



**FACULTY OF ENGINEERING
CHULALONGKORN UNIVERSITY
FIRE SAFETY RESEARCH CENTER**



- TYPE OF TEST** : DETERMINATION OF THE FIRE RESISTANCE OF NON-LOADBEARING ELEMENTS OF CONSTRUCTION
- TEST SPECIMEN** : **SPEED WALL FAIRFACE**
The specimen is a 3 m x 3 m vertical construction consisting of a single layer of 80-mm thick reinforced expanded polystyrene concrete panels with a density of 815 kg/m³. The panels were plastered by 10 mm mortar on both the exposed and unexposed sides. Ø9 mm steel rebars and cement glue were used to fix the joints between the panels and the perimeter frame along all edges. The details of the specimen are shown in Appendix C. The specimen was provided and installed by the client.
- CLIENT** : **FIN MANUFAC CO.,LTD.**
6/69 Moo 3, Klong 5 Road, Lamlukka
Pathumthani 12150, Thailand
- DATE OF TEST** : March 3, 2021
- TEST MACHINE** : Large-scale vertical furnace (Fire Tester III) at the Fire Safety Research Center (FSRC), Department of Civil Engineering, Chulalongkorn University (Thailand). The furnace is capable of producing a standard temperature-time relationship according to BS 476 Part 20: 1987.
- TEST METHOD** : The testing procedures follow the British Standard BS 476: Fire tests on building materials and structures
BS 476 Part 20: 1987: Method for determination of the fire resistance of elements of construction (general principles)
BS 476 Part 22: 1987: Methods for determination of the fire resistance of non-loadbearing elements of construction Section 5: Determination of the fire resistance of partitions.
- TEST RESULTS** : The non-loadbearing element of construction described above has the fire resistance of each criterion for the period stated:
(The test results are good only for the specimen tested.)

Criteria	Fire Resistance (hr:min)	Remarks
Insulation	2:22	The average temperature of the unexposed face of the specimen exceeded 140°C above its initial value of 32°C.
Integrity	4:00	The test was terminated by the client. During the test, all integrity criteria were fulfilled (no sustained flaming and no through gap such that the 6 mm diameter gap gauge could penetrate).

Tested by: 
(Professor Dr. Jaron Rungamornrat)

Date: March 17, 2021

Checked by: 
(Professor Dr. Thanyawat Pothisiri)


(Associate Prof. Dr. Tirawat Boonyatee)

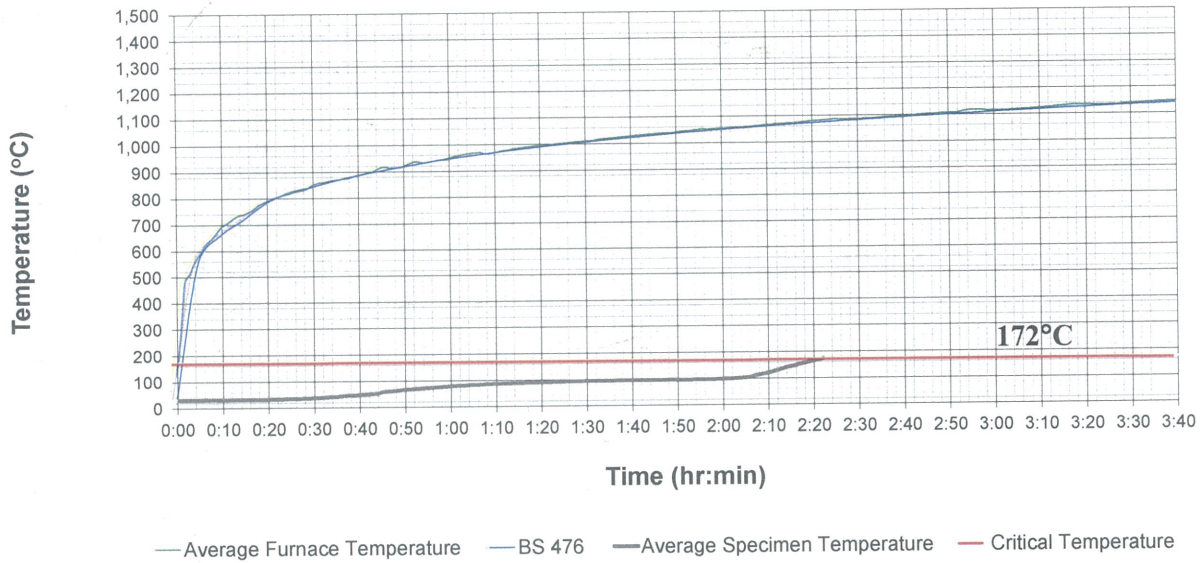
On Behalf of Head of Civil Engineering Department

