

**LABORATORY REPORT:
EN 1177 (2008)**

**Assessment of Critical Fall Height on Standard
Wetpour Systems – 20mm, 40mm, 50mm, 60mm,
70mm, 90mm, 110mm and 130mm**

Report Number **LSUK.17-0236 (Revised V2)**

Client **MRI Polytech**

Date(s) **20/11/2017**

This report contains 14 pages.

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SUMMARY

Standard Wetpour Systems at thicknesses of 20mm, 40mm, 50mm, 60mm, 70mm, 90mm, 110mm and 130mm have been tested in accordance with EN 1177:2008 "Impact Absorbing Playground Surfacing – Safety requirements and test methods". This report describes the samples tested, the method of the test employed and the results obtained are given.

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1. INTRODUCTION

A programme of testing has been carried out on samples of Standard Wetpour Systems at thicknesses of 20mm, 40mm, 50mm, 60mm, 70mm, 90mm, 110mm and 130mm.

The product was tested to the method given in EN 1177:2008 "Impact Absorbing Playground Surfacing – Safety requirements and test methods". The method of test employed is described and the results obtained are given.

2. PRODUCT DETAILS & DESCRIPTION

- 20mm Wetpour
- 40mm Wetpour
- 50mm Wetpour
- 60mm Wetpour
- 70mm Wetpour
- 90mm Wetpour
- 110mm Wetpour
- 130mm Wetpour

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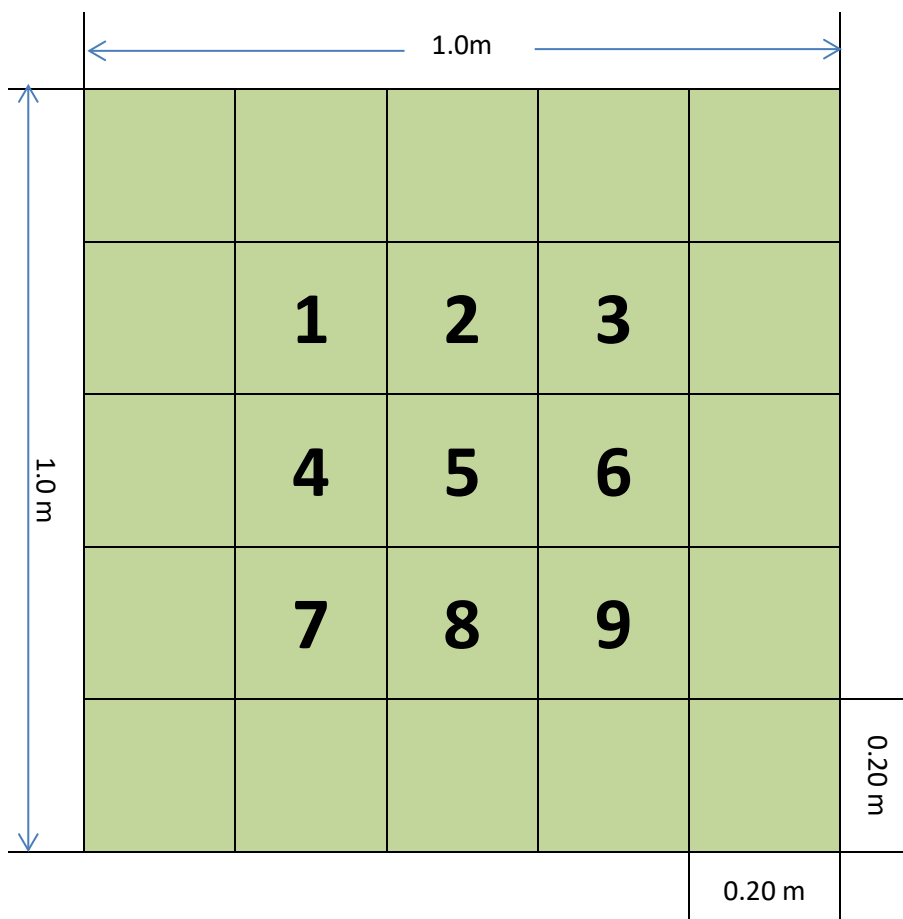
TEST PROCEDURE

The test procedure employed was that described in section 4 of EN 1177:2008 “Impact Absorbing Playground Surfacing – Safety requirements and test methods”. All samples were conditioned in a temperature controlled laboratory at 23 ± 2°C for 24 hours prior to testing and the air temperature maintained over the same range during testing. The samples were tested laid loose on the concrete laboratory floor.

