.68	4.80	5.54					7.56
	velocity		7.60	9.21			8.93	8.33	7.95	7.95	7.48	7.29	7.22	8.08				
Barr, Thomas (IRL) (1994)	time		5.96	9.72			21.52	25.84	30.24	34.80	39.48	44.16		49.53	1 / 8			
	reaction time	0.197																13.92
	interval			3.76			11.80	4.32	4.40	4.56	4.68	4.68	5.37					7.54
	velocity		7.55	9.31			8.90	8.10	7.95	7.68	7.48	7.48	7.45	8.08				

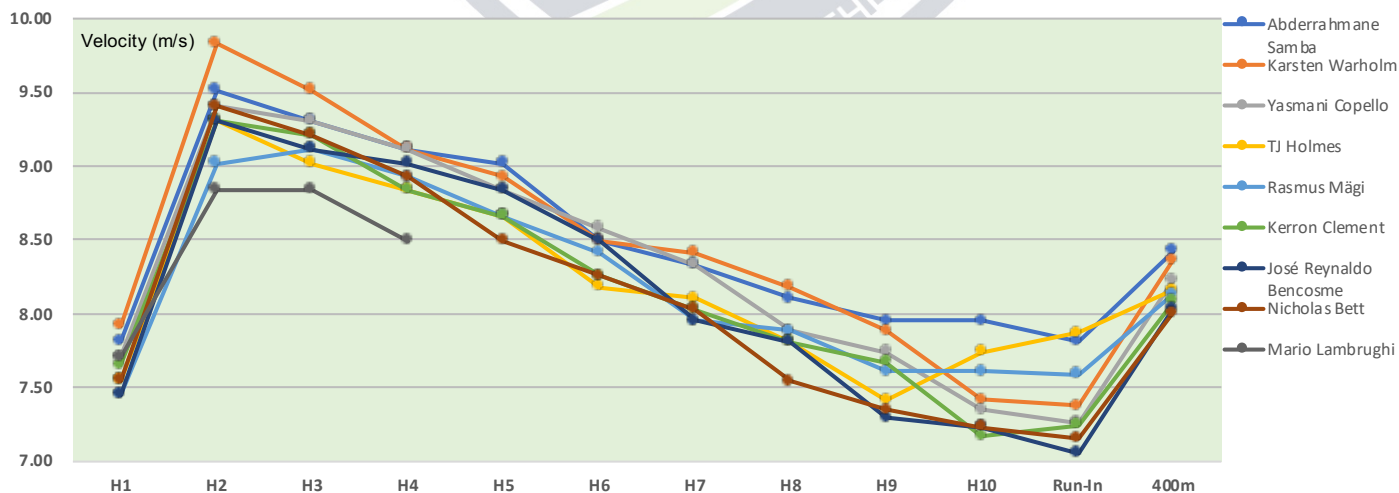
2018 Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis)

Men's 400m Hurdles

Date 2018.05.31

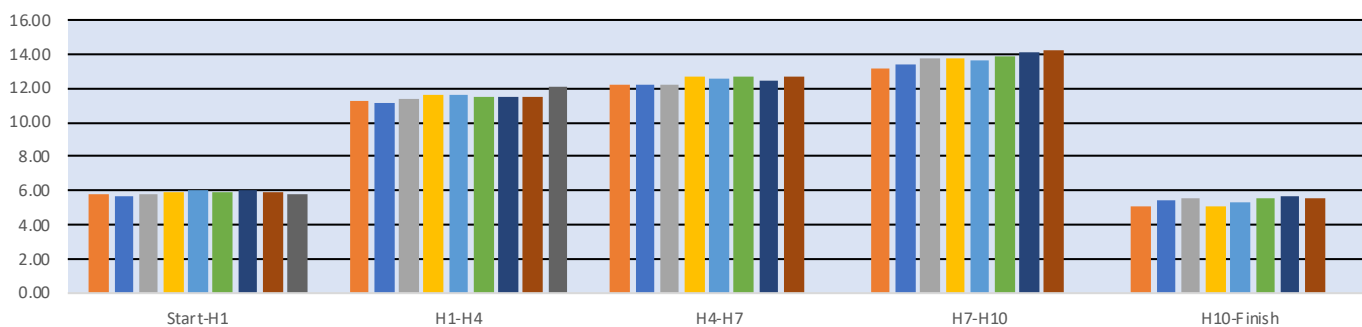
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Samba, Abderrahmane (QAT) (1995)	time		5.76	9.44	13.20	17.04	20.92	25.04	29.24	33.56	37.96	42.36		47.48	4 / 1			
	reaction time	0.158																
	interval velocity		7.81	3.68	3.76	3.84	3.88	4.12	4.20	4.32	4.40	4.40	5.12	AR PB		11.28	12.20	13.12
																9.31	8.61	8.00
	H1 lead leg	R	21	13	13	13	13	13	13	13	14	14	17	157				
Warholm, Karsten (NOR) (1996)	time		5.68	9.24	12.92	16.76	20.68	24.80	28.96	33.24	37.68	42.40		47.82	7 / 2			
	reaction time	0.155																
	interval velocity		7.92	3.56	3.68	3.84	3.92	4.12	4.16	4.28	4.44	4.72	5.42	NR PB		11.08	12.20	13.44
																9.48	8.61	7.81
	H1 lead leg	L	20	13	13	13	13	13	13	13	13	14	17.5	155.5				
Copello, Yasmani (TUR) (1987)	time		5.84	9.56	13.32	17.16	21.12	25.20	29.40	33.84	38.36	43.12		48.63	5 / 3			
	reaction time	0.205																
	interval velocity		7.71	3.72	3.76	3.84	3.96	4.08	4.20	4.44	4.52	4.76	5.51			11.32	12.24	13.72
																9.28	8.58	7.65
	H1 lead leg	R	20	13	13	13	13	13	13	14	14	14	18	158				
Holmes, TJ (USA) (1995)	time		5.96	9.72	13.60	17.56	21.60	25.88	30.20	34.68	39.40	43.92		49.00	3 / 4			
	reaction time	0.194																
	interval velocity		7.55	3.76	3.88	3.96	4.04	4.28	4.32	4.48	4.72	4.52	5.08			11.60	12.64	13.72
																9.05	8.31	7.65
	H1 lead leg	L	20	13	13	13	13	13	13	13	14	14	17	156				
Mägi, Rasmus (EST) (1992)	time		6.04	9.92	13.76	17.68	21.72	25.88	30.28	34.72	39.32	43.92		49.19	9 / 5			
	reaction time	0.140																
	interval velocity		7.45	3.88	3.84	3.92	4.04	4.16	4.40	4.44	4.60	4.60	5.27			11.64	12.60	13.64
																9.02	8.33	7.70
	H1 lead leg	L	21	13	13	13	13	13	14	14	14	14	17	159				
Clement, Kerron (USA) (1985)	time		5.88	9.64	13.44	17.40	21.44	25.68	30.04	34.52	39.08	43.96		49.48	6 / 6			
	reaction time	0.159																
	interval velocity		7.65	3.76	3.80	3.96	4.04	4.24	4.36	4.48	4.56	4.88	5.52			11.52	12.64	13.92
																9.11	8.31	7.54
	H1 lead leg	R	20	13	13	13	13	13	13	13	13	14	16.5	154.5				
Bencosme, José Reynaldo (ITA) (1999)	time		6.04	9.80	13.64	17.52	21.48	25.60	30.00	34.48	39.28	44.12		49.79	2 / 7			
	reaction time	0.153																
	interval velocity		7.45	3.76	3.84	3.88	3.96	4.12	4.40	4.48	4.80	4.84	5.67			11.48	12.48	14.12
																9.15	8.41	7.44
	H1 lead leg	L	20	13	13	13	13	13	14	14	15	15		143				
Bett, Nicholas (KEN) (1990)	time		5.96	9.68	13.48	17.40	21.52	25.76	30.12	34.76	39.52	44.36		49.95	8 / 8			
	reaction time	0.180																
	interval velocity		7.55	3.72	3.80	3.92	4.12	4.24	4.36	4.64	4.76	4.84	5.59			11.44	12.72	14.24
																9.18	8.25	7.37
	H1 lead leg	R	22	13	13	13	13	13	13	15	15	15		145				
Lambrugh, Mario (IRA) (1992)	time		5.84	9.80	13.76	17.88								dnf	1 / --			
	reaction time	0.135																
	interval velocity		7.71	3.96	3.96	4.12										12.04		
																8.72		
	H1 lead leg	R	22	14	14	14								64				



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=YrzUPoJQDEI>

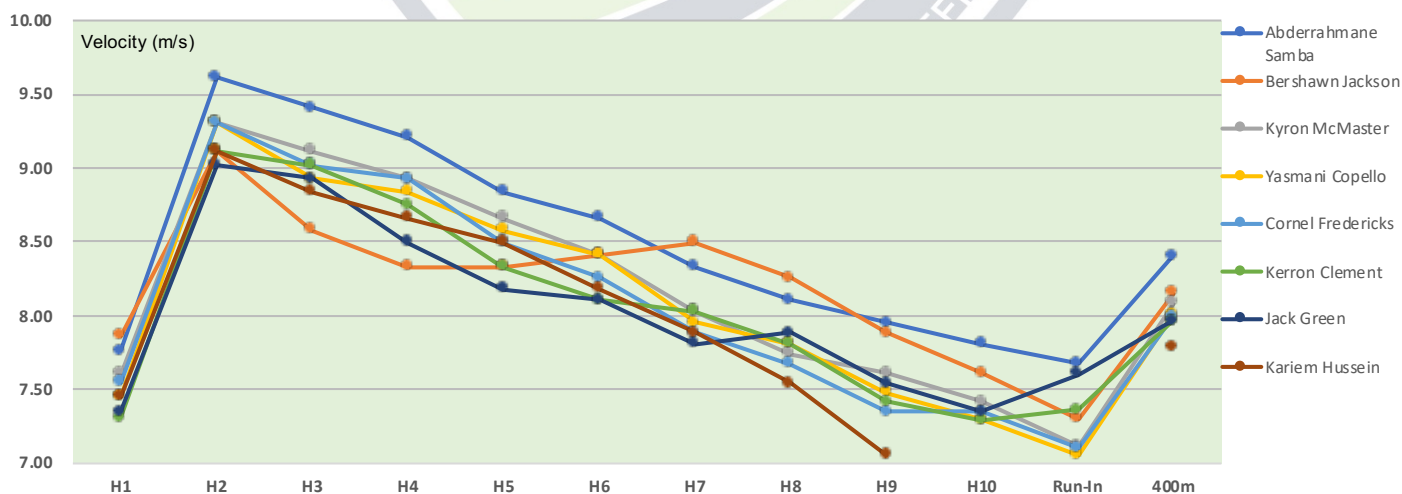
2018 Doha Diamond League (Doha, QAT) (TV Analysis)

Men's 400m Hurdles

Date 2018.05.04

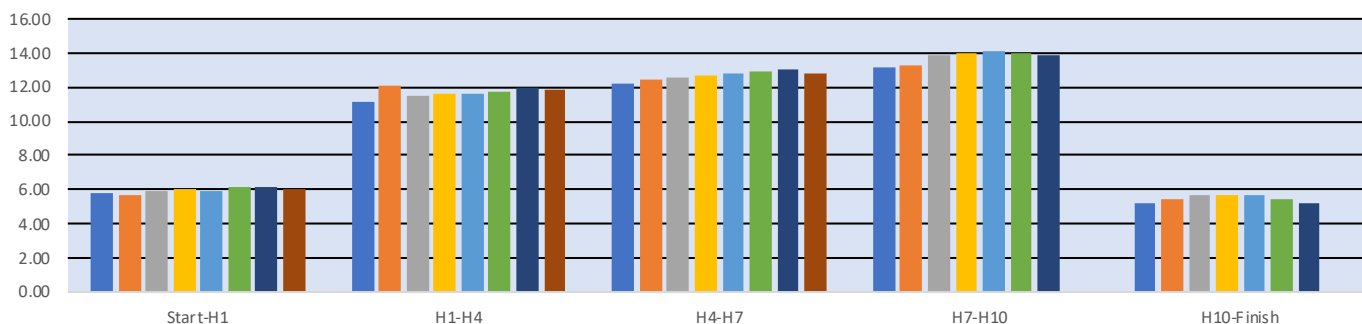
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Samba, Abderrahmane (QAT) (1995)	time		5.80	9.44	13.16	16.96	20.92	24.96	29.16	33.48	37.88	42.36		47.57	4 / 1			
	reaction time	0.192																
	interval velocity		7.76	9.62	9.41	9.21	8.84	8.66	8.33	8.10	7.95	7.81	7.68	8.41		11.16	12.20	13.20
	H1 lead leg	R	20	13	13	13	13	13	13	13		14	17.5	142.5		9.41	8.61	7.95
Jackson, Bershawn (USA) (1983)	time		5.72	9.56	13.64	17.84	22.04	26.20	30.32	34.56	39.00	43.60		49.08	2 / 2			
	reaction time	0.176																
	interval velocity		7.87	9.11	8.58	8.33	8.33	8.41	8.50	8.25	7.88	7.61	7.30	8.15		12.12	12.48	13.28
	H1 lead leg	L	22	15	15	15	15	15	15	15		15	19	161		8.66	8.41	7.91
McMaster, Kyron (IVB) (1997)	time		5.92	9.68	13.52	17.44	21.48	25.64	30.00	34.52	39.12	43.84		49.46	5 / 3			
	reaction time	0.215																
	interval velocity		7.60	9.31	9.11	8.93	8.66	8.41	8.03	7.74	7.61	7.42	7.12	8.09		11.52	12.56	13.84
	H1 lead leg	L	21	13	13	13	13	14	14	14		14	17	146		9.11	8.36	7.59
Copello, Yasmani (TUR) (1987)	time		6.04	9.80	13.72	17.68	21.76	25.92	30.32	34.80	39.48	44.28		49.95	3 / 4			
	reaction time	0.224																
	interval velocity		7.45	9.31	8.93	8.84	8.58	8.41	7.95	7.81	7.48	7.29	7.05	8.01		11.64	12.64	13.96
	H1 lead leg	R	20	13	13	13	13	13	14	14		14	18.2	145.2		9.02	8.31	7.52
Fredericks, Cornel (RSA) (1990)	time		5.96	9.72	13.60	17.52	21.64	25.88	30.32	34.88	39.64	44.40		50.03	1 / 5			
	reaction time	0.164																
	interval velocity		7.55	9.31	9.02	8.93	8.50	8.25	7.88	7.68	7.35	7.35	7.10	8.00		11.56	12.80	14.08
	H1 lead leg	R	22	14	14	14	14	14	15	15		15	19	156		9.08	8.20	7.46
Clement, Kerron (USA) (1985)	time		6.16	10.00	13.88	17.88	22.08	26.40	30.76	35.24	39.96	44.76		50.19	6 / 6			
	reaction time	0.276																
	interval velocity		7.31	9.11	9.02	8.75	8.33	8.10	8.03	7.81	7.42	7.29	7.37	7.97		11.72	12.88	14.00
	H1 lead leg	R	20	13	13	13	13	13	13	13		14	14	139		8.96	8.15	7.50
Green, Jack (GBR) (1991)	time		6.12	10.00	13.92	18.04	22.32	26.64	31.12	35.56	40.20	44.96		50.22	8 / 7			
	reaction time	0.230																
	interval velocity		7.35	9.02	8.93	8.50	8.18	8.10	7.81	7.88	7.54	7.35	7.60	7.96		11.92	13.08	13.84
	H1 lead leg	R	22	14	13	14	14	14	14	15		15	15	150		8.81	8.03	7.59
Hussein, Kariem (SUI) (1989)	time		6.04	9.88	13.84	17.88	22.00	26.28	30.72	35.36	40.32			51.40	7 / 8			
	reaction time	0.230																
	interval velocity		7.45	9.11	8.84	8.66	8.50	8.18	7.88	7.54	7.06					11.84	12.84	
	H1 lead leg	L	20	13	13	13	13	13	13	14		15		141		8.87	8.18	