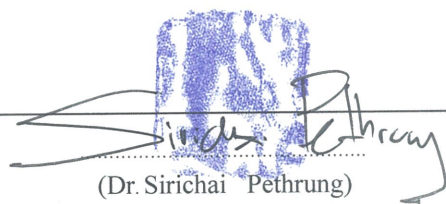


FACULTY OF ENGINEERING
CHULALONGKORN UNIVERSITY
FIRE SAFETY RESEARCH CENTER




FURNACE TEMPERATURE





(Dr. Sirichai Pethrung)
Authorized Testing Officer

APPENDIX A: TEMPERATURE OF THE FURNACE AND THE SPECIMEN

Time (hr:min:sec)	Furnace Temperature(°C)										Time (hr:min:sec)	BS 476 (°C)
	P1	P2	P3	P4	P5	P6	P7	P8	P9	Average		
0:00:00	92	197	94	60	108	131	165	87	178	124	0:00	20
0:01:00	154	369	196	153	338	345	400	204	339	278	0:05	556
0:02:00	515	501	393	474	513	497	563	368	517	482	0:10	659
0:03:00	546	551	498	459	504	512	534	488	494	510	0:15	718
0:04:00	595	597	550	495	538	542	548	553	521	549	0:20	781
0:05:00	631	626	586	522	565	567	568	590	552	579	0:25	821
0:06:00	660	647	602	553	596	599	596	620	580	606	0:30	842
0:07:00	687	672	620	582	625	622	612	646	605	630	0:35	865
0:08:00	698	684	639	590	634	639	622	667	626	644	0:40	885
0:09:00	719	699	655	620	659	661	646	683	662	667	0:45	902
0:10:00	738	718	675	648	681	683	668	707	691	690	0:50	918
0:11:00	750	727	694	657	692	693	677	722	701	701	0:55	932
0:12:00	755	737	697	676	708	706	684	734	709	711	1:00	945
0:13:00	767	749	708	692	721	719	700	744	727	725	1:05	957
0:14:00	776	758	718	704	732	731	710	753	734	735	1:10	968
0:15:00	778	765	727	707	737	735	708	755	733	738	1:15	979
0:16:00	786	769	733	717	745	741	717	759	745	746	1:20	988
0:17:00	798	781	746	726	756	749	721	765	749	755	1:25	997
0:18:00	811	793	756	744	772	763	740	777	774	770	1:30	1006
0:19:00	820	804	767	757	781	772	748	788	779	779	1:35	1014
0:20:00	831	814	774	764	787	780	754	796	792	788	1:40	1022
0:21:00	833	819	782	771	797	789	763	804	795	795	1:45	1029
0:22:00	844	824	790	778	803	794	768	810	805	802	1:50	1036
0:23:00	851	832	801	783	806	798	771	814	814	808	1:55	1043
0:24:00	854	835	803	792	812	807	779	820	818	813	2:00	1049
0:25:00	859	839	807	797	818	808	785	826	821	818	2:05	1055
0:26:00	864	847	812	798	822	816	792	832	828	823	2:10	1061
0:27:00	868	851	813	805	828	818	794	836	831	827	2:15	1067
0:28:00	871	853	821	807	831	822	798	839	830	830	2:20	1072
0:29:00	877	859	827	814	837	827	802	842	838	836	2:25	1077
0:30:00	888	868	836	826	846	840	816	853	854	847	2:30	1082
0:31:00	896	875	843	833	857	847	824	864	862	856	2:35	1087
0:32:00	897	879	849	838	857	851	828	870	867	860	2:40	1092
0:33:00	898	880	848	840	861	854	832	874	868	861	2:45	1097
0:34:00	903	884	855	843	862	855	832	876	875	865	2:50	1101
0:35:00	903	886	859	847	869	860	836	879	874	868	2:55	1106
0:36:00	907	889	858	846	867	863	841	882	880	870	3:00	1110
0:37:00	907	890	862	851	871	864	841	884	880	872	3:05	1114
0:38:00	910	892	862	855	876	868	848	886	881	875	3:10	1118
0:39:00	917	896	868	860	882	872	851	890	887	880	3:15	1122
0:40:00	922	901	875	866	889	877	857	896	894	886	3:20	1126
0:41:00	928	907	882	868	889	881	860	900	897	890	3:25	1129
0:42:00	928	912	883	875	893	886	865	903	900	894	3:30	1133
0:43:00	933	915	890	876	899	889	869	908	905	898	3:35	1136
0:44:00	940	921	893	885	905	898	878	913	915	905	3:40	1140
0:45:00	946	929	900	892	915	906	885	925	925	914	3:45	1143
0:46:00	947	930	905	898	916	908	888	931	929	917	3:50	1146
0:47:00	946	928	904	894	916	905	885	931	921	914	3:55	1150
0:48:00	946	929	901	893	913	904	887	926	920	913	4:00	1153
0:49:00	946	930	905	893	915	906	884	924	920	914		
0:50:00	953	932	905	898	920	908	890	927	924	917		
0:51:00	960	942	914	906	928	920	899	936	935	927		
0:52:00	963	947	922	915	935	924	905	944	942	933		
0:53:00	966	948	925	917	938	926	907	949	949	936		
0:54:00	961	946	920	913	931	923	904	948	941	932		
0:55:00	963	946	920	911	933	922	904	944	941	931		
0:56:00	968	950	922	914	936	924	904	946	944	934		
0:57:00	969	953	931	921	940	929	910	950	947	939		
0:58:00	973	957	930	923	945	933	913	954	948	942		
0:59:00	977	959	938	925	944	936	916	956	954	945		


