

Admixture evaluation

- Mumbai region

Technical Requirements

- Type of admixture
- Minimum water reduction required (18% or greater in our case)
- Retention time for mixes etc. (Taking into account worst case scenarios)
- Details of mix design for each area

Aim

Conduct concrete trials on two cements (OPC & PPC) with one lower grade (major concrete grade in the area, M30) & one higher grade (M40 & above, M50) & to record the following data:

- Dosage of admixture
- Slump (Initial) & Slump retention
(For the retention desired in the area)
- Air content
- Compressive strength
(7 & 28 days)

Superplasticizers studied

Superplasticizer Brand	Superplasticizer	Type of SP (As per ASTM)
1	LD RB112 [LG]	Type G
	LD RB111 [HG]	Type G
2	CF 125 [LG]	Type G
	CF 165 [HG]	Type G
3	SUPAPLAST-PC(RMC) [LG]	Type G
	SUPAPLAST-PC(S) [HG]	Type G
4	SIKAMENT 581 acc [LG]	Type G
	SIKAMENT HE 510 acc [HG]	Type G
5	CONPLAST SP-440 [LG]	Type G
	CONPLAST SP-500 [HG]	Type G

Concrete mixtures studied for evaluation

	OPC (30 MPa)	OPC (50 MPa)	PPC (30 MPa)	PPC (50 MPa)
Cement, kg	380	480	380	520
Water, kg	160	160	160	160
20 mm, kg	433	545	428	525
10 mm, kg	473	451	467	435
N. Sand, kg	668	551	660	531
C. Sand, kg	330	278	326	268

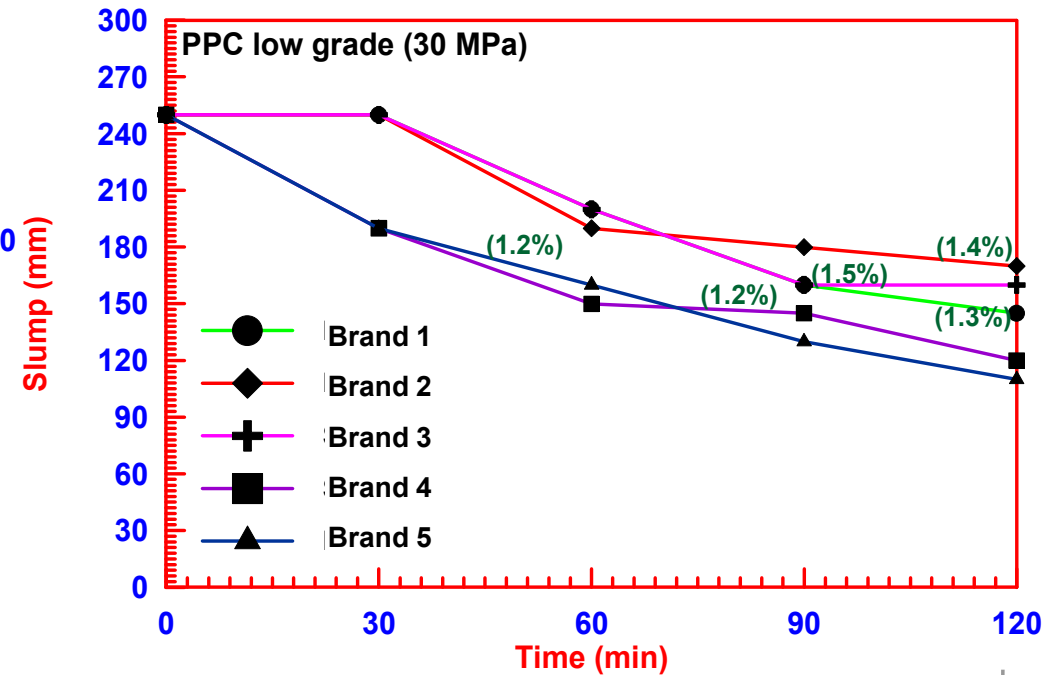
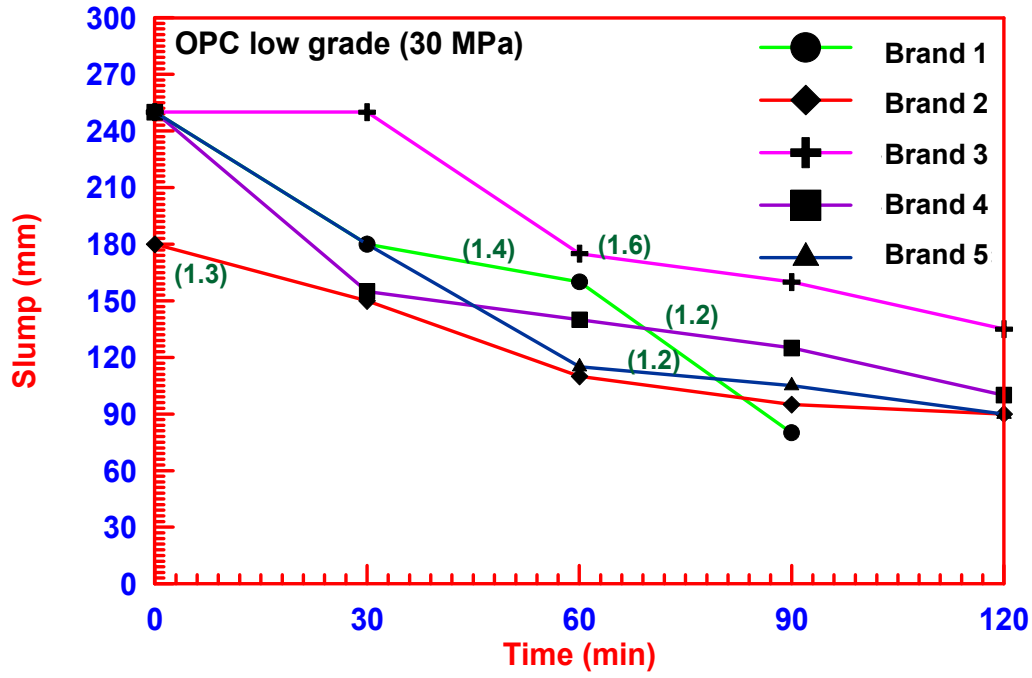
Results of laboratory trials