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=RB1vew_gqBk

Women's 400m Hurdles

2018 Top 10 Times - 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 - 2018 South Eastern Conference Championships (Knoxville, TN) (TV Analysis)			Henson (2020) - Athlete First: 2018 year end hurdle report															
date	13-May	time	6.23	10.40	14.66	18.93	23.33	27.83	32.43	37.13	42.16	47.20			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	strides		15	15	15	15	15	15	15	16	16	18.5	155.5				
Little, Shamier (USA) (1995)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2018 NACAC Championships (Toronto, CAN)			53.32												/ 1			
date	12-Aug	time																
reaction time		interval	No Information Available															
		velocity																
H1 lead leg		strides																
Little, Shamier (USA) (1995)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2018 Athletissima (Lausanne, SUI) (TV Analysis)			Henson (2020) - Athlete First: 2018 year end hurdle report															
date	5-Jul	time	6.16	10.36	14.68	19.04	23.48	28.04	32.72	37.52	42.44	47.48			4 / 1			
reaction time	0.188	interval		4.20	4.32	4.36	4.44	4.56	4.68	4.80	4.92	5.04	5.93			12.88	13.68	14.76
		velocity	7.31	8.33	8.10	8.03	7.88	7.68	7.48	7.29	7.11	6.94	6.75	7.49		8.15	7.68	7.11
H1 lead leg	R	strides	23	15	15	15	15	15	15	16	16	16	20	181				
Russell, Janieve (JAM) (1993)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2018 Athletissima (Lausanne, SUI) (TV Analysis)			Henson (2020) - Athlete First: 2018 year end hurdle report															
date	5-Jul	time	6.32	10.52	14.84	19.20	23.68	28.16	32.80	37.48	42.44	47.48			5 / 2			
reaction time	0.147	interval		4.20	4.32	4.36	4.48	4.48	4.64	4.68	4.96	5.04	5.98	PB		12.88	13.60	14.68
		velocity	7.12	8.33	8.10	8.03	7.81	7.81	7.54	7.48	7.06	6.94	6.69	7.48		8.15	7.72	7.15
H1 lead leg	R	strides	22	15	15	15	15	15	15	15	16	16	19.5	178.5				
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
A FINAL - 2018 National Relay Championships (Fayetteville, AR) (TV Analysis)			Henson (2020) - Athlete First: 2018 year end hurdle report															
date	27-Apr	time	6.31	10.30		19.08	23.53	28.06	32.80	37.66	42.81	47.95			5 / 1			
reaction time		interval		3.99		8.78	4.45	8.98	4.74	4.86	5.15	5.14	5.65	WJR PB		12.77	13.72	15.15
		velocity	7.13	8.77		7.97	7.87	3.90	7.38	7.20	6.80	6.81	7.08	7.46		8.22	7.65	6.93
H1 lead leg	R	strides	22	15			15	15	15	15	16	16	18.5	147.5				
Little, Shamier (USA) (1995)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2018 USATF National Champnships (Des Moines, IA) (TV Analysis)			Henson (2020) - Athlete First: 2018 year end hurdle report															
date	24-Jun	time	6.30	10.51	14.78	19.15	23.55	28.09	32.66	37.40	42.31	47.54			5 / 1			
reaction time		interval		4.21	4.27	4.37	4.40	4.54	4.57	4.74	4.91	5.23	6.07			12.85	13.51	14.88
		velocity	7.14	8.31	8.20	8.01	7.95	7.71	7.66	7.38	7.13	6.69	6.59	7.46		8.17	7.77	7.06
H1 lead leg	R	strides	23	15	15	15	15	15	15	15	16	16	20	180				
Russell, Janieve (JAM) (1993)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2018 IAAF Continental Cup (Ostrava, CZE)			Henson (2021) - Athlete First: 2018 year end hurdle report															
date	9-Sep	time	6.36	10.60	14.94	19.32	23.76	28.28	32.92	37.62	42.64	47.64			1 / 1			
reaction time	0.156	interval		4.24	4.34	4.38	4.44	4.52	4.64	4.70	5.02	5.00	5.98			12.96	13.60	14.72
		velocity	7.08	8.25	8.06	7.99	7.88	7.74	7.54	7.45	6.97	7.00	6.69	7.46		8.10	7.72	7.13
H1 lead leg	R	strides	22	15	15	15	15	15	15	15	16	16	19.2	178.2				
Russell, Janieve (JAM) (1993)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2018 Spitzen Leichtathletik (Luzern, SUI)			53.63												/ 1			
date	9-Jul	time																
reaction time		interval	No Information Available															
		velocity																
H1 lead leg		strides																
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 - 2018 Bislett Games (Oslo, NOR) (TV Analysis)			Henson (2020) - Athlete First: 2018 year end hurdle report															
date	7-Jun	time	6.04	10.08	14.44	18.96	23.56	28.08	32.72	37.64	42.48	47.64			5 / 1			
reaction time	0.166	interval		4.04	4.36	4.52	4.60	4.52	4.64	4.92	4.84	5.16	6.01			12.92	13.76	14.92
		velocity	7.45	8.66	8.03	7.74	7.61	7.74	7.54	7.11	7.23	6.78	6.66	7.46		8.13	7.63	7.04
H1 lead leg	R	strides	23	15	15	15	15	15	15	16	16	16	19.7	180.7				
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 - 2018 Shanghai Diamond League (Shanghai, CHN) (TV Analysis)			Henson (2020) - Athlete First: 2018 year end hurdle report															
date	12-May	time	6.12	10.16	14.48	18.88	23.52	28.08	32.76	37.56	42.72	47.84			4 / 1			
reaction time	0.186	interval		4.04	4.32	4.40	4.64	4.56	4.68	4.80	5.16	5.12	5.93			12.76	13.88	15.08
		velocity	7.35	8.66	8.10	7.95	7.54	7.68	7.48	7.29	6.78	6.84	6.75	7.44		8.23	7.56	6.96
H1 lead leg	R	strides	23	15	15	15	15	15	15	15	16	16	19.5	179.5				
Russell, Janieve (JAM) (1993)			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane/Place	H1-H4	H4-H7	H7-H10
FINAL - 2018 Shanghai Diamond League (Shanghai, CHN) (TV Analysis)			Henson (2020) - Athlete First: 2018 year end hurdle report															
date	12-May	time	6.40	10.48	14.76	19.12	23.56	28.16	32.96	37.92	42.88	47.96			3 / 2			
reaction time	0.170	interval		4.08	4.28	4.36	4.44	4.60	4.80	4.96	4.96	5.08	5.82	PB		12.72	13.84	15.00
		velocity	7.03	8.58	8.18	8.03	7.88	7.61	7.29	7.06	7.06	6.89	6.87	7.44		8.25	7.59	7.00
H1 lead leg	R	strides	22	15	15	15	15	15	15	16	16	16	19.5	179.5				

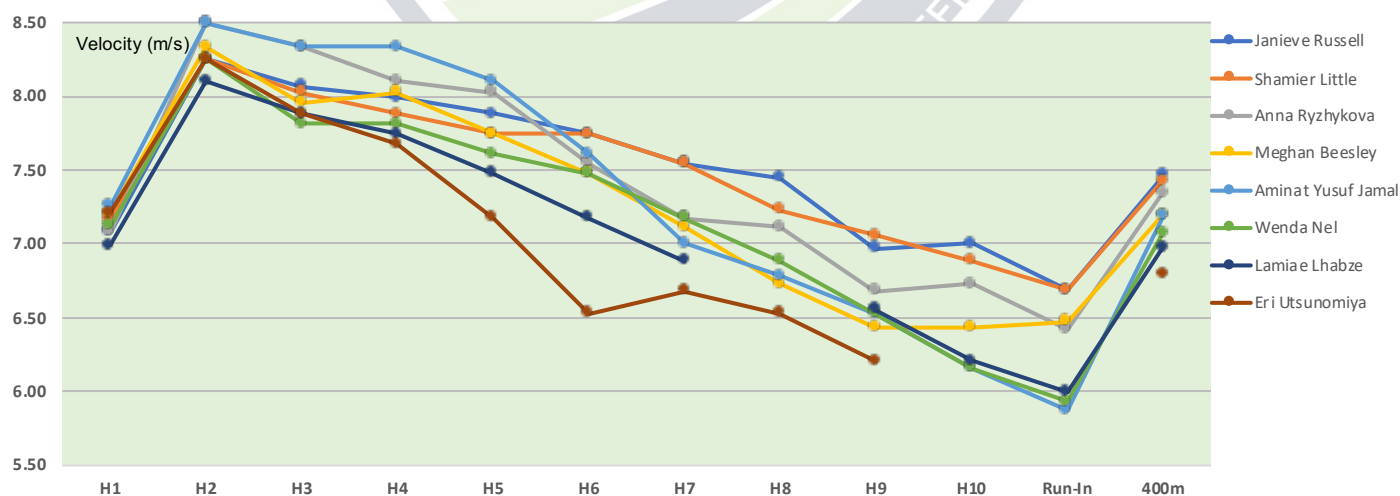
2018 IAAF Continental Cup (Ostrava, CZE) (TV Analysis)