 (Dr. Sirichai Pethrung)
 Authorized Testing Officer

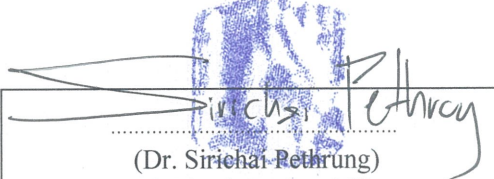
Time (hr:min:sec)	Furnace Temperature(°C)									Average
	P1	P2	P3	P4	P5	P6	P7	P8	P9	
1:00:00	979	963	938	929	948	939	921	959	957	948
1:01:00	981	966	942	933	952	946	927	963	968	953
1:02:00	985	970	943	939	958	948	929	969	971	957
1:03:00	989	973	953	941	961	952	933	973	975	961
1:04:00	993	977	955	944	964	955	939	976	980	965
1:05:00	994	978	954	946	968	958	940	980	978	966
1:06:00	994	980	955	947	966	959	942	982	985	968
1:07:00	995	981	958	951	969	962	944	985	983	970
1:08:00	990	976	952	946	965	954	938	981	974	964
1:09:00	993	977	955	945	967	954	938	980	973	965
1:10:00	996	980	959	948	967	958	942	980	977	967
1:11:00	1000	983	961	953	973	962	946	983	982	971
1:12:00	1003	987	966	957	974	967	948	986	985	975
1:13:00	1006	990	967	959	978	965	950	988	985	976
1:14:00	1011	996	974	964	979	971	955	990	992	981
1:15:00	1014	998	977	968	984	975	957	994	991	984
1:16:00	1017	999	977	968	987	975	958	995	994	986
1:17:00	1020	1002	978	970	989	975	961	998	1000	988
1:18:00	1022	1003	980	974	991	979	963	999	1000	990
1:19:00	1021	1006	985	974	995	981	966	1002	997	992
1:20:00	1024	1008	984	977	995	983	967	1003	1000	993
1:21:00	1024	1008	983	981	998	983	969	1004	1005	995
1:22:00	1025	1011	990	979	997	986	971	1007	1006	997
1:23:00	1029	1011	989	982	999	986	970	1008	1009	998
1:24:00	1033	1014	993	984	1003	988	974	1009	1014	1001
1:25:00	1031	1015	994	986	1003	993	976	1011	1010	1002
1:26:00	1034	1017	995	987	1003	993	978	1013	1014	1004
1:27:00	1034	1019	997	989	1007	996	978	1015	1013	1005
1:28:00	1036	1018	997	989	1009	996	983	1016	1016	1007
1:29:00	1038	1021	1000	991	1013	995	980	1018	1016	1008
1:30:00	1038	1021	1002	993	1010	999	984	1019	1018	1009
1:31:00	1036	1024	1004	994	1012	1000	984	1020	1020	1010
1:32:00	1041	1024	1003	996	1014	1000	987	1021	1021	1012
1:33:00	1043	1027	1007	1000	1020	1003	989	1025	1024	1015
1:34:00	1046	1027	1007	1001	1019	1005	996	1027	1029	1017
1:35:00	1047	1030	1011	1003	1022	1008	997	1030	1030	1020
1:36:00	1047	1032	1012	1004	1023	1010	997	1031	1031	1021
1:37:00	1049	1033	1014	1006	1023	1012	999	1032	1032	1022
1:38:00	1052	1036	1016	1007	1023	1014	1000	1034	1036	1024
1:39:00	1050	1036	1017	1010	1027	1014	1003	1036	1037	1025
1:40:00	1054	1038	1020	1011	1028	1016	1003	1037	1039	1027
1:41:00	1055	1038	1019	1013	1029	1018	1006	1038	1040	1029
1:42:00	1056	1041	1024	1015	1032	1018	1006	1039	1039	1030
1:43:00	1057	1043	1025	1015	1032	1020	1007	1041	1040	1031
1:44:00	1059	1041	1026	1019	1036	1019	1009	1042	1043	1033
1:45:00	1059	1044	1028	1019	1035	1023	1012	1043	1042	1034
1:46:00	1061	1046	1029	1020	1036	1022	1013	1044	1047	1035
1:47:00	1061	1046	1030	1020	1037	1024	1014	1046	1047	1036
1:48:00	1064	1046	1031	1022	1037	1024	1016	1046	1051	1038
1:49:00	1062	1047	1030	1024	1040	1026	1018	1047	1047	1038
1:50:00	1064	1049	1033	1025	1041	1028	1016	1049	1047	1039
1:51:00	1070	1053	1039	1027	1044	1030	1018	1050	1052	1042
1:52:00	1071	1054	1041	1028	1045	1032	1022	1052	1054	1044
1:53:00	1073	1055	1042	1029	1048	1032	1021	1053	1055	1046
1:54:00	1076	1058	1043	1034	1048	1034	1022	1054	1057	1047
1:55:00	1076	1059	1047	1034	1052	1036	1023	1056	1060	1049
1:56:00	1078	1061	1054	1035	1052	1038	1027	1057	1061	1051
1:57:00	1080	1062	1039	1036	1051	1038	1027	1059	1063	1050
1:58:00	1082	1063	1033	1038	1055	1040	1028	1060	1063	1051
1:59:00	1082	1065	1034	1040	1054	1042	1029	1062	1064	1052