Brand		# 1		# 2		# 3		# 4		# 5	
Cement type		OPC	PPC	OPC	PPC	OPC	PPC	OPC	PPC	OPC	PPC
Admixture dosage (%)		1.4	1.3	1.3	1.4	1.6	1.5	1.2	1.2	1.2	1.2
Slump (mm)	Initial	>250	>250	180	>250	>250	>250	>250	>250	>250	>250
	30 min	180	250	150	>250	>250	>250	155	190	180	190
	60 min	160	200	110	190	175	200	140	150	115	160
	90 min	80	160	95	180	160	160	125	145	105	130
	120 min	--	145	90	170	135	160	100	120	90	110
Strength (MPa)	7 d	39.3	35.3	40.3	29.5	37.0	31.0	42.7	35.3	35.4	35.9
	28 d	55.9	47.0	54.8	46.2	49.7	45.0	56.2	48.3	51.6	50.0
Air content (%) at 2 Hrs		--	1.9	2.4	3.3	2.5	1.5	3.0	2.2	3.3	2.7

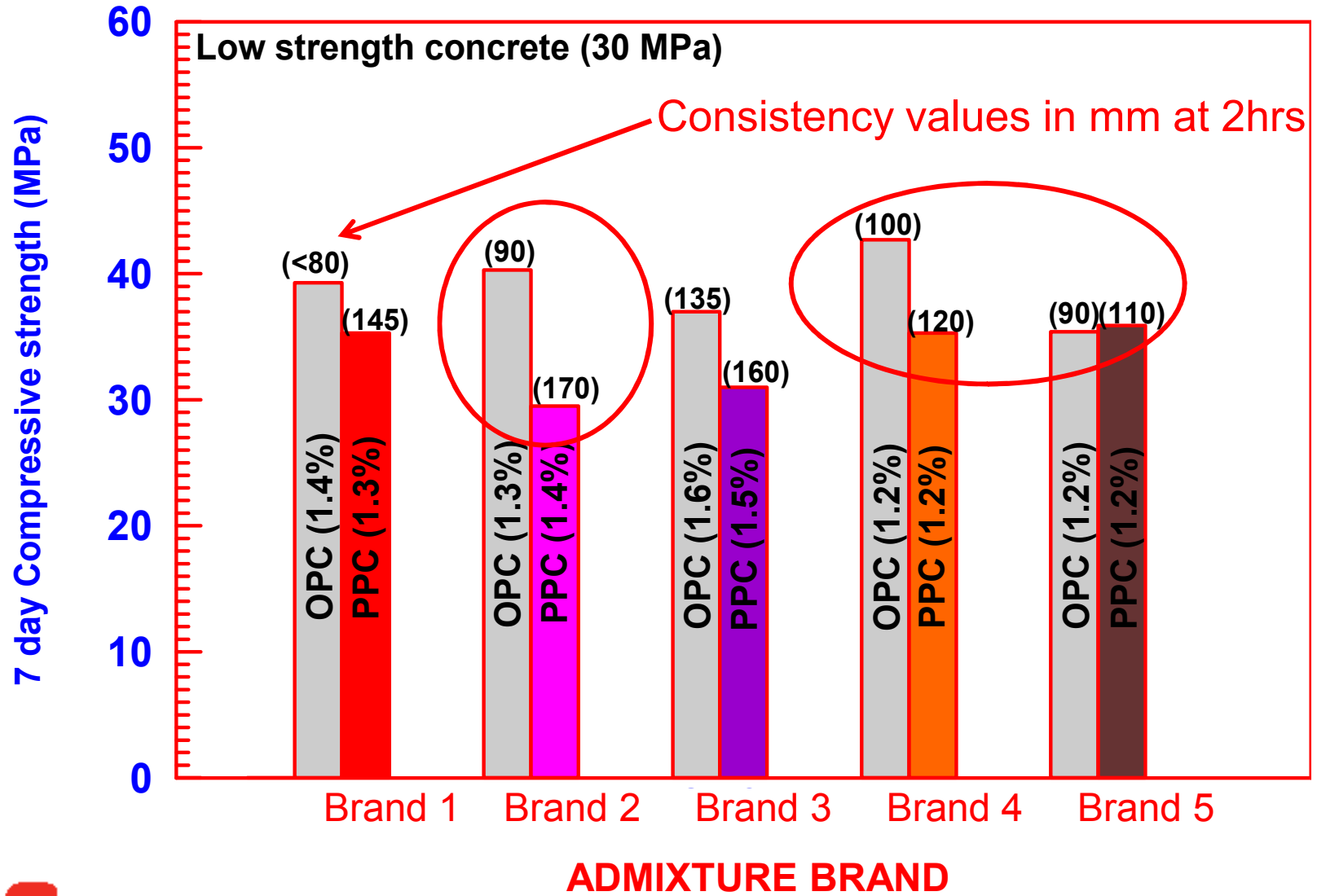
Results of laboratory trials

Brand		# 1		# 2		# 3		# 4		# 5	
Cement type		OPC	PPC	OPC	PPC	OPC	PPC	OPC	PPC	OPC	PPC
Admixture dosage (%)		1.4	1.4	1.4	1.3	1.3	--	1.2	1.25	1.3	1.1
Slump (mm)	Initial	>250	>250	>250	>250	>250	--	>250	>250	>250	>250
	30 min	>250	250	>250	>250	>250	--	150	190	180	200
	60 min	180	220	160	180	>250	--	130	190	150	160
	90 min	160	195	150	180	200	--	100	175	130	140
	120 min	140	180	115	125	160	--	100	140	110	110
Strength (MPa)	7 d	45.4	48.0	53.1	46.0	56.8	--	53.1	49.5	46.7	51.6
	28 d	68.6	62.5	70.7	65.2	67.5	--	68.8	59.6	65.0	65.8
Air content (%) at 2 Hrs		1.5	1.6	1.1	1.5	1.9	--	1.6	1.3	1.7	2.5