Please note: testing on a rigid concrete substrate will provide a worst case scenario for HIC and hence the CFH values obtained in the laboratory will often be lower than one would expect or experienced in-situ when the systems are often placed on a macadam, unbound or naturally occurring base/formation.

Test floor	Concrete
Test location	Labosport laboratory
Method of attachment	Loose Laid
Surface condition	Dry
Surface temperature	23.1°C
Laboratory temperature	23.9°C

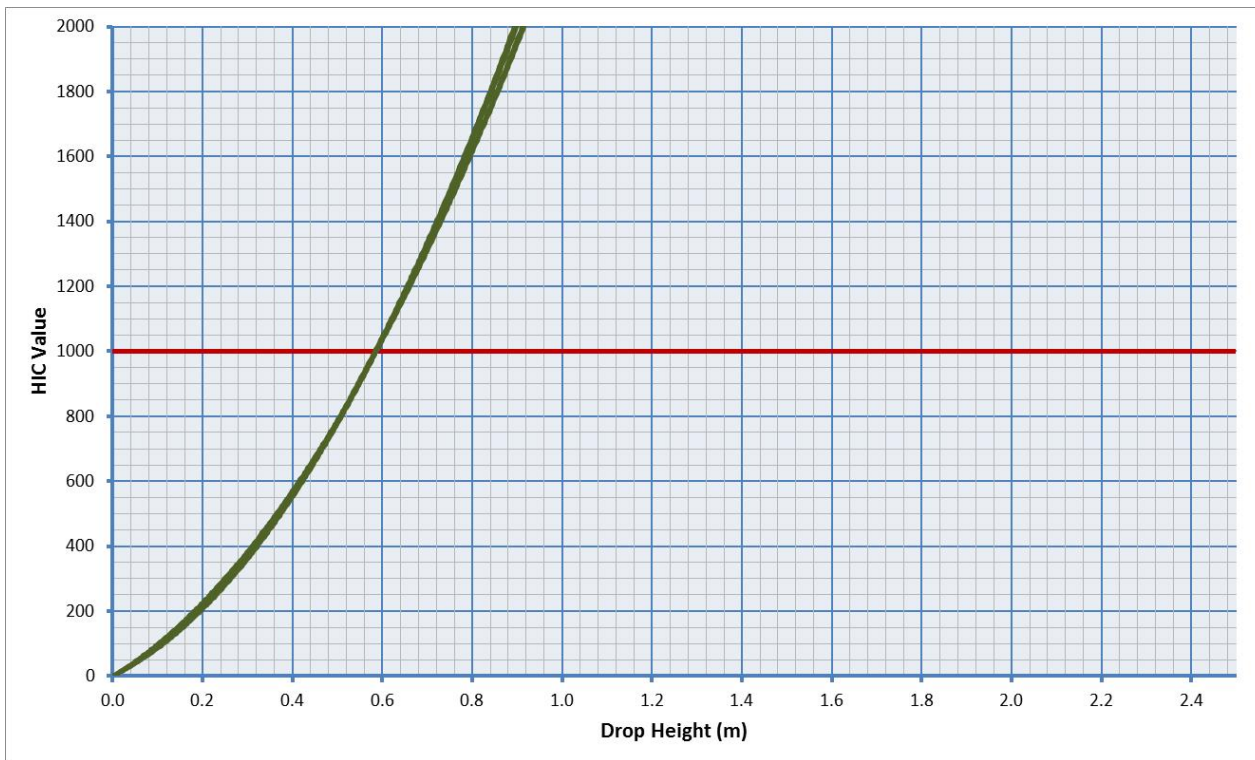
The samples were tested at the following locations (diagram not to scale):