 (Dr. Sirichai Pethrung)
 Authorized Testing Officer

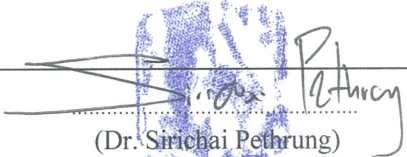
Time (hr:min:sec)	Furnace Temperature(°C)									
	P1	P2	P3	P4	P5	P6	P7	P8	P9	Average
2:00:00	1083	1065	1034	1041	1056	1041	1031	1063	1067	1053
2:01:00	1082	1066	1035	1042	1056	1044	1032	1064	1065	1054
2:02:00	1086	1067	1038	1043	1060	1043	1029	1065	1067	1055
2:03:00	1086	1068	1036	1043	1059	1045	1035	1066	1068	1056
2:04:00	1086	1069	1037	1046	1060	1049	1034	1067	1068	1057
2:05:00	1087	1070	1038	1046	1062	1047	1036	1068	1068	1058
2:06:00	1087	1072	1043	1047	1065	1048	1038	1070	1072	1060
2:07:00	1089	1072	1043	1050	1067	1047	1040	1071	1074	1061
2:08:00	1090	1076	1042	1050	1064	1052	1039	1073	1075	1062
2:09:00	1091	1076	1044	1052	1067	1052	1040	1074	1075	1063
2:10:00	1094	1079	1048	1052	1070	1056	1043	1076	1075	1066
2:11:00	1096	1080	1048	1054	1069	1057	1044	1077	1078	1067
2:12:00	1097	1082	1053	1055	1070	1059	1045	1078	1081	1069
2:13:00	1097	1082	1049	1058	1073	1060	1048	1079	1081	1069
2:14:00	1098	1082	1050	1059	1076	1058	1049	1080	1082	1071
2:15:00	1100	1084	1052	1059	1074	1061	1050	1081	1084	1072
2:16:00	1100	1084	1054	1061	1077	1061	1050	1082	1082	1072
2:17:00	1103	1086	1055	1062	1076	1061	1048	1082	1085	1073
2:18:00	1102	1086	1056	1064	1081	1063	1053	1084	1087	1075
2:19:00	1105	1088	1057	1065	1081	1065	1056	1087	1091	1077
2:20:00	1106	1091	1062	1065	1081	1069	1056	1089	1093	1079
2:21:00	1105	1090	1060	1068	1086	1069	1060	1091	1092	1080
2:22:00	1109	1093	1060	1070	1085	1071	1056	1092	1097	1081
2:23:00	1110	1094	1063	1070	1087	1070	1060	1093	1097	1083
2:24:00	1109	1095	1063	1073	1088	1073	1063	1095	1098	1084
2:25:00	1113	1098	1067	1075	1089	1075	1062	1096	1101	1086
2:26:00	1114	1097	1066	1075	1090	1074	1063	1097	1098	1086
2:27:00	1110	1097	1067	1075	1089	1075	1063	1098	1099	1086