Women's 400m Hurdles

Date 2018.09.09

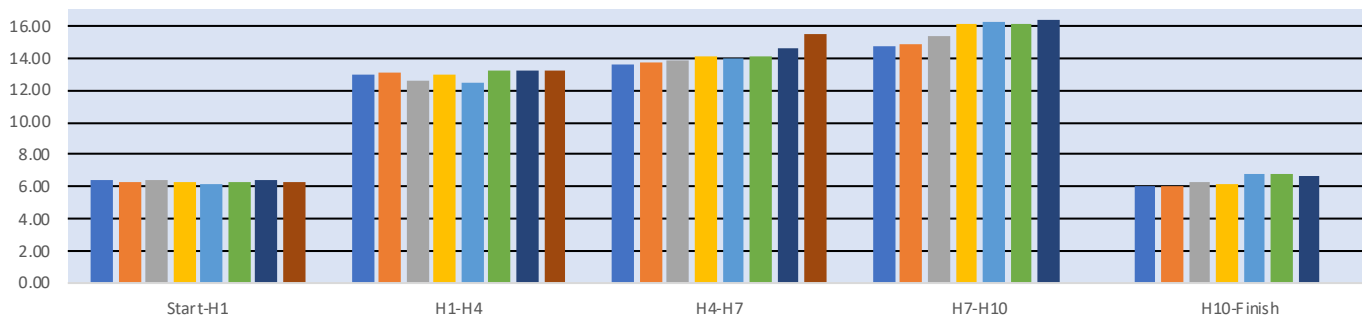
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Russell, Janieve (JAM) (1993)	time		6.36	10.60	14.94	19.32	23.76	28.28	32.92	37.62	42.64	47.64		53.62	1 / 1			
	reaction time	0.156																
	interval		7.08	4.24	4.34	4.38	4.44	4.52	4.64	4.70	5.02	5.00	5.98			12.96	13.60	14.72
	velocity		7.08	8.25	8.06	7.99	7.88	7.74	7.54	7.45	6.97	7.00	6.69	7.46		8.10	7.72	7.13
Little, Shamier (USA) (1995)	time		6.28	10.52	14.88	19.32	23.84	28.36	33.00	37.84	42.80	47.88		53.86	5 / 2			
	reaction time	0.223																
	interval		7.17	4.24	4.36	4.44	4.52	4.52	4.64	4.84	4.96	5.08	5.98			13.04	13.68	14.88
	velocity		7.17	8.25	8.03	7.88	7.74	7.74	7.54	7.23	7.06	6.89	6.69	7.43		8.05	7.68	7.06
Ryzhykova, Anna (UKR) (1989)	time		6.36	10.48	14.68	19.00	23.36	28.00	32.88	37.80	43.04	48.24		54.47	8 / 3			
	reaction time	0.172																
	interval		7.08	4.12	4.20	4.32	4.36	4.64	4.88	4.92	5.24	5.20	6.23			12.64	13.88	15.36
	velocity		7.08	8.50	8.33	8.10	8.03	7.54	7.17	7.11	6.68	6.73	6.42	7.34		8.31	7.56	6.84
Beesley, Meghan (GBR) (1989)	time		6.24	10.44	14.84	19.20	23.72	28.40	33.32	38.52	43.96	49.40		55.58	4 / 4			
	reaction time	0.170																
	interval		7.21	4.20	4.40	4.36	4.52	4.68	4.92	5.20	5.44	5.44	6.18			12.96	14.12	16.08
	velocity		7.21	8.33	7.95	8.03	7.74	7.48	7.11	6.73	6.43	6.43	6.47	7.20		8.10	7.44	6.53
Yusuf Jamal, Aminat (BRN) (1997)	time		6.20	10.32	14.52	18.72	23.04	27.64	32.64	37.80	43.16	48.84		55.65	3 / 5			
	reaction time	0.194																
	interval		7.26	4.12	4.20	4.20	4.32	4.60	5.00	5.16	5.36	5.68	6.81			12.52	13.92	16.20
	velocity		7.26	8.50	8.33	8.33	8.10	7.61	7.00	6.78	6.53	6.16	5.87	7.19		8.39	7.54	6.48
Nel, Wenda (RSA) (1988)	time		6.32	10.56	15.04	19.52	24.12	28.80	33.68	38.76	44.12	49.80		56.54	2 / 6			
	reaction time	0.192																
	interval		7.12	4.24	4.48	4.48	4.60	4.68	4.88	5.08	5.36	5.68	6.74			13.20	14.16	16.12
	velocity		7.12	8.25	7.81	7.81	7.61	7.48	7.17	6.89	6.53	6.16	5.93	7.07		7.95	7.42	6.51
Lhabze, Lamiae (MAR) (1984)	time		6.44	10.76	15.20	19.72	24.40	29.28	34.36		45.04	50.68		57.35	6 / 7			
	reaction time	0.158																
	interval		6.99	4.32	4.44	4.52	4.68	4.88	5.08		10.68	5.64	6.67			13.28	14.64	16.32
	velocity		6.99	8.10	7.88	7.74	7.48	7.17	6.89		6.55	6.21	6.00	6.97		7.91	7.17	6.43
Utsunomiya, Eri (JPN) (1993)	time		6.24	10.48	14.92	19.48	24.36	29.72	34.96	40.32	45.96		58.92	7 / 8				
	reaction time	0.181																
	interval		7.21	4.24	4.44	4.56	4.88	5.36	5.24	5.36	5.64					13.24	15.48	
	velocity		7.21	8.25	7.88	7.68	7.17	6.53	6.68	6.53	6.21					7.93	6.78	
	H1 lead leg		23	15	15	15	16	18	17		18			137				



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=Q7trikVDIP8>

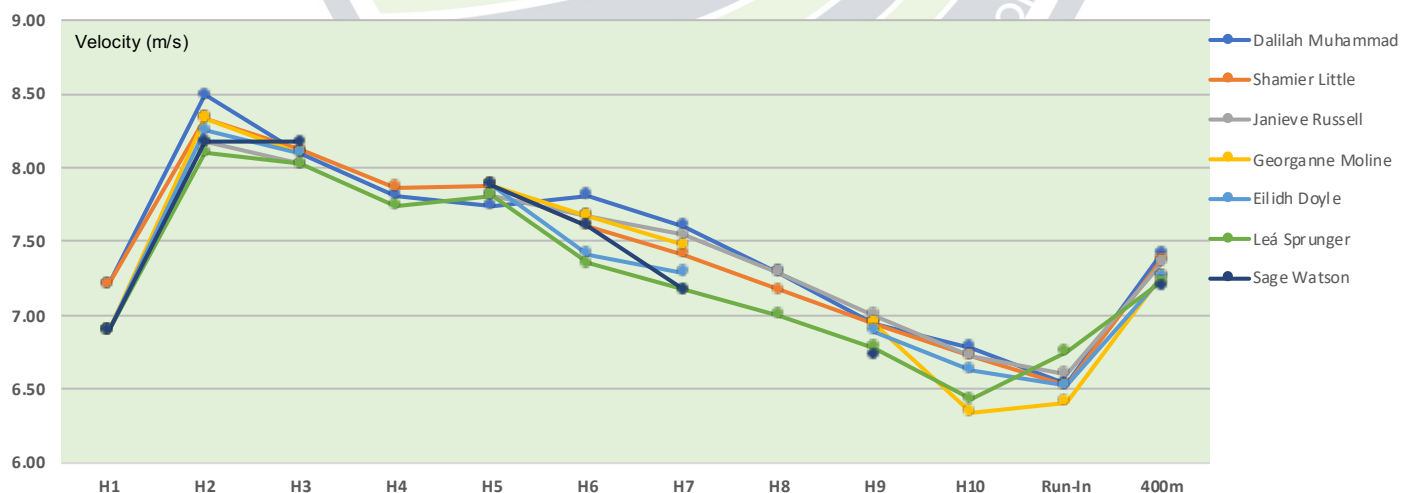
2018 Weltklasse (Zürich, SUI) (TV Analysis)

Women's 400m Hurdles

Date 2018.08.30

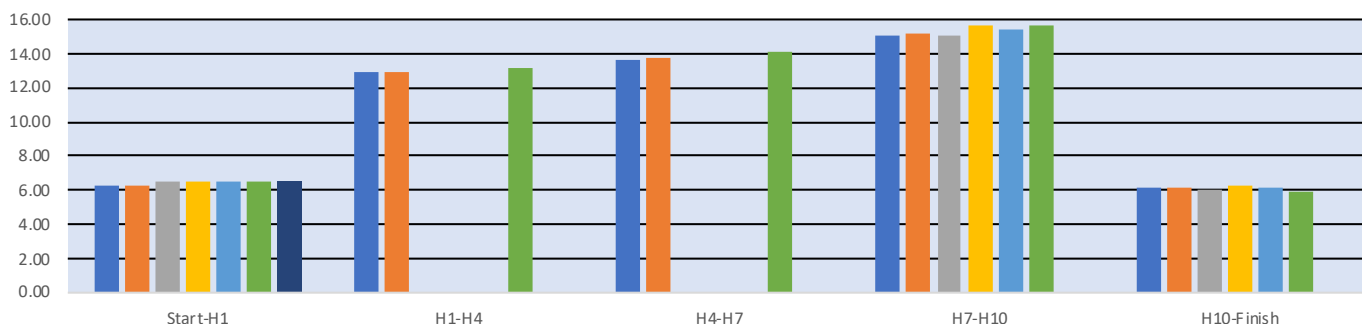
FINAL

			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		6.24	10.36	14.68	19.16	23.68	28.16	32.76	37.56	42.60	47.76		53.88	5 / 1			
	reaction time	0.184																
	interval		7.21	4.12	4.32	4.48	4.52	4.48	4.60	4.80	5.04	5.16	6.12			12.92	13.60	15.00
	velocity		7.21	8.50	8.10	7.81	7.74	7.81	7.61	7.29	6.94	6.78	6.54	7.42		8.13	7.72	7.00
	H1 lead leg	R																
	strides		22	15	15	15	15	15	15	15	16	16	20.2	179.2				
Little, Shamier (USA) (1995)	time		6.24	10.44	14.75	19.20	23.64	28.24	32.96	37.84	42.88	48.08		54.21	3 / 2			
	reaction time	0.213																
	interval			4.20	4.31	4.45	4.44	4.60	4.72	4.88	5.04	5.20	6.13			12.96	13.76	15.12
	velocity		7.21	8.33	8.12	7.87	7.88	7.61	7.42	7.17	6.94	6.73	6.53	7.38		8.10	7.63	6.94
	H1 lead leg	R																
	strides		23	15	15	15	15	15	15	16	16	17	20	182				
Russell, Janieve (JAM) (1993)	time		6.52	10.80	15.16		24.12	28.68	33.32	38.12	43.12	48.32		54.38	6 / 3			
	reaction time	0.153																
	interval			4.28	4.36		8.96	4.56	4.64	4.80	5.00	5.20	6.06					15.00
	velocity		6.90	8.18	8.03		7.81	7.68	7.54	7.29	7.00	6.73	6.60	7.36				7.00
	H1 lead leg	R																
	strides		22	15	15			15	15	16		17	20	135				
Moline, Georganne (USA) (1990)	time		6.52	10.72	15.04		23.92	28.48	33.16		43.24	48.76		55.00	2 / 4			
	reaction time	0.261																
	interval			4.20	4.32		8.88	4.56	4.68		10.08	5.52	6.24					15.60
	velocity		6.90	8.33	8.10		7.88	7.68	7.48		6.94	6.34	6.41	7.27				6.73
	H1 lead leg	L																
	strides		23	16	15			15	15			17	20.2	121.2				
Doyle, Eilidh (GBR) (1987)	time		6.52	10.76	15.08		23.96	28.68	33.48		43.64	48.92		55.05	7 / 5			
	reaction time	0.176																
	interval			4.24	4.32		8.88	4.72	4.80		10.16	5.28	6.13					15.44
	velocity		6.90	8.25	8.10		7.88	7.42	7.29		6.89	6.63	6.53	7.27				6.80
	H1 lead leg	L																
	strides		23	15	15			16	16			17	21	123				
Sprunger, Leá (SUI) (1990)	time		6.52	10.84	15.20	19.72	24.20	28.96	33.84	38.84	44.00	49.44		55.36	4 / 6			
	reaction time	0.174																
	interval			4.32	4.36	4.52	4.48	4.76	4.88	5.00	5.16	5.44	5.92			13.20	14.12	15.60
	velocity		6.90	8.10	8.03	7.74	7.81	7.35	7.17	7.00	6.78	6.43	6.76	7.23		7.95	7.44	6.73
	H1 lead leg	R																
	strides		21	14	14	14	14	15	15	15		17	18.5	157.5				
Watson, Sage (CAN) (1994)	time		6.52	10.80	15.08		23.96	28.56	33.44		43.84			55.57	8 / 7			
	reaction time	0.184																
	interval			4.28	4.28		8.88	4.60	4.88		10.40							
	velocity		6.90	8.18	8.18		7.88	7.61	7.17		6.73			7.20				
	H1 lead leg	R																
	strides		22	15	15			15	16					83				



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=QRRFuOXI81E>

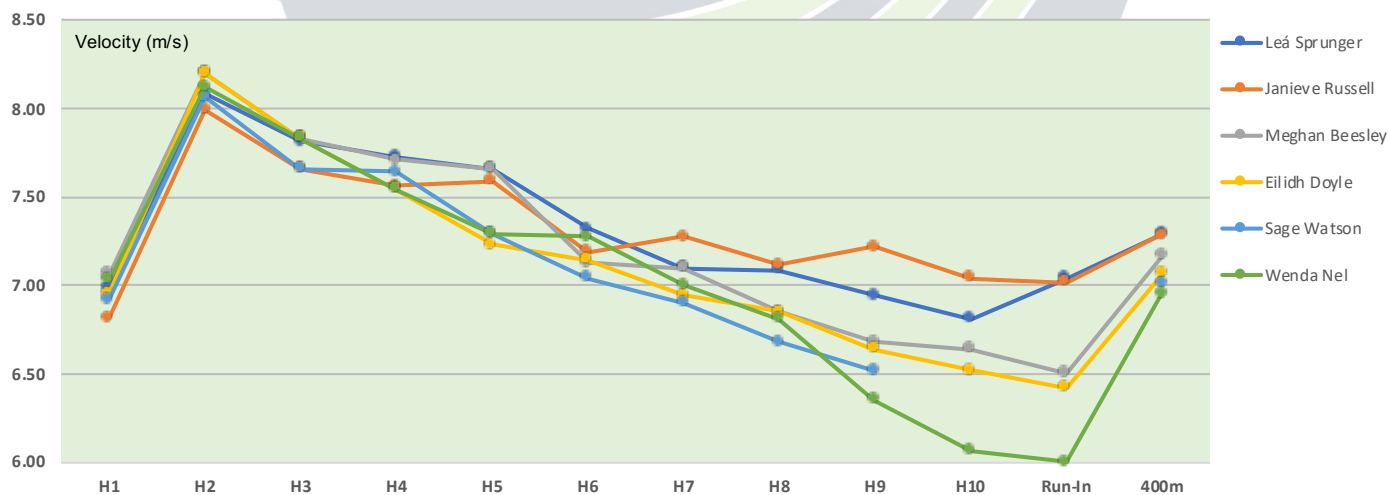
2018 Müller Grand Prix (Birmingham, GBR) (TV Analysis)