3. TEST RESULTS

20mm Wetpour

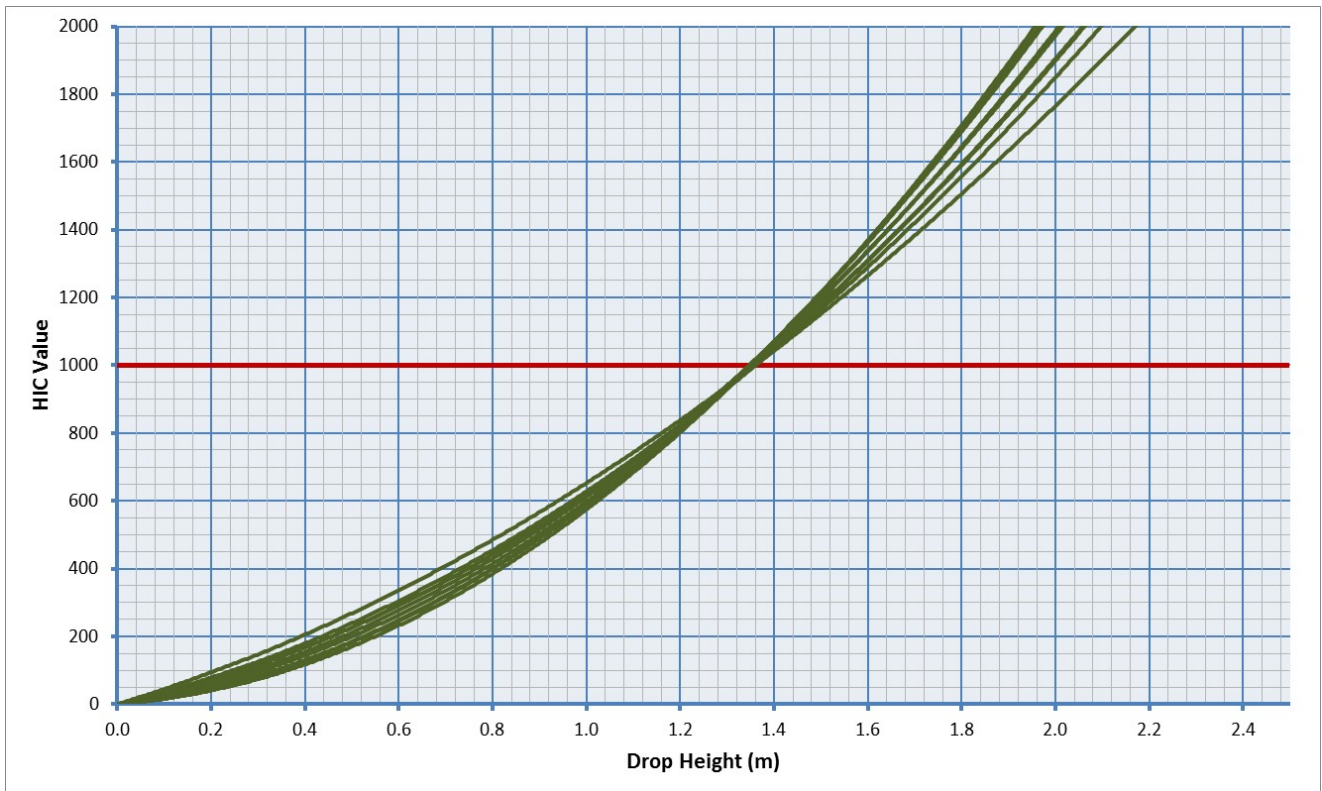
Drop Height (m)	Test Location									Average HIC (m)
	1	2	3	4	5	6	7	8	9	
0.00	0	0	0	0	0	0	0	0	0	0
0.40	487	496	475	482	492	499	466	478	492	0.5
0.50	820	828	816	825	830	816	824	827	829	
0.60	1128	1115	1129	1121	1126	1136	1124	1129	1108	
0.70	1277	1258	1264	1279	1245	1284	1271	1264	1260	
Critical Fall Height (m)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Delta T <3 ms