2:28:00	1109	1096	1067	1073	1090	1074	1064	1099	1098	1085
2:29:00	1110	1098	1068	1074	1091	1077	1064	1099	1098	1087
2:30:00	1111	1097	1068	1074	1090	1078	1065	1099	1101	1087
2:31:00	1112	1096	1065	1076	1089	1077	1064	1099	1103	1087
2:32:00	1112	1098	1069	1076	1090	1077	1065	1100	1104	1088
2:33:00	1112	1098	1065	1076	1090	1077	1066	1100	1107	1088
2:34:00	1113	1098	1068	1078	1094	1079	1068	1101	1103	1089
2:35:00	1116	1101	1070	1080	1095	1079	1069	1102	1104	1091
2:36:00	1116	1102	1069	1081	1097	1080	1071	1103	1105	1092
2:37:00	1118	1102	1074	1083	1099	1081	1071	1105	1107	1093
2:38:00	1117	1105	1073	1083	1099	1082	1073	1105	1109	1094
2:39:00	1120	1106	1075	1086	1100	1084	1073	1107	1107	1095
2:40:00	1122	1107	1076	1086	1101	1085	1075	1107	1112	1097
2:41:00	1122	1107	1075	1087	1103	1086	1075	1108	1111	1097
2:42:00	1124	1109	1079	1089	1103	1086	1078	1109	1113	1099
2:43:00	1123	1110	1078	1090	1103	1089	1077	1110	1113	1099
2:44:00	1126	1112	1082	1091	1106	1090	1079	1112	1115	1101
2:45:00	1128	1113	1080	1093	1107	1091	1082	1113	1117	1102
2:46:00	1131	1114	1085	1094	1109	1091	1082	1114	1118	1104
2:47:00	1129	1115	1084	1093	1108	1092	1084	1114	1119	1104
2:48:00	1130	1117	1084	1094	1109	1094	1084	1115	1119	1105
2:49:00	1130	1115	1086	1096	1112	1093	1084	1116	1119	1106
2:50:00	1131	1117	1089	1096	1114	1093	1083	1117	1120	1107
2:51:00	1134	1118	1087	1096	1113	1094	1084	1117	1120	1107
2:52:00	1133	1118	1086	1099	1113	1095	1086	1117	1120	1107
2:53:00	1132	1120	1088	1103	1117	1101	1092	1121	1125	1111
2:54:00	1137	1125	1092	1104	1118	1104	1093	1125	1131	1114
2:55:00	1140	1126	1096	1106	1121	1107	1096	1128	1134	1117
2:56:00	1139	1127	1097	1109	1122	1107	1096	1130	1132	1118
2:57:00	1138	1126	1099	1107	1122	1105	1093	1131	1134	1117
2:58:00	1137	1123	1096	1106	1120	1102	1095	1131	1131	1116
2:59:00	1137	1123	1092	1103	1117	1102	1091	1128	1132	1114