Women's 400m Hurdles

Date 2018.08.18

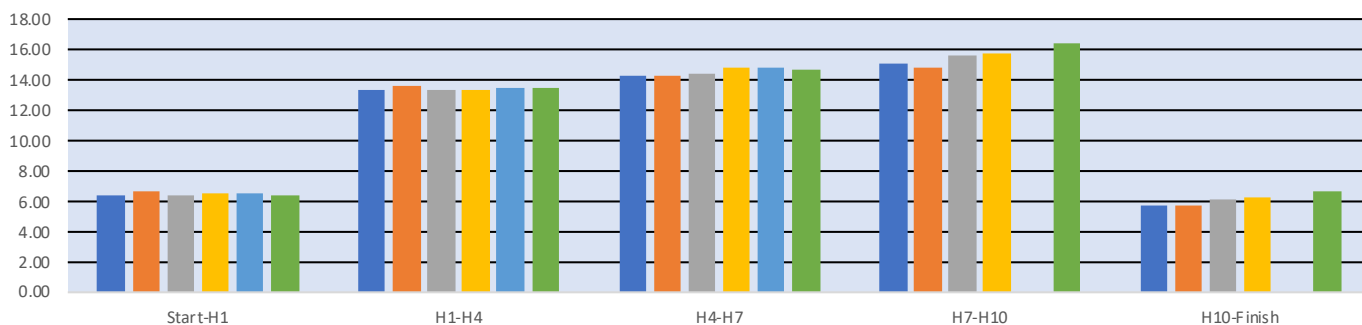
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Sprunger, Leá (SUI) (1990)	time		6.44	10.77	15.25	19.78	24.35	29.13	34.06	39.00	44.04	49.18		54.86	4 / 1			
	reaction time	0.116														13.34	14.28	15.12
	interval		6.99	4.33	4.48	4.53	4.57	4.78	4.93	4.94	5.04	5.14	5.68			7.87	7.35	6.94
	velocity																	
Russell, Janieve (JAM) (1993)	time		6.60	10.98	15.55	20.18	24.79	29.66	34.47	39.39	44.24	49.21		54.91	6 / 2			
	reaction time	0.149														13.58	14.29	14.74
	interval		6.82	7.99	7.66	7.56	7.59	7.19	7.28	7.11	7.22	7.04	7.02			7.73	7.35	7.12
	velocity																	
Beesley, Meghan (GBR) (1989)	time		6.37	10.64	15.11	19.65	24.22	29.13	34.06	39.17	44.41	49.68		55.83	7 / 3			
	reaction time	0.168														13.28	14.41	15.62
	interval		7.06	8.20	7.83	7.71	7.66	7.13	7.10	6.85	6.68	6.64	6.50			7.91	7.29	6.72
	velocity																	
Doyle, Eilidh (GBR) (1987)	time		6.47	10.74	15.21	19.85	24.69	29.59	34.63	39.74	45.01	50.38		56.61	3 / 4			
	reaction time	0.159														13.38	14.78	15.75
	interval		6.96	8.20	7.83	7.54	7.23	7.14	6.94	6.85	6.64	6.52	6.42			7.85	7.10	6.67
	velocity																	
Watson, Sage (CAN) (1994)	time		6.50	10.84	15.41	19.99	24.79	29.76	34.83	40.07	45.44			57.11	8 / 5			
	reaction time	0.174														13.49	14.84	
	interval		6.92	8.06	7.66	7.64	7.29	7.04	6.90	6.68	6.52					7.78	7.08	
	velocity																	
Nel, Wenda (RSA) (1988)	time		6.40	10.71	15.18	19.82	24.62	29.43	34.43	39.57	45.08	50.85		57.51	2 / 6			
	reaction time	0.183														13.42	14.61	16.42
	interval		7.03	8.12	7.83	7.54	7.29	7.28	7.00	6.81	6.35	6.07	6.01			7.82	7.19	6.39
	velocity																	



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=68h5d9OkWx0>

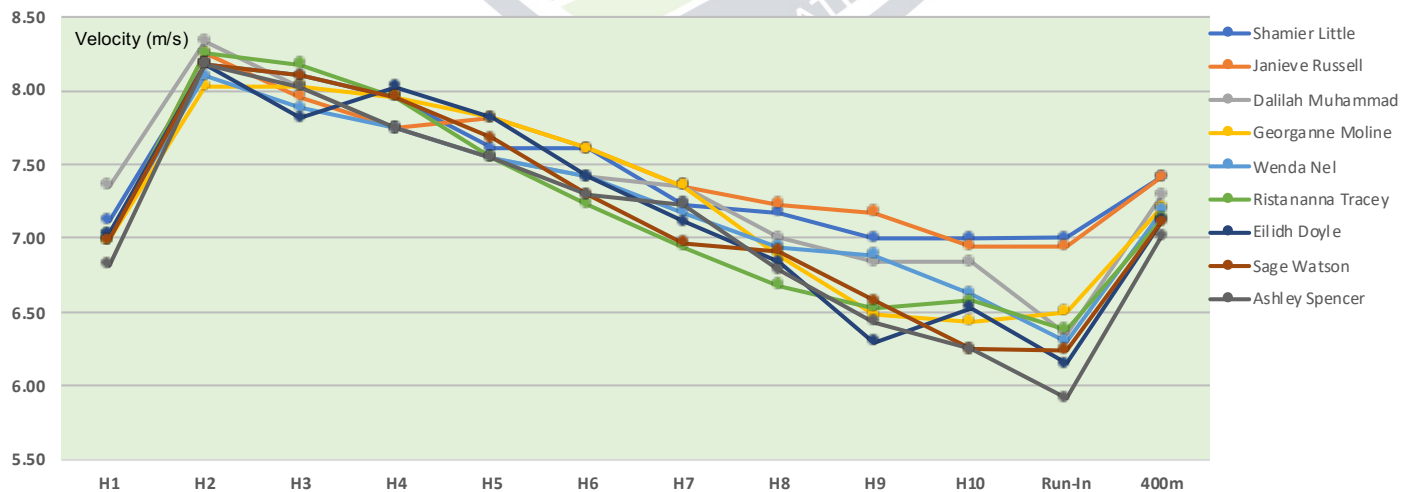
2018 Müller Anniversary Games (London, GBR) (TV Analysis)

Women's 400m Hurdles

Date 2018.07.21

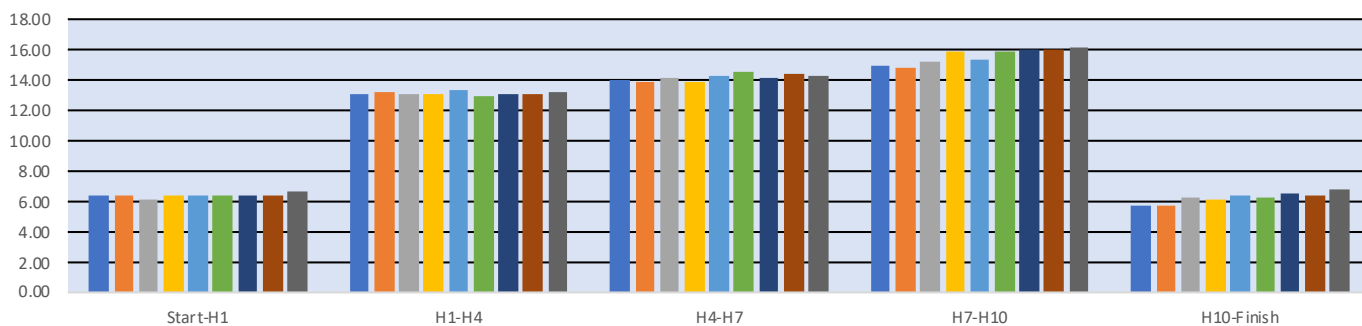
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Little, Shamier (USA) (1995)	time		6.32	10.60	14.92	19.32	23.92	28.52	33.36	38.24	43.24	48.24		53.95	5 / 1			
	reaction time	0.143																
	interval			4.28	4.32	4.40	4.60	4.60	4.84	4.88	5.00	5.00	5.71			13.00	14.04	14.88
	velocity		7.12	8.18	8.10	7.95	7.61	7.61	7.23	7.17	7.00	7.00	7.01	7.41		8.08	7.48	7.06
Russell, Janieve (JAM) (1993)	time		6.44	10.68	15.08	19.60	24.08	28.68	33.44	38.28	43.16	48.20		53.96	6 / 2			
	reaction time	0.206																
	interval			4.24	4.40	4.52	4.48	4.60	4.76	4.84	4.88	5.04	5.76			13.16	13.84	14.76
	velocity		6.99	8.25	7.95	7.74	7.81	7.61	7.35	7.23	7.17	6.94	6.94	7.41		7.98	7.59	7.11
Muhammad, Dalilah (USA) (1990)	time		6.12	10.32	14.68	19.20	23.84	28.56	33.32	38.32	43.44	48.56		54.86	4 / 3			
	reaction time																	
	interval			4.20	4.36	4.52	4.64	4.72	4.76	5.00	5.12	5.12	6.30			13.08	14.12	15.24
	velocity		7.35	8.33	8.03	7.74	7.54	7.42	7.35	7.00	6.84	6.84	6.35	7.29		8.03	7.44	6.89
Moline, Georganne (USA) (1990)	time		6.44	10.80	15.16	19.56	24.04	28.64	33.40	38.48	43.88	49.32		55.47	7 / 4			
	reaction time	0.211																
	interval			4.36	4.36	4.40	4.48	4.60	4.76	5.08	5.40	5.44	6.15			13.12	13.84	15.92
	velocity		6.99	8.03	8.03	7.95	7.81	7.61	7.35	6.89	6.48	6.43	6.50	7.21		8.00	7.59	6.60
Nel, Wenda (RSA) (1988)	time		6.40	10.72	15.16	19.68	24.32	29.04	33.92	38.96	44.04	49.32		55.67	1 / 5			
	reaction time	0.179																
	interval			4.32	4.44	4.52	4.64	4.72	4.88	5.04	5.08	5.28	6.35			13.28	14.24	15.40
	velocity		7.03	8.10	7.88	7.74	7.54	7.42	7.17	6.94	6.89	6.63	6.30	7.19		7.91	7.37	6.82
Tracey, Ristananna (JAM) (1992)	time		6.44	10.68	14.96	19.36	24.00	28.84	33.88	39.12	44.48	49.80		56.07	9 / 6			
	reaction time	0.204																
	interval			4.24	4.28	4.40	4.64	4.84	5.04	5.24	5.36	5.32	6.27			12.92	14.52	15.92
	velocity		6.99	8.25	8.18	7.95	7.54	7.23	6.94	6.68	6.53	6.58	6.38	7.13		8.13	7.23	6.60
Doyle, Eilidh (GBR) (1987)	time		6.40	10.68	15.16	19.52	24.00	28.72	33.64	38.76	44.32	49.68		56.18	8 / 7			
	reaction time	0.149																
	interval			4.28	4.48	4.36	4.48	4.72	4.92	5.12	5.56	5.36	6.50			13.12	14.12	16.04
	velocity		7.03	8.18	7.81	8.03	7.81	7.42	7.11	6.84	6.29	6.53	6.15	7.12		8.00	7.44	6.55
Watson, Sage (CAN) (1994)	time		6.44	10.72	15.04	19.44	24.00	28.80	33.82	38.88	44.20	49.80		56.21	2 / 8			
	reaction time	0.174																
	interval			4.28	4.32	4.40	4.56	4.80	5.02	5.06	5.32	5.60	6.41			13.00	14.38	15.98
	velocity		6.99	8.18	8.10	7.95	7.68	7.29	6.97	6.92	6.58	6.25	6.24	7.12		8.08	7.30	6.57
Spencer, Ashley (USA) (1993)	time		6.60	10.88	15.24	19.76	24.40	29.20	34.04	39.20	44.64	50.24		57.00	3 / 9			
	reaction time	0.164																
	interval			4.28	4.36	4.52	4.64	4.80	4.84	5.16	5.44	5.60	6.76			13.16	14.28	16.20
	velocity		6.82	8.18	8.03	7.74	7.54	7.29	7.23	6.78	6.43	6.25	5.92	7.02		7.98	7.35	6.48



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=StgSUC7UWNE>

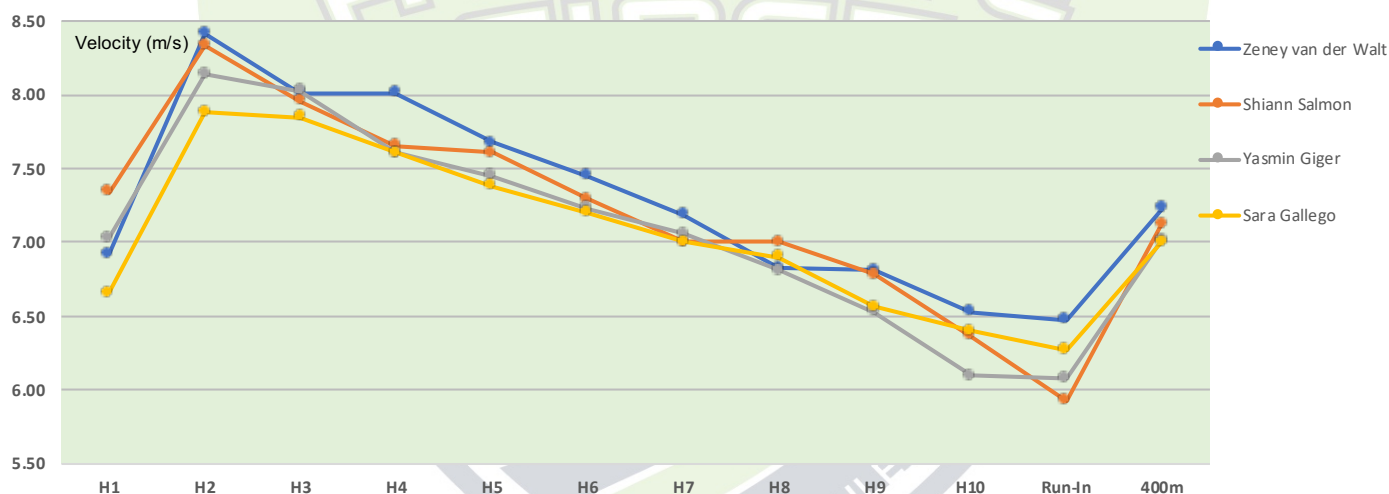
2018 IAAF World Junior Championships (Tampere, FIN) (TV Analysis)