20mm Wetpour
graph of HIC vs drop height

40mm Wetpour

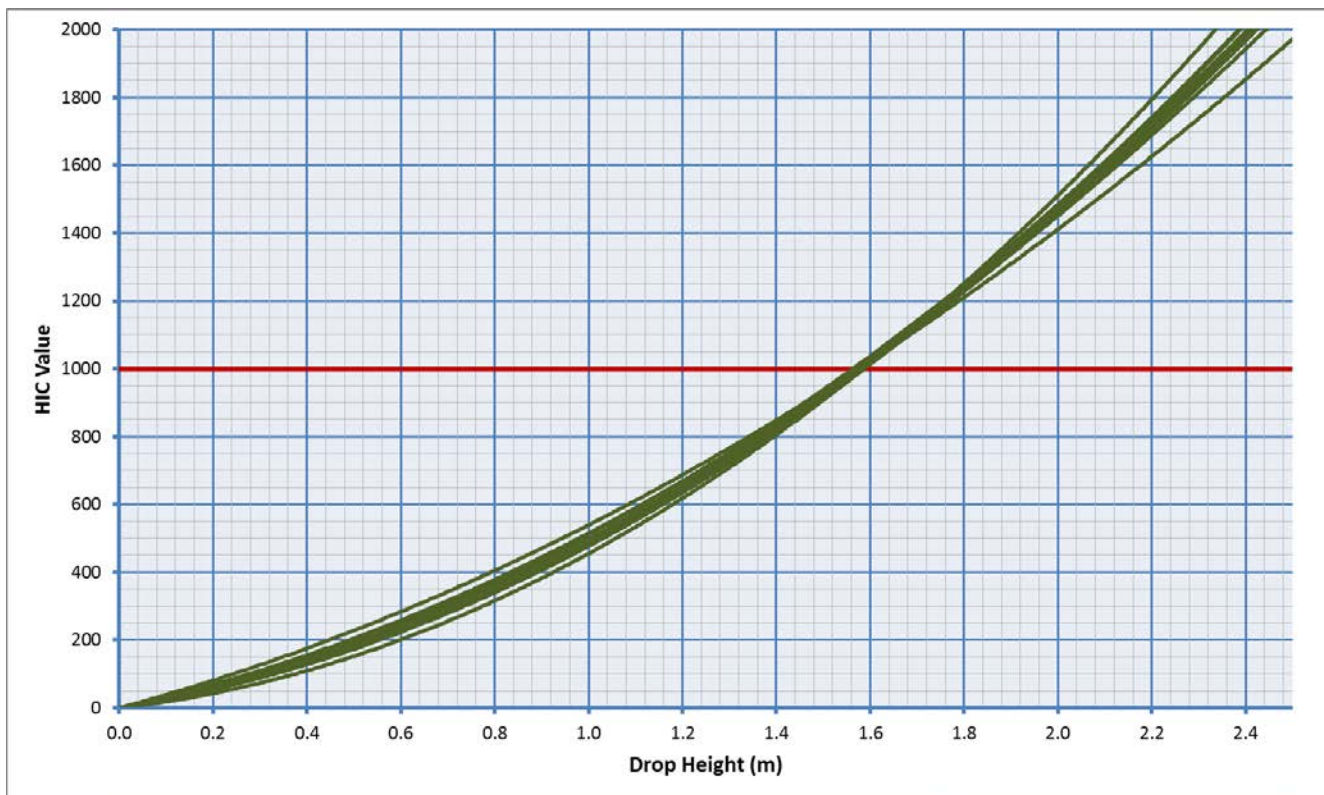
Drop Height (m)	Test Location									Average HIC (m)
	1	2	3	4	5	6	7	8	9	
0.00	0	0	0	0	0	0	0	0	0	1.3
1.20	822	841	848	835	826	841	829	823	836	
1.30	927	925	949	935	948	923	927	951	944	
1.40	1026	1020	1002	1024	1017	1036	1028	1020	1034	
1.50	1241	1247	1175	1248	1179	1195	1215	1192	1219	
Critical Fall Height (m)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	



40mm Wetpour
graph of HIC vs drop height

50mm Wetpour

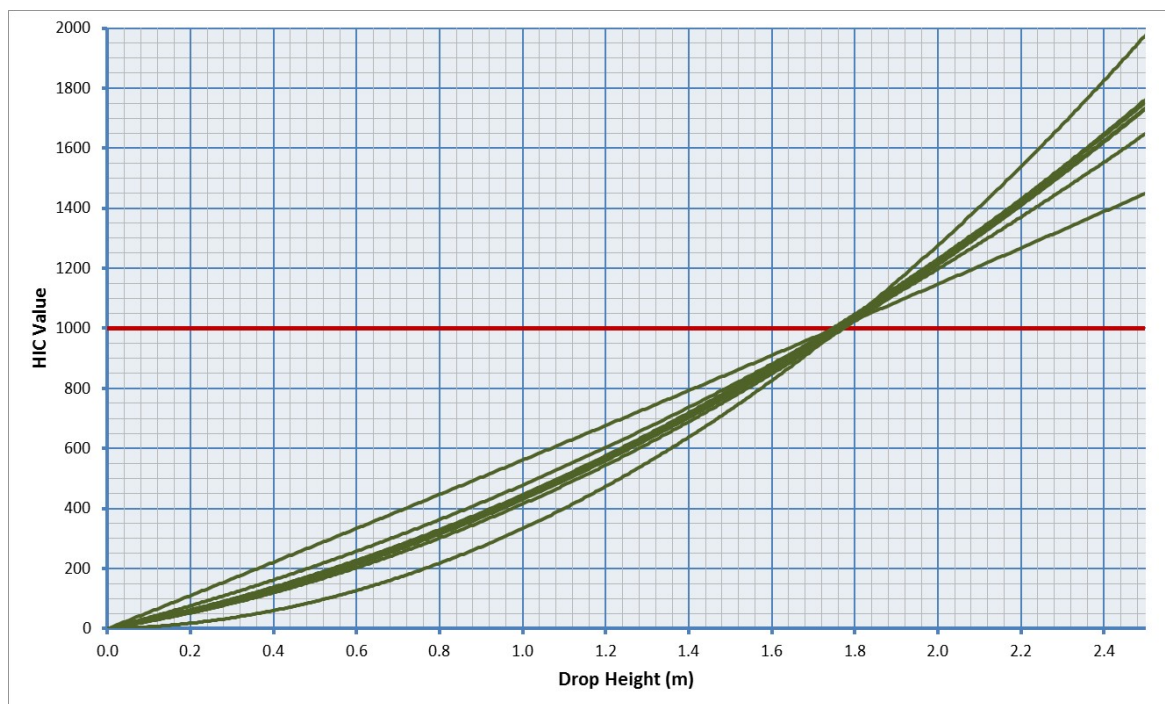
Drop Height (m)	Test Location									Average HIC (m)
	1	2	3	4	5	6	7	8	9	
0.00	0	0	0	0	0	0	0	0	0	1.5
1.40	838	849	795	845	844	829	835	835	819	
1.50	901	918	925	883	912	919	922	939	898	
1.60	1015	1051	1012	1037	1048	1031	1043	1059	1024	
1.70	1138	1102	1129	1119	1118	1122	1132	1127	1118	
Critical Fall Height (m)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	