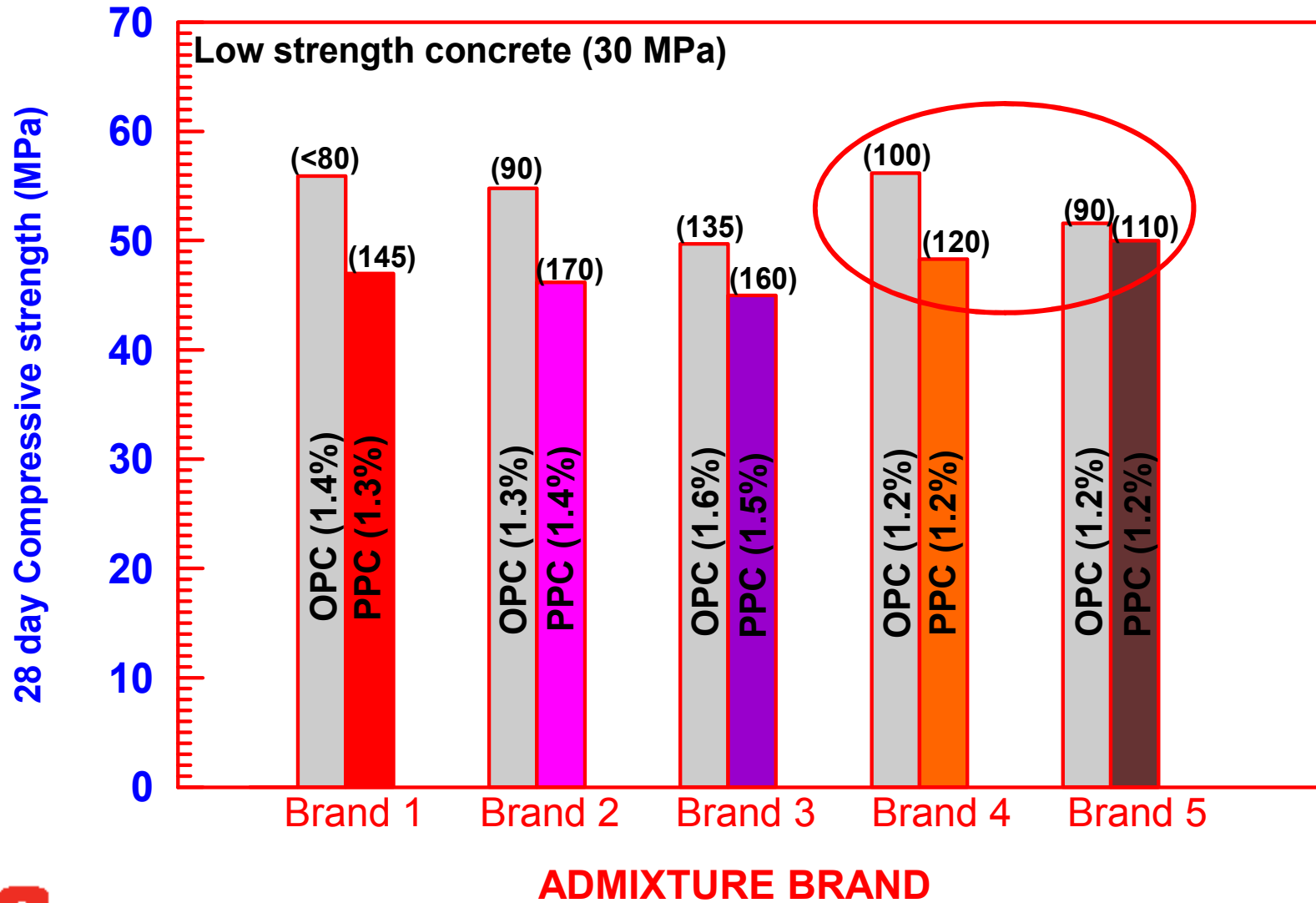
Slump Retention of low strength concrete