(Dr. Sirichai Pethrung)
Authorized Testing Officer


Time (hr:min:sec)	Furnace Temperature(°C)									Average
	P1	P2	P3	P4	P5	P6	P7	P8	P9	
3:00:00	1137	1124	1096	1105	1120	1101	1091	1128	1127	1114
3:01:00	1136	1124	1096	1105	1118	1104	1094	1129	1131	1115
3:02:00	1136	1123	1094	1106	1121	1104	1095	1128	1129	1115
3:03:00	1136	1122	1093	1106	1121	1103	1094	1128	1132	1115
3:04:00	1136	1125	1095	1105	1119	1106	1096	1129	1132	1116
3:05:00	1140	1126	1098	1109	1123	1106	1097	1129	1133	1118
3:06:00	1140	1129	1099	1108	1123	1109	1096	1131	1134	1119
3:07:00	1141	1128	1100	1110	1124	1107	1099	1132	1134	1120
3:08:00	1141	1130	1099	1111	1126	1109	1098	1133	1134	1120
3:09:00	1143	1132	1100	1112	1127	1111	1101	1134	1135	1122
3:10:00	1146	1133	1101	1113	1128	1111	1101	1135	1138	1123
3:11:00	1145	1133	1102	1113	1130	1111	1101	1135	1134	1123
3:12:00	1146	1135	1105	1115	1129	1114	1101	1136	1136	1124
3:13:00	1148	1136	1109	1117	1131	1114	1104	1138	1140	1126
3:14:00	1150	1137	1115	1119	1134	1115	1106	1140	1143	1129
3:15:00	1150	1139	1115	1120	1136	1118	1107	1141	1143	1130
3:16:00	1150	1139	1114	1122	1136	1120	1109	1143	1145	1131
3:17:00	1153	1141	1116	1124	1138	1121	1112	1145	1147	1133
3:18:00	1155	1144	1118	1125	1138	1123	1112	1145	1148	1134
3:19:00	1155	1144	1118	1126	1142	1123	1112	1147	1147	1135
3:20:00	1154	1142	1119	1125	1141	1123	1113	1147	1147	1135
3:21:00	1152	1142	1117	1126	1140	1123	1113	1148	1150	1135
3:22:00	1150	1141	1118	1124	1140	1123	1113	1148	1148	1134
3:23:00	1149	1140	1114	1124	1139	1122	1114	1147	1148	1133
3:24:00	1150	1141	1120	1123	1137	1123	1111	1148	1149	1134
3:25:00	1150	1140	1118	1124	1138	1123	1111	1148	1149	1133
3:26:00	1151	1141	1119	1124	1140	1122	1111	1148	1149	1134
3:27:00	1150	1141	1118	1124	1140	1123	1111	1148	1148	1134
3:28:00	1152	1142	1121	1124	1139	1123	1111	1148	1151	1134
3:29:00	1154	1144	1123	1128	1141	1126	1114	1149	1152	1137
3:30:00	1154	1144	1120	1128	1144	1126	1116	1151	1151	1137
3:31:00	1156	1146	1125	1129	1142	1129	1118	1151	1152	1139
3:32:00	1158	1147	1125	1130	1145	1127	1117	1152	1152	1139
3:33:00	1157	1148	1127	1132	1147	1128	1117	1153	1153	1140
3:34:00	1158	1150	1127	1132	1147	1132	1120	1154	1154	1141
3:35:00	1158	1149	1124	1133	1147	1131	1124	1155	1156	1142
3:36:00	1161	1150	1128	1134	1148	1132	1120	1156	1157	1143
3:37:00	1161	1152	1131	1134	1149	1131	1121	1157	1158	1144
3:38:00	1161	1151	1128	1136	1148	1132	1122	1157	1158	1144
3:39:00	1162	1152	1130	1137	1150	1133	1123	1158	1161	1145
3:40:00	1162	1154	1131	1137	1150	1136	1124	1158	1159	1146
3:41:00	1164	1154	1130	1138	1150	1136	1124	1159	1160	1146
3:42:00	1164	1155	1131	1139	1153	1137	1126	1160	1159	1147
3:43:00	1163	1154	1129	1138	1152	1135	1128	1160	1160	1147
3:44:00	1164	1155	1133	1138	1151	1137	1125	1160	1160	1147
3:45:00	1165	1156	1131	1141	1154	1138	1129	1161	1161	1149
3:46:00	1165	1157	1133	1143	1157	1140	1131	1163	1164	1150
3:47:00	1168	1159	1136	1145	1157	1141	1132	1166	1167	1152
3:48:00	1170	1160	1139	1146	1158	1143	1133	1167	1168	1154
3:49:00	1171	1161	1138	1148	1160	1143	1134	1169	1170	1155
3:50:00	1175	1165	1143	1149	1162	1146	1135	1170	1171	1157
3:51:00	1175	1165	1143	1149	1165	1146	1137	1171	1169	1158
3:52:00	1173	1164	1140	1150	1163	1146	1139	1172	1173	1158
3:53:00	1172	1165	1141	1148	1160	1149	1137	1171	1173	1157
3:54:00	1172	1164	1139	1148	1162	1145	1134	1171	1168	1156
3:55:00	1172	1162	1140	1147	1159	1144	1133	1169	1168	1155
3:56:00	1171	1162	1139	1146	1158	1145	1134	1168	1166	1154
3:57:00	1171	1161	1139	1147	1161	1143	1132	1168	1166	1154
3:58:00	1170	1162	1140	1147	1159	1146	1134	1168	1165	1155
3:59:00	1171	1163	1138	1147	1160	1146	1135	1168	1165	1155
4:00:00	1175	1163	1141	1149	1162	1145	1134	1169	1167	1156