50mm Wetpour
graph of HIC vs drop height

60mm Wetpour

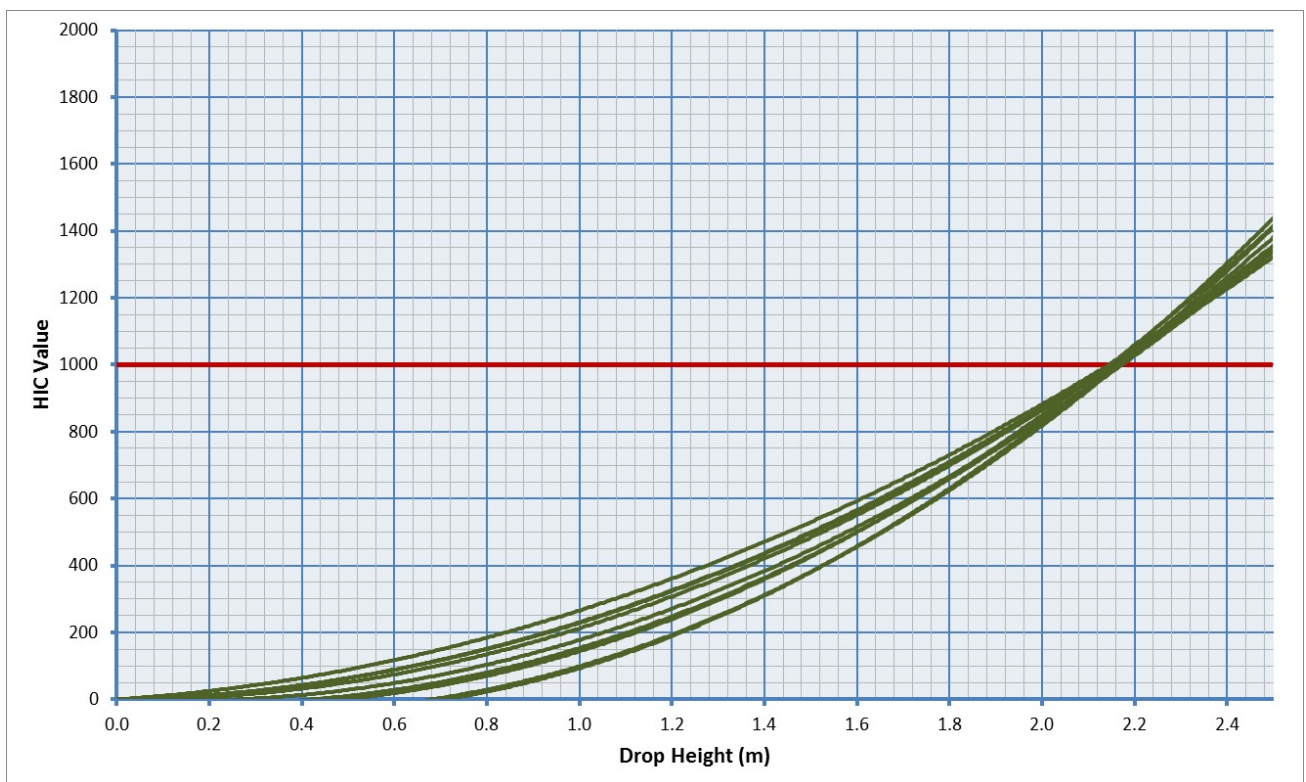
Drop Height (m)	Test Location									Average HIC (m)
	1	2	3	4	5	6	7	8	9	
0.00	0	0	0	0	0	0	0	0	0	1.7
1.60	826	917	868	845	887	871	893	865	859	
1.70	921	970	930	935	924	968	948	930	952	
1.80	1059	1009	1052	1036	1054	1049	1021	1036	1048	
1.90	1146	1100	1115	1111	1129	1135	1127	1118	1124	
Critical Fall Height (m)	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	