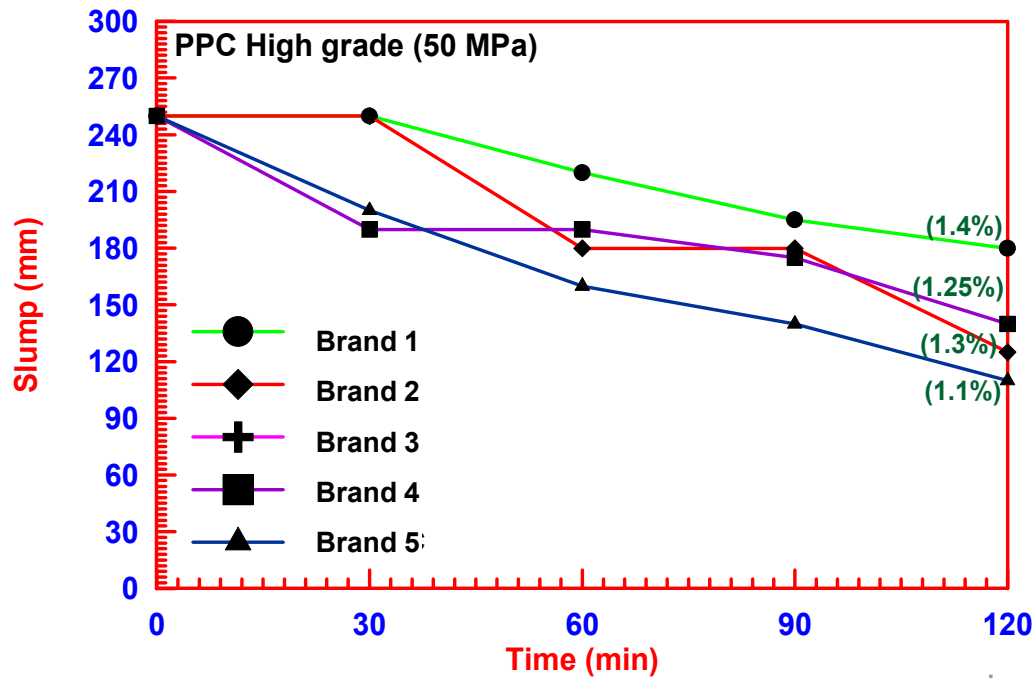
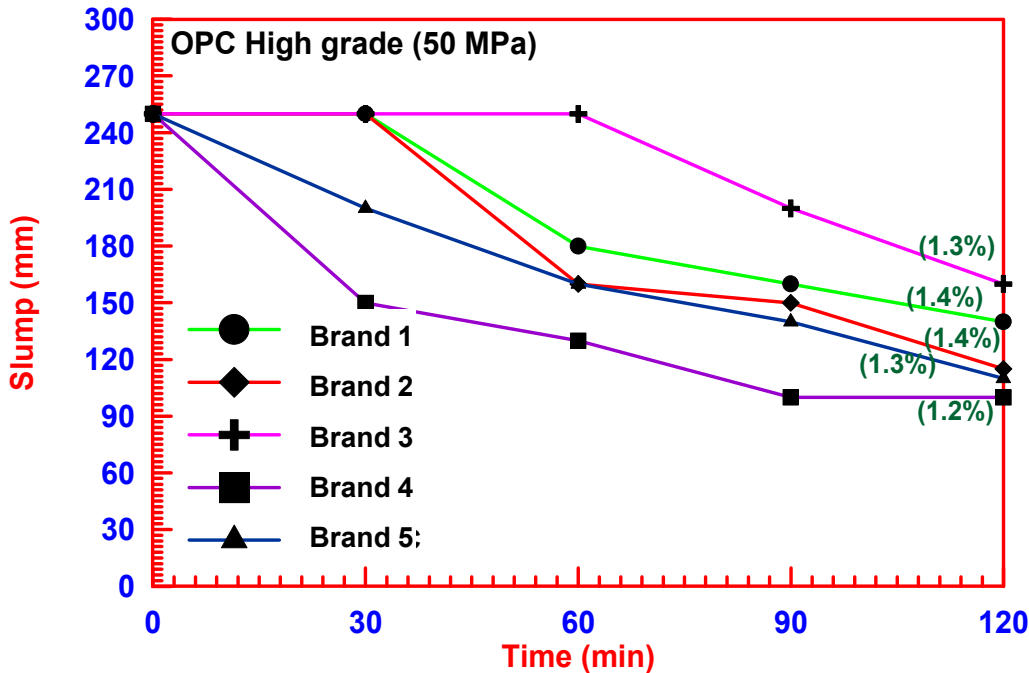
Trends observed (7 days)