Women's 400m Hurdles

Date 2018.07.13

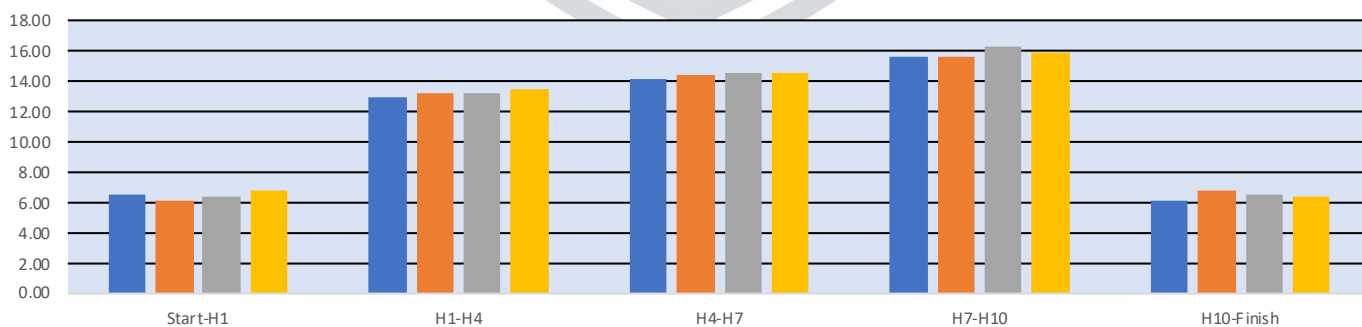
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Van Der Walt, Zeney (RSA) (2000)	time		6.50	10.66	15.03	19.40	23.96	28.66	33.53	38.66	43.80	49.16		55.34	5 / 1			
	reaction time	0.206																
	interval		6.92	4.16	4.37	4.37	4.56	4.70	4.87	5.13	5.14	5.36	6.18			12.90	14.13	15.63
	velocity		8.41	8.01	8.01	7.68	7.45	7.19	6.82	6.81	6.53	6.47	7.23			8.14	7.43	6.72
Salmon, Shiann (JAM) (1999)	time		6.13	10.33	14.73	19.30	23.90	28.70	33.70	38.70	43.86	49.36		56.11	4 / 2			
	reaction time	0.167																
	interval		7.34	4.20	4.40	4.57	4.60	4.80	5.00	5.00	5.16	5.50	6.75			13.17	14.40	15.66
	velocity		8.33	7.95	7.66	7.61	7.29	7.00	7.00	6.78	6.36	5.93	7.13			7.97	7.29	6.70
Giger, Yasmin (SUI) (1999)	time		6.40	10.70	15.06	19.66	24.36	29.20	34.16	39.30	44.66	50.40		56.98	8 / 3			
	reaction time	0.179																
	interval		7.03	4.30	4.36	4.60	4.70	4.84	4.96	5.14	5.36	5.74	6.58			13.26	14.50	16.24
	velocity		8.14	8.03	7.61	7.45	7.23	7.06	6.81	6.53	6.10	6.08	7.02			7.92	7.24	6.47
Gallego, Sara (ESP) (2000)	time		6.76	11.20	15.66	20.26	25.00	29.86	34.86	39.93	45.26	50.73		57.11	6 / 4			
	reaction time	0.190																
	interval		6.66	4.44	4.46	4.60	4.74	4.86	5.00	5.07	5.33	5.47	6.38	NJR PB		13.50	14.60	15.87
	velocity		7.88	7.85	7.61	7.38	7.20	7.00	6.90	6.57	6.40	6.27	7.00			7.78	7.19	6.62
	H1 lead leg	R	23	15	15	15	15	15	16	16	17	17	18	161				



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=QBG1H_3J03E

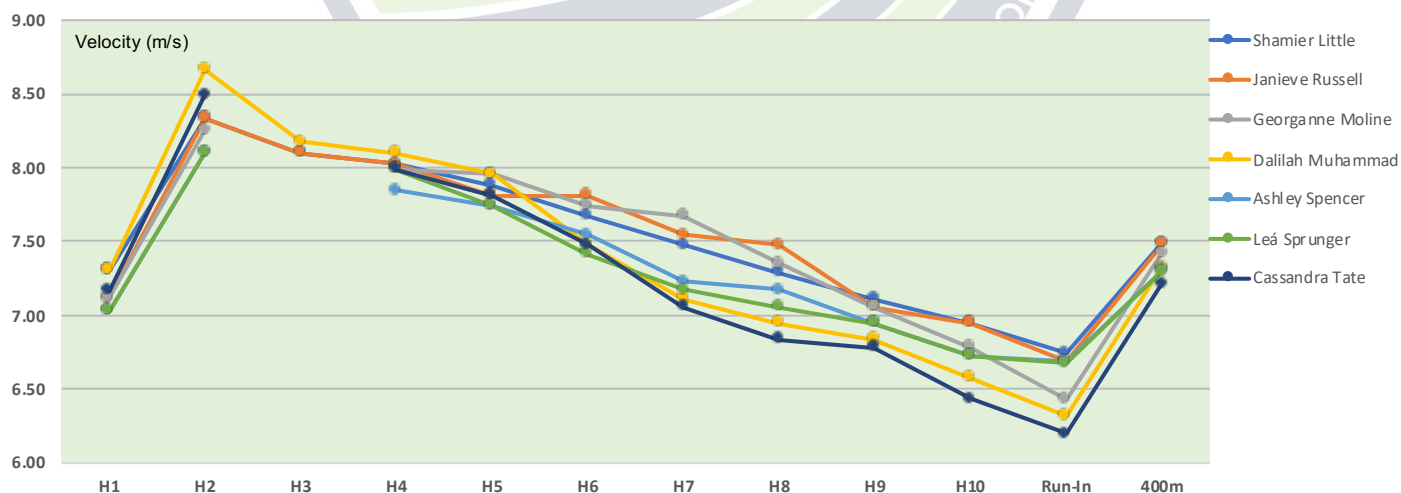
2018 Athletissima (Lausanne, SUI) (TV Analysis)

Women's 400m Hurdles

Date 2018.07.05

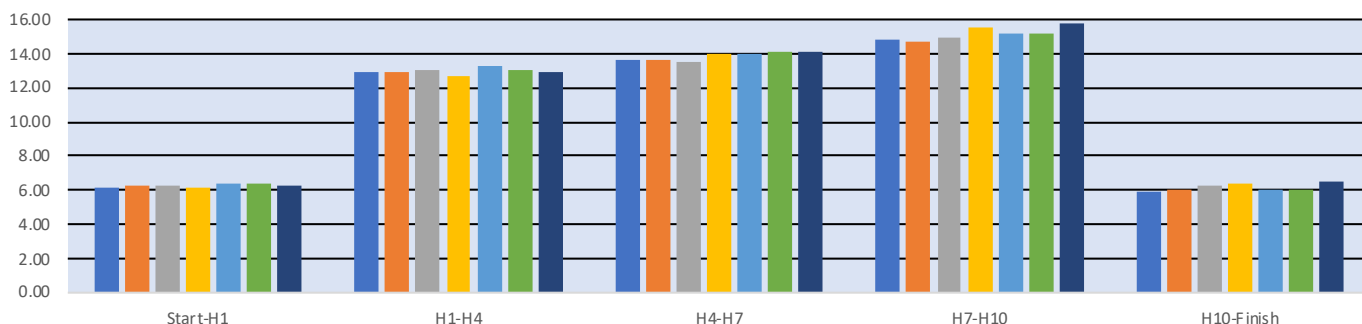
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Little, Shamier (USA) (1995)	time		6.16	10.36	14.68	19.04	23.48	28.04	32.72	37.52	42.44	47.48		53.41	4 / 1			
	reaction time	0.188																
	interval		7.31	4.20	4.32	4.36	4.44	4.56	4.68	4.80	4.92	5.04	5.93			12.88	13.68	14.76
	velocity		7.31	8.33	8.10	8.03	7.88	7.68	7.48	7.29	7.11	6.94	6.75	7.49		8.15	7.68	7.11
Russell, Janieve (JAM) (1993)	time		6.32	10.52	14.84	19.20	23.68	28.16	32.80	37.48	42.44	47.48		53.46	5 / 2			
	reaction time	0.147																
	interval		7.12	4.20	4.32	4.36	4.48	4.48	4.64	4.68	4.96	5.04	5.98	PB		12.88	13.60	14.68
	velocity		7.12	8.33	8.10	8.03	7.81	7.81	7.54	7.48	7.06	6.94	6.69	7.48		8.15	7.72	7.15
Moline, Georganne (USA) (1990)	time		6.32	10.56	14.84	19.32	23.72	28.24	32.80	37.56	42.52	47.68		53.90	7 / 3			
	reaction time	0.204																
	interval		7.12	4.24	4.32	4.36	4.40	4.52	4.56	4.76	4.96	5.16	6.22			13.00	13.48	14.88
	velocity		7.12	8.25	8.10	8.03	7.99	7.74	7.68	7.35	7.06	6.78	6.43	7.42		8.08	7.79	7.06
Muhammad, Dalilah (USA) (1990)	time		6.16	10.20	14.48	18.80	23.20	27.88	32.80	37.84	42.96	48.28		54.61	3 / 4			
	reaction time	0.182																
	interval		7.31	4.04	4.28	4.32	4.40	4.68	4.92	5.04	5.12	5.32	6.33			12.64	14.00	15.48
	velocity		7.31	8.66	8.18	8.10	7.95	7.48	7.11	6.94	6.84	6.58	6.32	7.32		8.31	7.50	6.78
Spencer, Ashley (USA) (1993)	time		6.40	10.72	14.84	19.64	24.16	28.80	33.64	38.52	43.56	48.76		54.74	8 / 5			
	reaction time	0.153																
	interval		7.03	4.32	4.32	4.32	4.42	4.64	4.84	4.88	5.04	5.20	5.98			13.24	14.00	15.12
	velocity		7.03	8.10	8.10	7.85	7.74	7.54	7.23	7.17	6.94	6.73	6.69	7.31		7.93	7.50	6.94
Sprunger, Leá (SUI) (1990)	time		6.40	10.72	14.84	19.48	24.00	28.72	33.60	38.56	43.60	48.80		54.79	6 / 6			
	reaction time	0.126																
	interval		7.03	4.32	4.32	4.32	4.42	4.64	4.84	4.88	5.04	5.20	5.99			13.08	14.12	15.20
	velocity		7.03	8.10	8.10	7.99	7.74	7.42	7.17	7.06	6.94	6.73	6.68	7.30		8.03	7.44	6.91
Tate, Cassandra (USA) (1990)	time		6.28	10.40	14.84	19.16	23.64	28.32	33.28	38.40	43.56	49.00		55.45	2 / 7			
	reaction time	0.208																
	interval		7.17	4.12	4.32	4.36	4.48	4.68	4.96	5.12	5.16	5.44	6.45			12.88	14.12	15.72
	velocity		7.17	8.50	8.10	8.03	7.81	7.48	7.06	6.84	6.78	6.43	6.20	7.21		8.15	7.44	6.68



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=zOzO.lIqao4g>

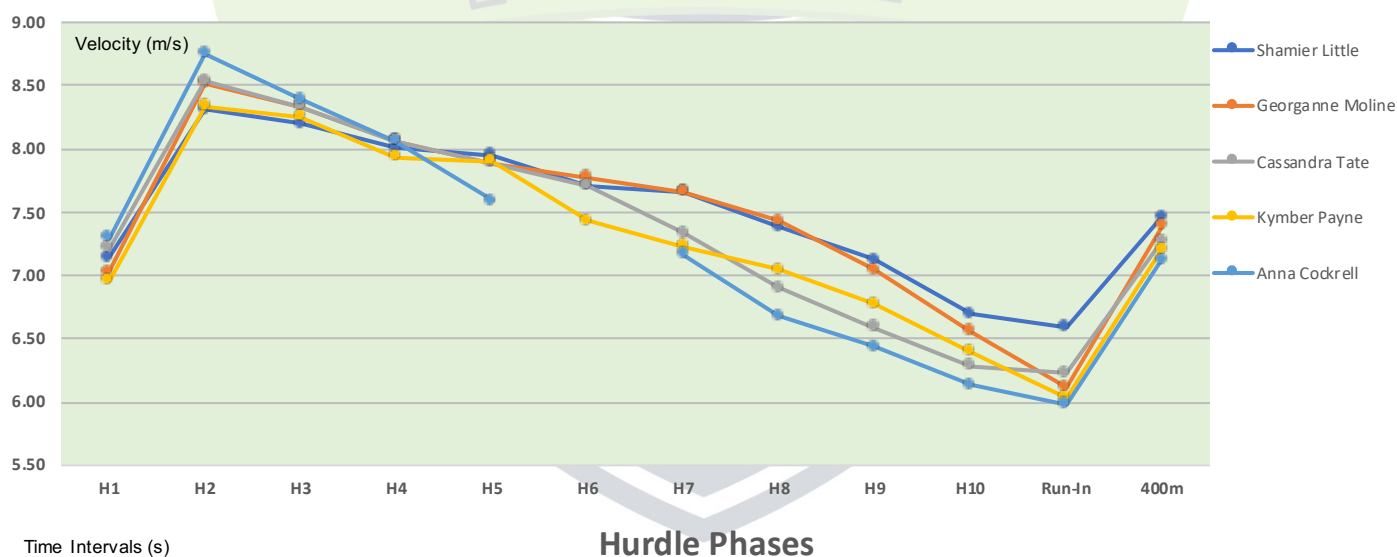
2018 USATF National Championships (Des Moines, IA) (TV Analysis)