60mm Wetpour
graph of HIC vs drop height

70mm Wetpour

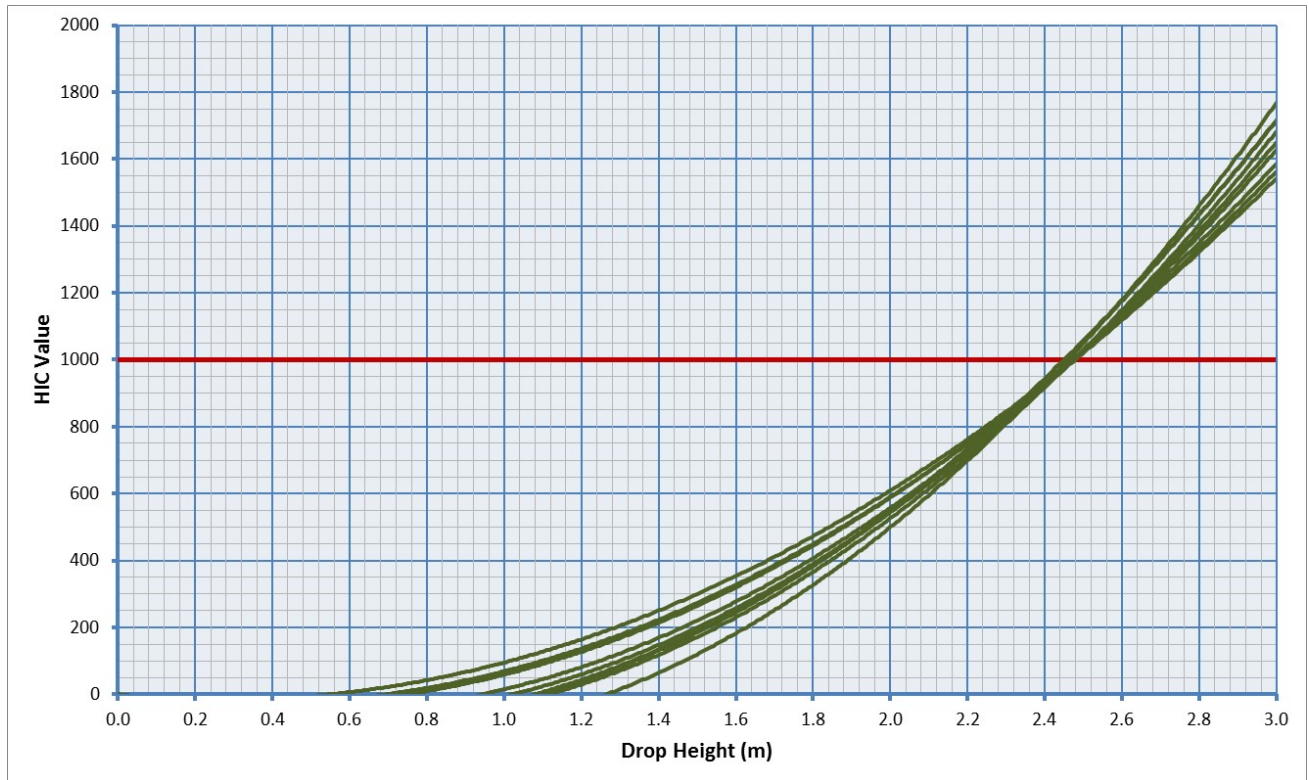
Drop Height (m)	Test Location									Average HIC (m)
	1	2	3	4	5	6	7	8	9	
0.00	0	0	0	0	0	0	0	0	0	2.1
2.00	893	886	820	864	885	832	854	839	827	
2.10	958	955	900	959	924	936	941	920	951	
2.20	1030	1020	1082	1036	1054	1032	1071	1065	1047	
2.30	1149	1165	1135	1139	1153	1125	1168	1175	1140	
Critical Fall Height (m)	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	