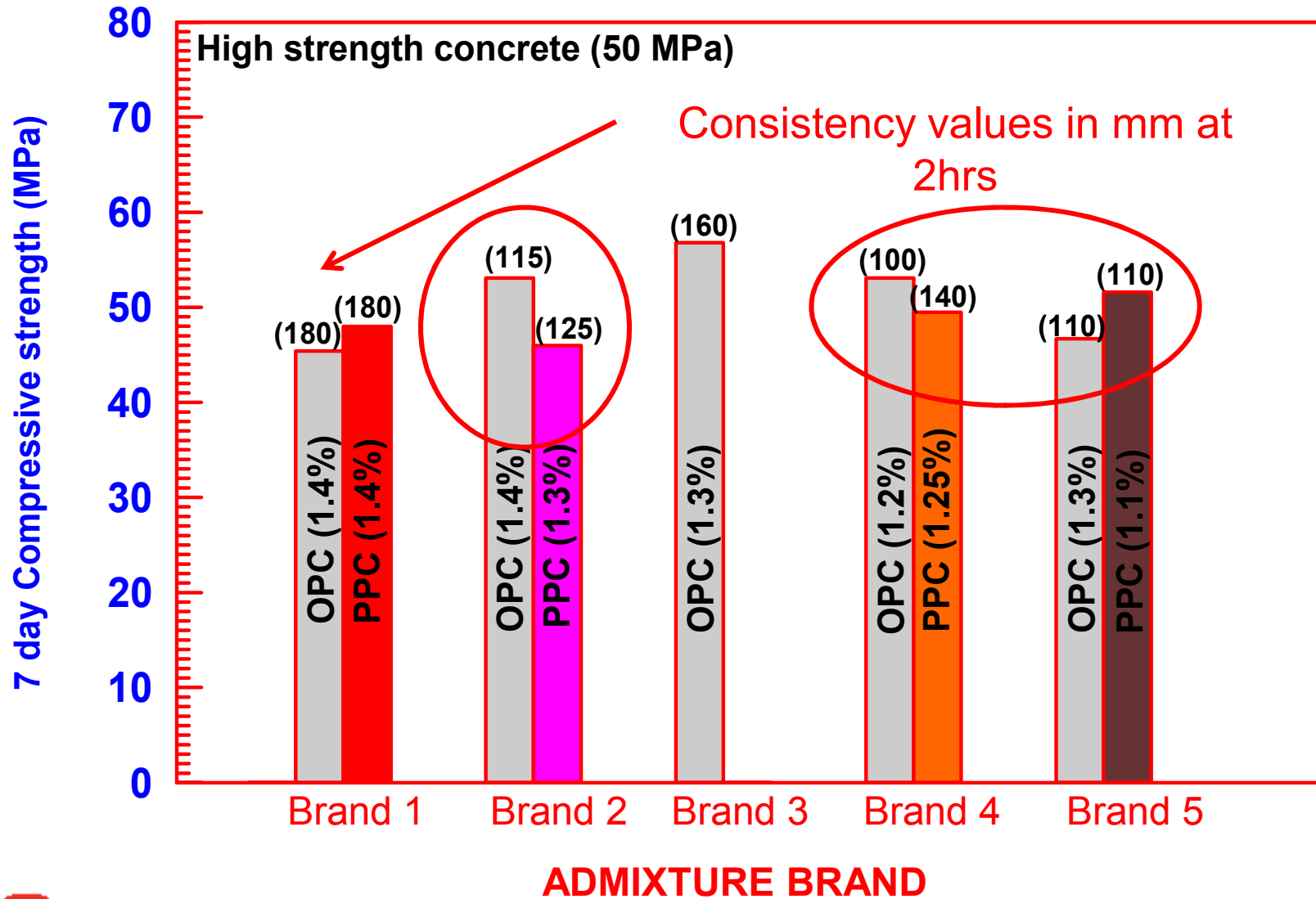
Trends observed (28 days)



Slump Retention of high strength concrete



Trends observed (7 days)



Trends observed (28 days)