Women's 400m Hurdles

Date 2018.06.24

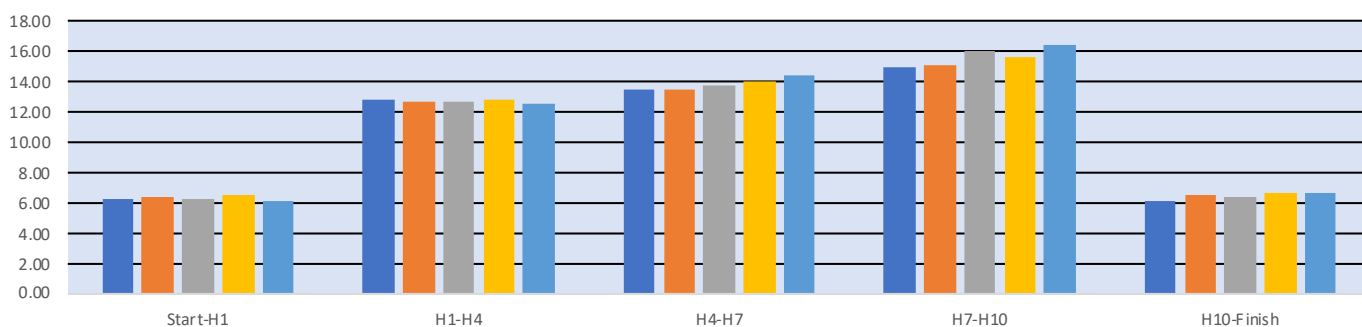
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Little, Shamier (USA) (1995)	time		6.30	10.51	14.78	19.15	23.55	28.09	32.66	37.40	42.31	47.54		53.61	5 / 1			
	reaction time															12.85	13.51	14.88
	interval			4.21	4.27	4.37	4.40	4.54	4.57	4.74	4.91	5.23	6.07			8.17	7.77	7.06
	velocity		7.14	8.31	8.20	8.01	7.95	7.71	7.66	7.38	7.13	6.69	6.59	7.46				
Moline, Georganne (USA) (1990)	H1 lead leg	R	23	15	15	15	15	15	15	15	16	16	20	180				
	time		6.40	10.51	14.71	19.05	23.49	27.99	32.56	37.27	42.24	47.58		54.12	4 / 2			
	reaction time															12.65	13.51	15.02
	interval			4.11	4.20	4.34	4.44	4.50	4.57	4.71	4.97	5.34	6.54			8.30	7.77	6.99
Tate, Cassandra (USA) (1990)	velocity		7.03	8.52	8.33	8.06	7.88	7.78	7.66	7.43	7.04	6.55	6.12	7.39				
	H1 lead leg	R	22	15	15	15	15	15	15	15	16	17	20.5	180.5				
	time		6.24	10.34	14.54	18.88	23.32	27.86	32.63	37.70	43.01	48.58		55.00	3 / 3			
	reaction time															12.64	13.75	15.95
Payne, Kymber (USA) (1996)	interval			4.10	4.20	4.34	4.44	4.54	4.77	5.07	5.31	5.57	6.42			8.31	7.64	6.58
	velocity		7.21	8.54	8.33	8.06	7.88	7.71	7.34	6.90	6.59	6.28	6.23	7.27				
	H1 lead leg	R	22	15	15	15	15	15	15	15	16	17	20	180				
	time		6.47	10.67	14.91	19.32	23.75	28.46	33.30	38.27	43.44	48.91		55.54	6 / 4			
Cockrell, Anna (USA) (1997)	reaction time															12.85	13.98	15.61
	interval			4.20	4.24	4.41	4.43	4.71	4.84	4.97	5.17	5.47	6.63			8.17	7.51	6.73
	velocity		6.96	8.33	8.25	7.94	7.90	7.43	7.23	7.04	6.77	6.40	6.03	7.20				
	H1 lead leg	L	24	15	15	15	15	16	16	17	17	17	20	187				
Cockrell, Anna (USA) (1997)	time		6.17	10.17	14.34	18.68	23.29		33.06	38.30	43.74	49.45		56.14	8 / 5			
	reaction time															12.51	14.38	16.39
	interval			4.00	4.17	4.34	4.61		9.77	5.24	5.44	5.71	6.69			8.39	7.30	6.41
	velocity		7.29	8.75	8.39	8.06	7.59		7.16	6.68	6.43	6.13	5.98	7.13				
	H1 lead leg	L	22	14	15	15	15			16	17	17		131				



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=oe2oir5DAwU>

Biomechanical Analysis

2018 NCAA Championships (Eugene, OR) (TV Analysis)

Women's 400m Hurdles

Date 2018.06.09

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		6.43	10.53	14.63	18.90	23.20	27.73	32.43	37.33	42.60	47.93		53.96	4 / 1			
	reaction time																	
	interval			4.10	4.10	4.27	4.30	4.53	4.70	4.90	5.27	5.33	6.03			12.47	13.53	15.50
	velocity		7.00	8.54	8.54	8.20	8.14	7.73	7.45	7.14	6.64	6.57	6.63	7.41		8.42	7.76	6.77
	H1 lead leg	R		14	14	14	14	15	15	15	16	16	19.2	152.2				
Cockrell, Anna (USA) (1997)	time		6.43	10.43		19.16	23.73	28.56	33.63	38.80	44.06	49.40		55.71	5 / 2			
	reaction time			4.00		8.73	4.57	4.83	5.07	5.17	5.26	5.34	6.31			12.73	14.47	15.77
	interval		7.00	8.75		8.02	7.66	7.25	6.90	6.77	6.65	6.55	6.34	7.18		8.25	7.26	6.66
	velocity																	
	H1 lead leg	L		14		15	16	16	16	16	16	16	20.5	113.5				
Payne, Kymber (USA) (1996)	time		6.73	10.93	15.20	19.53	23.96	28.73	33.70		44.33	50.03		56.88	6 / 3			
	reaction time			4.20	4.27	4.33	4.43	4.77	4.97		10.63	5.70	6.85			12.80	14.17	16.33
	interval		6.69	8.33	8.20	8.08	7.90	7.34	7.04		6.59	6.14	5.84	7.03		8.20	7.41	6.43
	velocity																	
	H1 lead leg	L		15		15	15	16	16	17		18		136				

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

Date 2018.05.13

FINAL

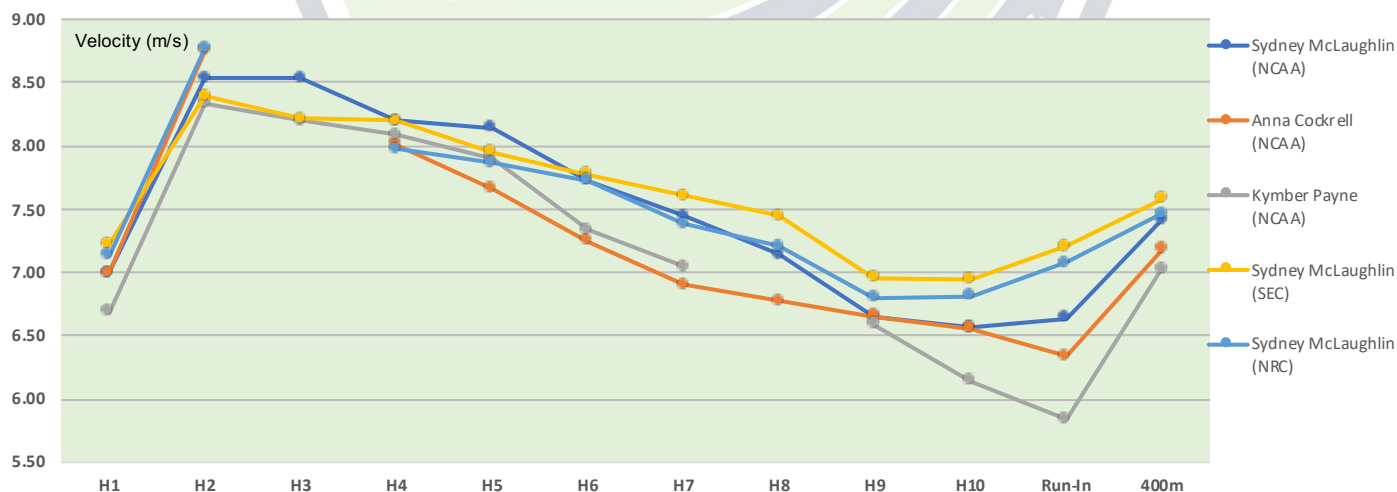
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (1999)	time		6.23	10.40	14.66	18.93	23.33	27.83	32.43	37.13	42.16	47.20		52.75	5 / 1			
	reaction time			4.17	4.26	4.27	4.40	4.50	4.60	4.70	5.03	5.04	5.55	WJR PB		12.70	13.50	14.77
	interval		7.22	8.39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

2018 National Relay Championships (Fayetteville, AR) (TV Analysis)

Date 2018.04.27

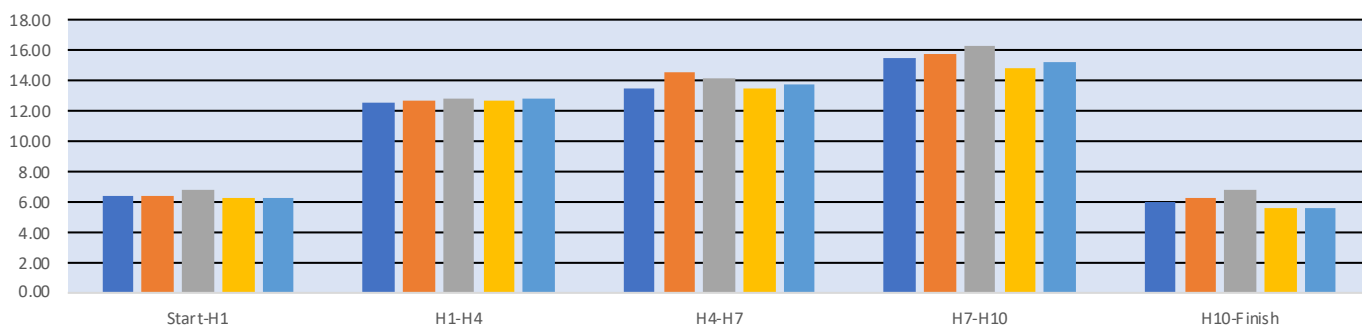
A FINAL

			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		6.31	10.30		19.08	23.53	28.06	32.80	37.66	42.81	47.95		53.60	5 / 1			
	reaction time			3.99		8.78	4.45	4.53	4.74	4.86	5.15	5.14	5.65	WJR PB		12.77	13.72	15.15
	interval		7.13	8.77		7.97	7.87	7.73	7.38	7.20	6.80	6.81	7.08	7.46		8.22	7.65	6.93
	velocity																	
	H1 lead leg	R		15		15	15	15	15	15	16	16	18.5	147.5				



Time Intervals (s)

Hurdle Phases



NCAA Championships

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: Gun Flash

Source: <https://www.youtube.com/watch?v=TKdwpS8IFzU>

South Eastern Conference Championships

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=DRlu2crrfMc>

National Relay Championships

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 60fps

Timing From: Gun Flash

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

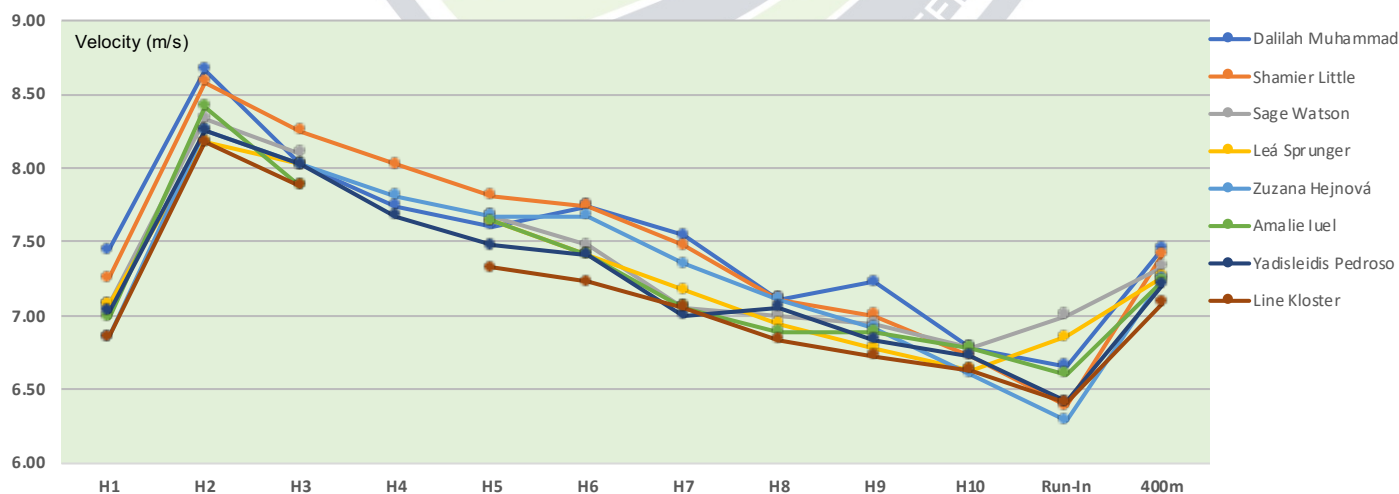
2018 Bislett Games (Oslo, NOR) (TV Analysis)