70mm Wetpour
graph of HIC vs drop height

90mm Wetpour

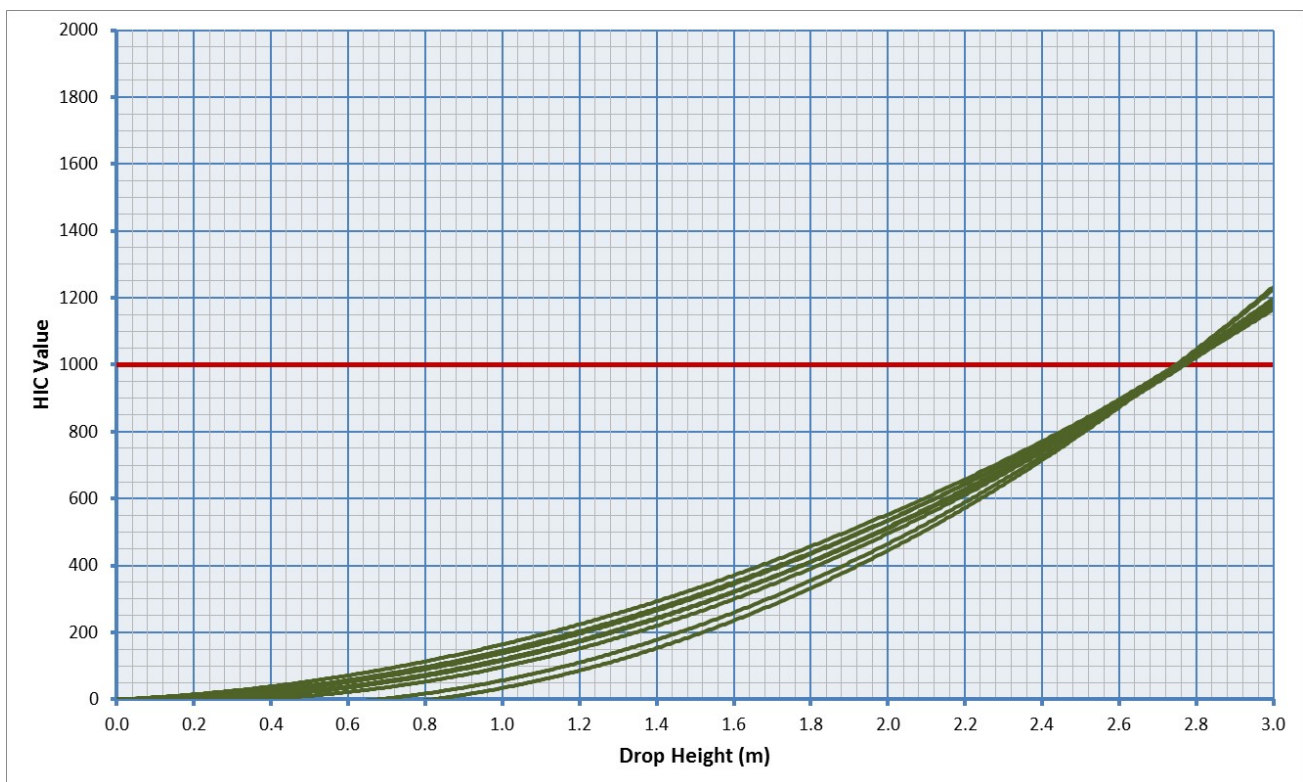
Drop Height (m)	Test Location									Average HIC (m)
	1	2	3	4	5	6	7	8	9	
0.00	0	0	0	0	0	0	0	0	0	2.4
2.30	845	856	829	852	862	834	851	847	852	
2.40	852	896	875	899	862	882	914	876	894	
2.50	1091	1065	1061	1054	1069	1059	1078	1052	1097	
2.60	1175	1104	1142	1125	1109	1134	1175	1135	1164	
Critical Fall Height (m)	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	