 (Dr. Sirichai Rethrung)
 Authorized Testing Officer

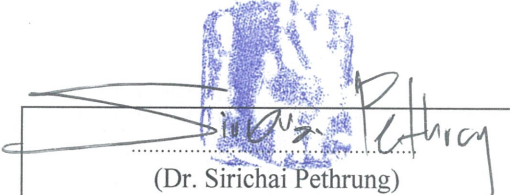
Time (hr:min:sec)	Specimen Temperature(°C)										Max. (A-J)	Average (A-E)
	A	B	C	D	E	F	G	H	I	J		
0:00:00	32	32	32	33	32	32	32	33	32	33	33	32
0:01:00	32	32	32	33	32	32	32	33	32	33	33	32
0:02:00	32	32	32	33	32	32	32	33	32	33	33	32
0:03:00	32	32	32	33	32	32	32	33	32	33	33	32
0:04:00	32	32	32	33	32	32	32	33	32	33	33	32
0:05:00	32	32	32	33	32	32	32	33	32	33	33	32
0:06:00	32	32	32	33	32	32	32	33	32	33	33	32
0:07:00	32	32	32	33	32	32	32	33	32	33	33	32
0:08:00	32	32	32	33	32	32	32	33	32	33	33	32
0:09:00	32	32	32	33	32	32	32	33	32	33	33	32
0:10:00	32	32	32	33	32	32	32	33	32	33	33	32
0:11:00	32	32	32	33	32	32	32	33	32	33	33	32
0:12:00	32	32	32	33	32	32	33	33	32	33	33	32
0:13:00	32	32	32	33	32	32	33	33	32	33	33	32
0:14:00	32	32	32	33	32	32	33	33	32	33	33	32
0:15:00	32	32	32	33	32	32	33	33	32	33	33	32
0:16:00	32	33	32	33	32	33	33	33	32	33	33	32
0:17:00	33	33	32	33	32	33	33	33	32	33	33	32
0:18:00	33	33	32	33	32	33	33	33	32	33	33	33
0:19:00	33	34	32	33	32	33	33	33	32	33	34	33
0:20:00	34	34	33	33	32	33	33	33	33	33	34	33
0:21:00	34	34	33	33	33	34	33	33	33	33	34	33
0:22:00	34	35	33	33	33	34	33	34	33	34	35	34
0:23:00	35	36	34	33	33	35	34	34	33	34	36	34
0:24:00	36	36	34	33	34	35	34	34	33	33	36	35
0:25:00	36	37	34	33	34	36	34	34	33	34	37	35
0:26:00	36	37	34	33	34	36	34	34	33	34	37	35
0:27:00	37	38	35	33	34	36	34	34	34	33	38	36
0:28:00	38	39	36	33	35	37	35	34	34	33	39	36
0:29:00	39	40	36	33	36	38	35	34	34	33	40	37
0:30:00	40	41	37	33	36	39	35	34	35	34	41	37
0:31:00	41	42	38	34	37	39	36	34	35	34	42	38
0:32:00	42	43	39	34	38	40	36	34	36	34	43	39
0:33:00	43	44	40	34	39	41	37	34	36	-	44	40
0:34:00	44	45	41	34	40	42	37	34	37	-	45	41