Women's 400m Hurdles

Date 2018.06.07

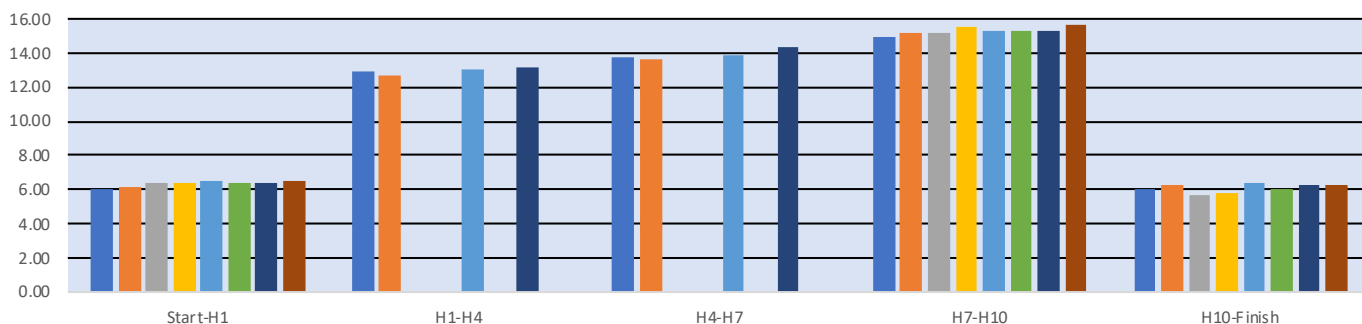
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Muhammad, Dalilah (USA) (1990)	time		6.04	10.08	14.44	18.96	23.56	28.08	32.72	37.64	42.48	47.64		53.65	5 / 1			
	reaction time	0.166																
	interval		7.45	8.66	4.36	4.52	4.60	4.52	4.64	4.92	4.84	5.16	6.01			12.92	13.76	14.92
	velocity		7.45	8.66	8.03	7.74	7.61	7.74	7.54	7.11	7.23	6.78	6.66	7.46		8.13	7.63	7.04
Little, Shamier (USA) (1995)	time		6.20	10.28	14.52	18.88	23.36	27.88	32.56	37.48	42.48	47.68		53.94	4 / 2			
	reaction time	0.200																
	interval		7.26	8.58	8.25	8.03	7.81	7.74	7.48	7.11	7.00	6.73	6.39	7.42		12.68	13.68	15.12
	velocity		7.26	8.58	8.03	7.81	7.74	7.48	7.11	7.00	6.73	6.39	6.20	181		8.28	7.68	6.94
Watson, Sage (CAN) (1994)	time		6.36	10.56	14.88		24.00	28.68	33.64	38.64	43.68	48.84		54.55	1 / 3			
	reaction time	0.162																
	interval		7.08	8.33	8.10		9.12	4.68	4.96	5.00	5.04	5.16	5.71	7.33				15.20
	velocity		7.08	8.33	8.10		7.68	7.48	7.06	7.00	6.94	6.78	7.01	150				6.91
Sprunger, Leá (SUI) (1990)	time		6.36	10.64	15.00		24.16	28.88	33.76	38.80	43.96	49.24		55.07	3 / 4			
	reaction time	0.138																
	interval		7.08	8.18	8.03		9.16	4.72	4.88	5.04	5.16	5.28	5.83	7.26				15.48
	velocity		7.08	8.18	8.03		7.64	7.42	7.17	6.94	6.78	6.63	6.86	144.5				6.78
Hejnová, Zuzana (CZE) (1986)	time		6.56	10.80	15.16	19.64	24.20	28.76	33.52	38.44	43.50	48.80		55.16	7 / 5			
	reaction time	0.145																
	interval		6.86	8.25	8.03	7.81	7.68	7.68	7.35	7.11	6.92	6.60	6.29	7.25		13.08	13.88	15.28
	velocity		6.86	8.25	8.03	7.81	7.68	7.68	7.35	7.11	6.92	6.60	6.29	180.2		8.03	7.56	6.87
luel, Amalie (NOR) (1994)	time		6.44	10.60	15.04		24.20	28.92	33.88	38.96	44.04	49.20		55.26	8 / 6			
	reaction time	0.140																
	interval		6.99	8.41	7.88		9.16	4.72	4.96	5.08	5.08	5.16	6.06	7.24				15.32
	velocity		6.99	8.41	7.88		7.64	7.42	7.06	6.89	6.89	6.78	6.60	131				6.85
Pedroso, Yadisleidis (ITA) (1987)	time		6.40	10.64	15.00	19.56	24.24	28.96	33.96	38.92	44.04	49.24		55.47	6 / 7			
	reaction time	0.226																
	interval		7.03	8.25	8.03	7.68	7.48	7.42	7.00	7.06	6.84	6.73	6.42	7.21		13.16	14.40	15.28
	velocity		7.03	8.25	8.03	7.68	7.48	7.42	7.00	7.06	6.84	6.73	6.42	171		7.98	7.29	6.87
Kloster, Line (NOR) (1990)	time		6.56	10.84	15.28		24.84	29.68	34.64	39.76	44.96	50.24		56.48	2 / 8			
	reaction time	0.190																
	interval		6.86	8.18	4.44		9.56	4.84	4.96	5.12	5.20	5.28	6.24					15.60
	velocity		6.86	8.18	7.88		7.32	7.23	7.06	6.84	6.73	6.63	6.41	119				6.73



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=YvvdzQ7vNeA>

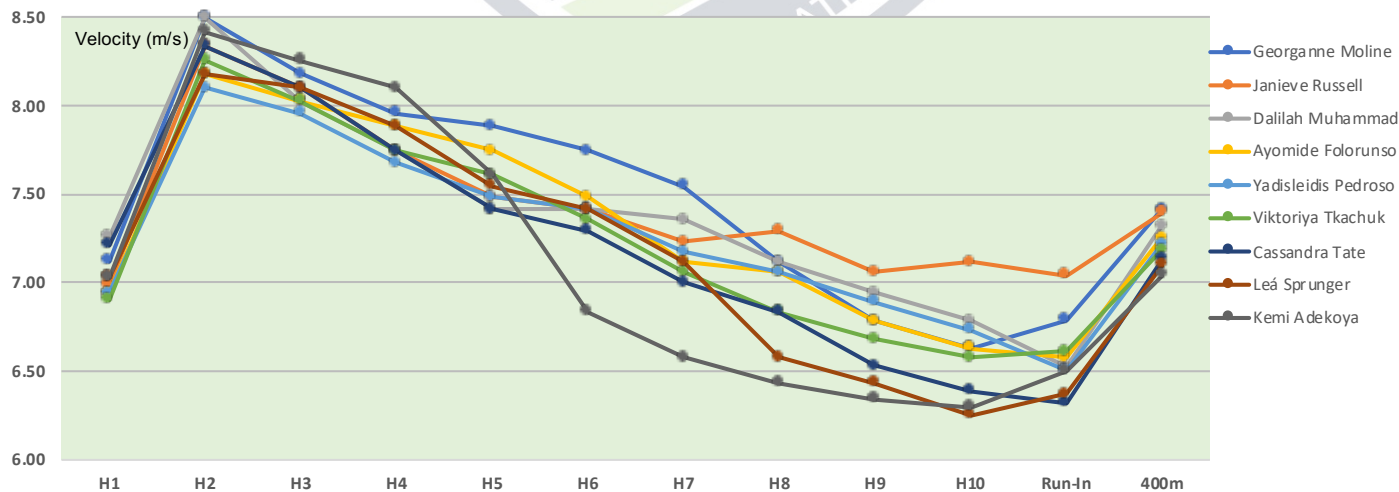
2018 Golden Gala Pietro Mennea (Rome, ITA) (TV Analysis)

Women's 400m Hurdles

Date 2018.05.31

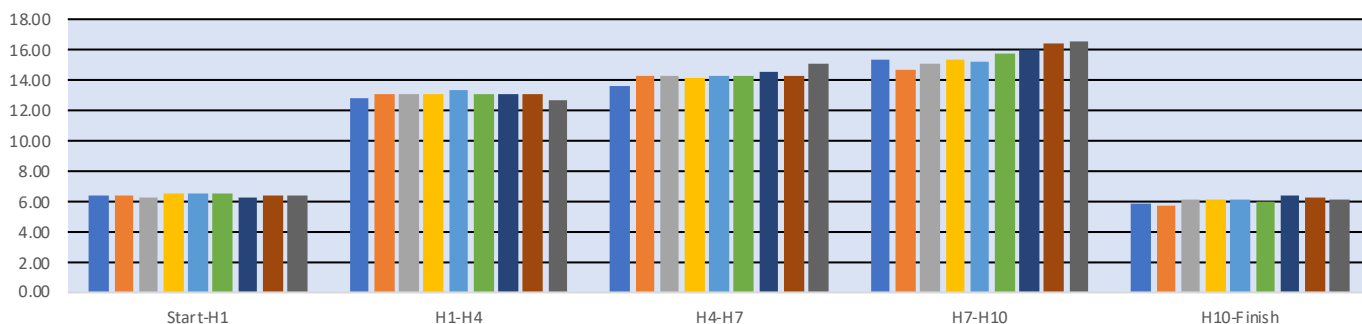
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Moline, Georganne (USA) (1990)	time		6.32	10.44	14.72	19.12	23.56	28.08	32.72	37.64	42.80	48.08		53.97	7 / 1			
	reaction time	0.213																
	interval			4.12	4.28	4.40	4.44	4.52	4.64	4.92	5.16	5.28	5.89			12.80	13.60	15.36
	velocity		7.12	8.50	8.18	7.95	7.88	7.74	7.54	7.11	6.78	6.63	6.79	7.41		8.20	7.72	6.84
Russell, Janieve (JAM) (1993)	time		6.44	10.64	14.96	19.48	24.16	28.88	33.72	38.52	43.48	48.40		54.08	5 / 2			
	reaction time	0.165																
	interval			4.20	4.32	4.52	4.68	4.72	4.84	4.80	4.96	4.92	5.68			13.04	14.24	14.68
	velocity		6.99	8.33	8.10	7.74	7.48	7.42	7.23	7.29	7.06	7.11	7.04	7.40		8.05	7.37	7.15
Muhammad, Dalilah (USA) (1990)	time		6.20	10.32	14.68	19.20	23.92	28.64	33.40	38.32	43.36	48.52		54.65	4 / 3			
	reaction time	0.172																
	interval			4.12	4.36	4.52	4.72	4.72	4.76	4.92	5.04	5.16	6.13			13.00	14.20	15.12
	velocity		7.26	8.50	8.03	7.74	7.42	7.42	7.35	7.11	6.94	6.78	6.53	7.32		8.08	7.39	6.94
Folorunso, Ayomide (ITA) (1996)	time		6.48	10.76	15.12	19.56	24.08	28.76	33.68	38.64	43.80	49.08		55.16	2 / 4			
	reaction time	0.182																
	interval			4.28	4.36	4.44	4.52	4.68	4.92	4.96	5.16	5.28	6.08	PB		13.08	14.12	15.40
	velocity		6.94	8.18	8.03	7.88	7.74	7.48	7.11	7.06	6.78	6.63	6.58	7.25		8.03	7.44	6.82
Pedroso, Yadisleidis (ITA) (1987)	time		6.48	10.80	15.20	19.76	24.44	29.16	34.04	39.00	44.08	49.28		55.43	8 / 5			
	reaction time	0.226																
	interval			4.32	4.40	4.56	4.68	4.72	4.88	4.96	5.08	5.20	6.15			13.28	14.28	15.24
	velocity		6.94	8.10	7.95	7.68	7.48	7.42	7.17	7.06	6.89	6.73	6.50	7.22		7.91	7.35	6.89
Tkachuk, Viktoriya (UKR) (1994)	time		6.52	10.76	15.12	19.64	24.24	29.00	33.96	39.08	44.32	49.64		55.69	9 / 6			
	reaction time	0.251																
	interval			4.24	4.36	4.52	4.60	4.76	4.96	5.12	5.24	5.32	6.05			13.12	14.32	15.68
	velocity		6.90	8.25	8.03	7.74	7.61	7.35	7.06	6.84	6.68	6.58	6.61	7.18		8.00	7.33	6.70
Tate, Cassandra (USA) (1990)	time		6.24	10.44	14.76	19.28	24.00	28.80	33.80	38.92	44.28	49.76		56.09	3 / 7			
	reaction time	0.228																
	interval			4.20	4.32	4.52	4.72	4.80	5.00	5.12	5.36	5.48	6.33			13.04	14.52	15.96
	velocity		7.21	8.33	8.10	7.74	7.42	7.29	7.00	6.84	6.53	6.39	6.32	7.13		8.05	7.23	6.58
Sprunger, Leá (SUI) (1990)	time		6.40	10.68	15.00	19.44	24.08	28.80	33.72	39.04	44.48	50.08		56.36	6 / 8			
	reaction time	0.147																
	interval			4.28	4.32	4.44	4.64	4.72	4.92	5.32	5.44	5.60	6.28			13.04	14.28	16.36
	velocity		7.03	8.18	8.10	7.88	7.54	7.42	7.11	6.58	6.43	6.25	6.37	7.10		8.05	7.35	6.42
Adekoya, Kemi (BRN) (1993)	time		6.40	10.56	14.80	19.12	23.72	28.84	34.16	39.60	45.12	50.68		56.83	1 / 9			
	reaction time	0.186																
	interval			4.16	4.24	4.32	4.60	5.12	5.32	5.44	5.52	5.56	6.15			12.72	15.04	16.52
	velocity		7.03	8.41	8.25	8.10	7.61	6.84	6.58	6.43	6.34	6.29	6.50	7.04		8.25	6.98	6.36