90mm Wetpour
graph of HIC vs drop height

110mm Wetpour

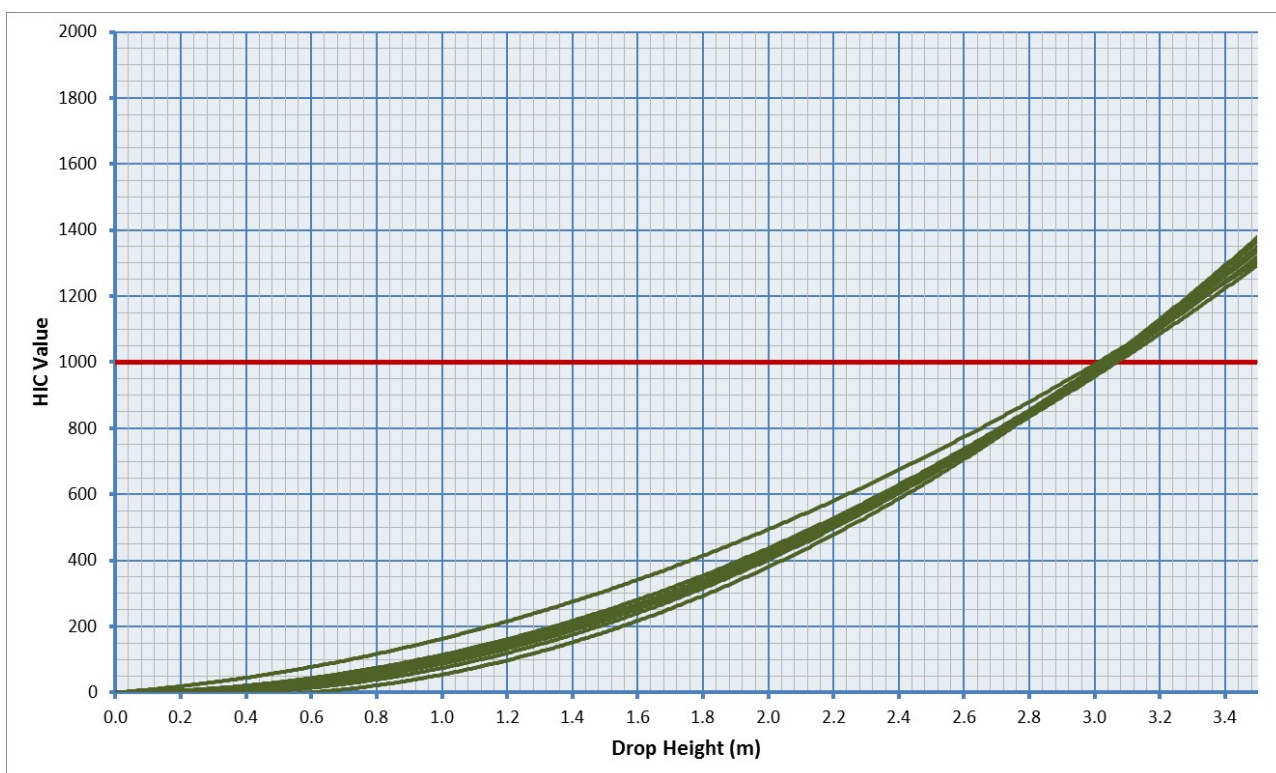
Drop Height (m)	Test Location									Average HIC (m)
	1	2	3	4	5	6	7	8	9	
0.00	0	0	0	0	0	0	0	0	0	2.7
2.60	909	880	908	914	898	923	897	901	905	
2.70	913	950	941	925	941	935	937	929	946	
2.80	1005	1042	1022	1009	1031	1024	1019	1026	1034	
2.90	1120	1143	1103	1116	1149	1131	1127	1115	1126	
Critical Fall Height (m)	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	



110mm Wetpour
graph of HIC vs drop height

130mm Wetpour

Drop Height (m)	Test Location									Average HIC (m)
	1	2	3	4	5	6	7	8	9	
0.00	0	0	0	0	0	0	0	0	0	3.0
2.90	938	951	907	936	929	909	915	923	914	
3.00	951	953	932	959	963	948	939	950	963	
3.10	1044	1092	1036	1049	1056	1048	1071	1062	1040	
3.20	1145	1102	1084	1134	1119	1097	1101	1134	1118	
Critical Fall Height (m)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	



130mm Wetpour
graph of HIC vs drop height

CONCLUSIONS

Standard Wetpour at thicknesses of 40mm, 50mm, 60mm, 70mm, 90mm, 110mm and 130mm were tested to the method given in EN 1177:2008 "Impact Absorbing Playground Surfacing – Safety Requirements and Test Methods.

Standard Wetpour at thicknesses of 40mm, 50mm, 60mm, 70mm, 90mm, 110mm and 130mm were found to have critical fall height value of:

40mm Wetpour	1.30m
50mm Wetpour	1.50m
60mm Wetpour	1.70m
70mm Wetpour	2.10m
90mm Wetpour	2.40m
110mm Wetpour	2.70m
130mm Wetpour	3.00m

The 20mm Wetpour surface was found to have a critical fall height value of:

20mm Wetpour	0.5m (Delta T <3 ms)
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The sample of 20mm Wetpour did not conform to the Delta T requirement of ≥ 3 ms. EN 1177:2008 states that "this procedure is only valid for impact events with a HIC duration of more than 3 ms, i.e. $(t_2 - t_1) \geq 3$ ms."

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Appendix A - Example of typical deceleration vs time curve