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=i0B41LvR3hY>

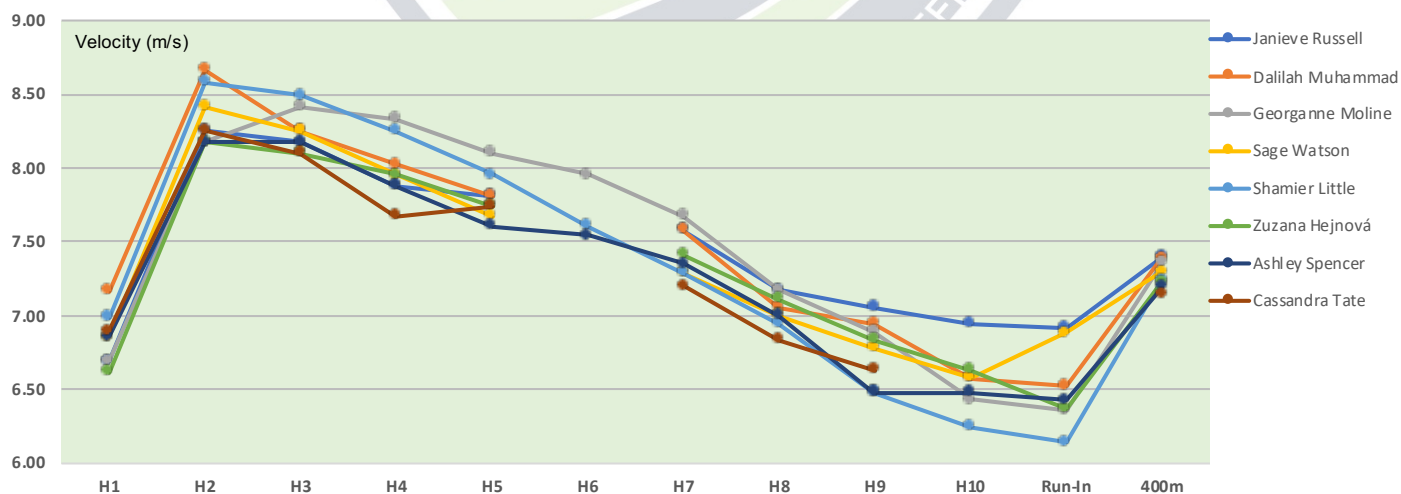
2018 Prefontaine Classic (Eugene, OR) (TV Analysis)

Women's 400m Hurdles

Date 2018.05.26

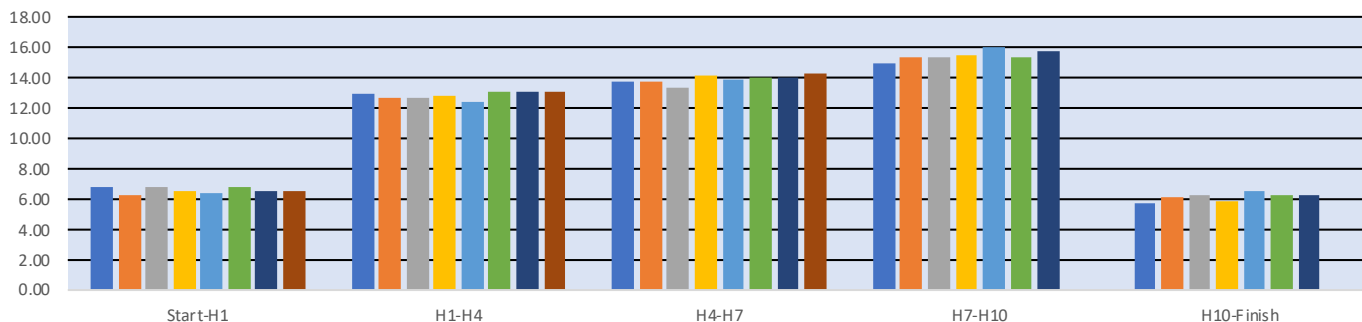
FINAL

			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Russell, Janieve (JAM) (1993)	time		6.72	10.96	15.24	19.68	24.16		33.40	38.28	43.24	48.28		54.06	5 / 1			
	reaction time	0.200							9.24	4.88	4.96	5.04	5.78			12.96	13.72	14.88
	interval		6.70	8.25	4.28	4.44	4.48		7.58	7.17	7.06	6.94	6.92	7.40		8.10	7.65	7.06
	velocity																	
Muhammad, Dalilah (USA) (1990)	time		6.28	10.32	14.56	18.92	23.40		32.64	37.60	42.64	47.96		54.09	4 / 2			
	reaction time	0.222							9.24	4.96	5.04	5.32	6.13			12.64	13.72	15.32
	interval		7.17	8.66	8.25	8.03	7.81		7.58	7.06	6.94	6.58	6.53	7.40		8.31	7.65	6.85
	velocity																	
Moline, Georganne (USA) (1990)	time		6.72	11.00	15.16	19.36	23.68	28.08	32.64	37.52	42.60	48.04		54.33	1 / 3			
	reaction time	0.219							4.56	4.88	5.08	5.44	6.29			12.64	13.28	15.40
	interval		6.70	8.18	8.41	8.33	8.10	7.95	7.68	7.17	6.89	6.43	6.36	7.36		8.31	7.91	6.82
	velocity																	
Watson, Sage (CAN) (1994)	time		6.56	10.72	14.96	19.36	23.92		33.52	38.52	43.68	49.00		54.81	7 / 4			
	reaction time	0.199							9.60	5.00	5.16	5.32	5.81			12.80	14.16	15.48
	interval		6.86	8.41	8.25	7.95	7.68		7.29	7.00	6.78	6.58	6.88	7.30		8.20	7.42	6.78
	velocity																	
Little, Shamier (USA) (1995)	time		6.44	10.52	14.64	18.88	23.28	27.88	32.68	37.72	43.12	48.72		55.23	2 / 5			
	reaction time	0.249							4.80	5.04	5.40	5.60	6.51			12.44	13.80	16.04
	interval		6.99	8.58	8.50	8.25	7.95	7.61	7.29	6.94	6.48	6.25	6.14	7.24		8.44	7.61	6.55
	velocity																	
Hejnová, Zuzana (CZE) (1986)	time		6.80	11.08	15.40	19.80	24.32		33.76	38.68	43.80	49.08		55.36	6 / 6			
	reaction time	0.190							9.44	4.92	5.12	5.28	6.28			13.00	13.96	15.32
	interval		6.62	8.18	8.10	7.95	7.74		7.42	7.11	6.84	6.63	6.37	7.23		8.08	7.52	6.85
	velocity																	
Spencer, Ashley (USA) (1993)	time		6.56	10.84	15.12	19.56	24.16	28.80	33.56	38.56	43.96	49.36		55.58	3 / 7			
	reaction time	0.183							4.76	5.00	5.40	5.40	6.22			13.00	14.00	15.80
	interval		6.86	8.18	8.18	7.88	7.61	7.54	7.35	7.00	6.48	6.48	6.43	7.20		8.08	7.50	6.65
	velocity																	
Tate, Cassandra (USA) (1990)	time		6.52	10.76	15.08	19.64	24.16		33.88	39.00	44.28			55.97	8 / 8			
	reaction time	0.256							9.72	5.12	5.28					13.12	14.24	
	interval		6.90	8.25	8.10	7.68	7.74		7.20	6.84	6.63			7.15		8.00	7.37	
	velocity																	
H1 lead leg	time																	
	interval																	
	velocity																	
	strides																	



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 25fps

Timing From: Gun Flash

Source: <https://www.youtube.com/watch?v=bX06kzSzWCI>

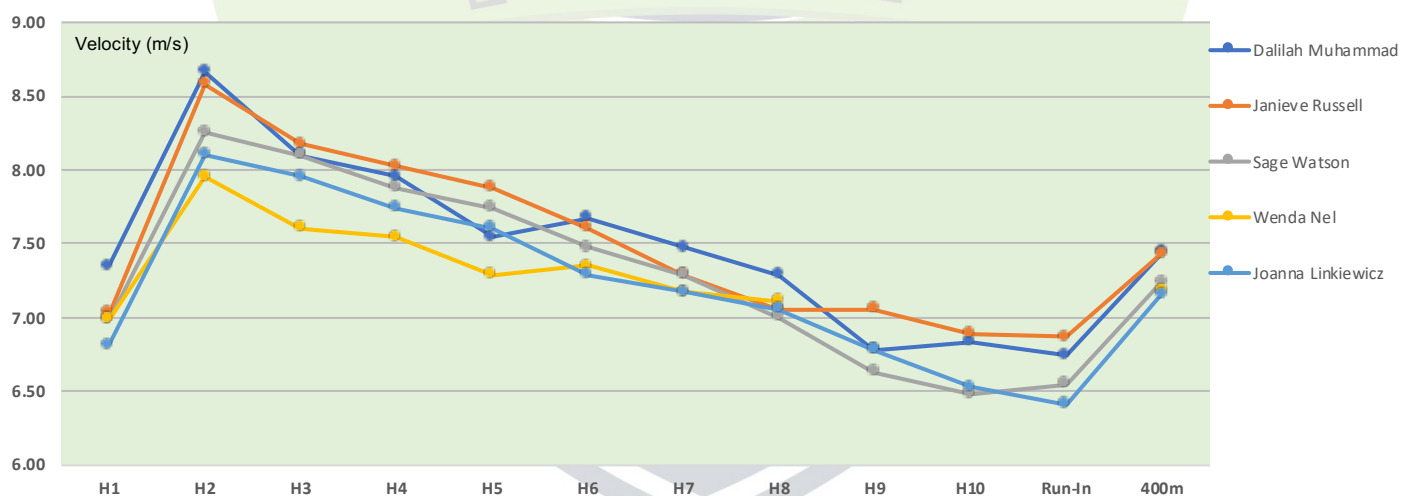
2018 Shanghai Diamond League (Shanghai, CHN) (TV Analysis)

Women's 400m Hurdles

Date 2018.05.12

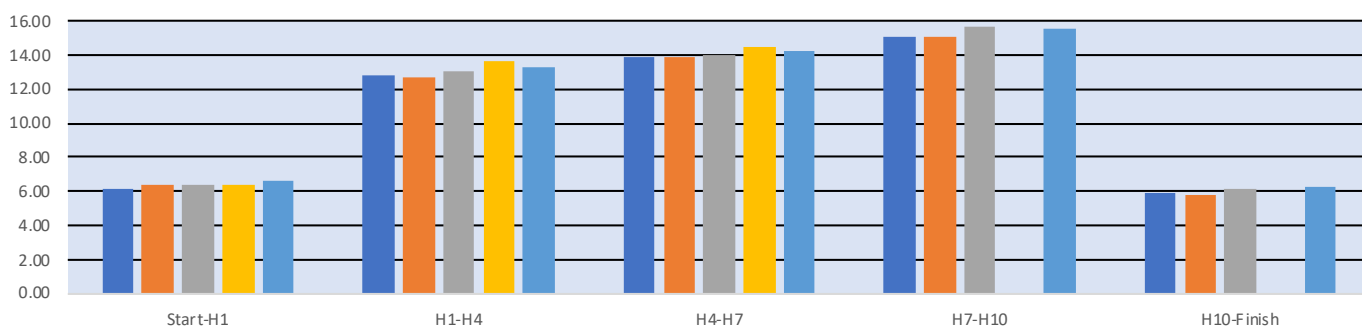
FINAL

			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	10.16	14.48	18.88	23.52	28.08	32.76	37.56	42.72	47.84		53.77	4 / 1			
	reaction time	0.186																
	interval		7.35	4.04	4.32	4.40	4.64	4.56	4.68	4.80	5.16	5.12	5.93			12.76	13.88	15.08
	velocity		8.66	8.10	7.95	7.54	7.68	7.48	7.29	6.78	6.84	6.75	7.44			8.23	7.56	6.96
Russell, Janieve (JAM) (1993)	time		6.40	10.48	14.76	19.12	23.56	28.16	32.96	37.92	42.88	47.96		53.78	3 / 2			
	reaction time	0.170																
	interval		7.03	4.08	4.28	4.36	4.44	4.60	4.80	4.96	4.96	5.08	5.82	PB		12.72	13.84	15.00
	velocity		8.58	8.18	8.03	7.88	7.61	7.29	7.06	7.06	6.89	6.87	7.44			8.25	7.59	7.00
Watson, Sage (CAN) (1994)	time		6.44	10.68	15.00	19.44	23.96	28.64	33.44	38.44	43.72	49.12		55.23	7 / 3			
	reaction time	0.180																
	interval		6.99	4.24	4.32	4.44	4.52	4.68	4.80	5.00	5.28	5.40	6.11			13.00	14.00	15.68
	velocity		8.25	8.10	7.88	7.74	7.48	7.29	7.00	6.63	6.48	6.55	7.24			8.08	7.50	6.70
Nel, Wenda (RSA) (1988)	time		6.44	10.84	15.44	20.08	24.88	29.64	34.52	39.44				55.63	8 / 4			
	reaction time	0.184																
	interval		4.40	4.60	4.64	4.80	4.76	4.88	4.92							13.64	14.44	
	velocity		6.99	7.95	7.61	7.54	7.29	7.35	7.17	7.11						7.70	7.27	
Linkiewicz, Joanna (POL) (1990)	time		6.60	10.92	15.32	19.84	24.44	29.24	34.12	39.08	44.24	49.60		55.84	2 / 5			
	reaction time	0.138																
	interval		4.32	4.40	4.52	4.60	4.80	4.88	4.96	5.16	5.36	6.24				13.24	14.28	15.48
	velocity		6.82	8.10	7.95	7.74	7.61	7.29	7.17	7.06	6.78	6.53	6.41	7.16		7.93	7.35	6.78
	H1 lead leg	R	23	15	15	15	15	15	15	16	16	16	19.5	179.5				
	H1 lead leg	R	22	15	15	15	15	15	15	16	16	16	19.5	179.5				
	H1 lead leg	R	22	15	15	15	15	15	15	16	17	17						
	H1 lead leg	L	23	16	16	16	16	16	17	17								
	H1 lead leg	L	25	16	16	16	16	17	17	17	17	18						



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=eqCAJB0IGY>