0:35:00	45	47	42	34	40	44	38	34	38	-	47	42
0:36:00	47	49	44	34	43	46	39	34	39	-	49	44
0:37:00	49	50	46	34	44	47	40	34	40	-	50	45
0:38:00	50	52	47	34	45	48	40	35	41	-	52	46
0:39:00	52	53	48	34	46	50	41	35	42	-	53	47
0:40:00	53	55	50	35	47	51	42	35	43	-	55	48
0:41:00	54	56	51	35	49	53	42	35	43	-	56	49
0:42:00	56	57	53	35	50	54	43	35	44	-	57	50
0:43:00	57	59	54	35	51	56	44	35	45	-	59	51
0:44:00	59	60	56	36	53	57	45	35	46	-	60	53
0:45:00	60	62	57	-	54	58	46	35	47	-	62	58
0:46:00	62	63	58	-	55	60	47	35	48	-	63	60
0:47:00	63	64	60	-	57	61	48	36	49	-	64	61
0:48:00	65	66	61	-	58	63	48	36	51	-	66	63
0:49:00	66	67	63	-	60	65	49	36	52	-	67	64
0:50:00	68	69	64	-	61	66	50	36	53	-	69	65
0:51:00	69	70	66	-	62	68	52	36	54	-	70	67
0:52:00	70	71	67	-	64	69	52	36	55	-	71	68
0:53:00	72	72	68	-	65	71	54	36	56	-	72	69
0:54:00	73	74	70	-	66	72	55	37	57	-	74	71
0:55:00	74	75	71	-	68	74	56	37	58	-	75	72
0:56:00	76	76	72	-	69	75	57	37	60	-	76	73
0:57:00	77	77	74	-	70	77	58	37	61	-	77	74
0:58:00	78	78	75	-	72	78	59	37	62	-	78	76
0:59:00	79	79	76	-	73	80	60	37	63	-	80	77


 (Dr. Sirichai Pethrung)
 Authorized Testing Officer

Time (hr:min:sec)	Specimen Temperature(°C)											Max. (A-J)	Average (A-E)
	A	B	C	D	E	F	G	H	I	J			
1:00:00	80	80	77	-	74	82	61	37	64	-	82	78	
1:01:00	81	81	78	-	75	83	62	37	65	-	83	79	
1:02:00	82	82	79	-	76	85	63	37	66	-	85	80	
1:03:00	83	82	80	-	77	87	64	37	67	-	87	81	
1:04:00	84	83	81	-	78	89	65	37	68	-	89	82	
1:05:00	85	84	82	-	79	91	66	38	69	-	91	83	
1:06:00	86	84	83	-	80	93	67	38	70	-	93	83	
1:07:00	87	85	84	-	81	95	68	38	72	-	95	84	
1:08:00	87	86	84	-	82	96	69	38	73	-	96	85	
1:09:00	88	86	85	-	83	97	70	38	73	-	97	86	
1:10:00	89	87	86	-	84	96	71	38	74	-	96	86	
1:11:00	89	87	86	-	85	97	71	38	75	-	97	87	
1:12:00	89	88	87	-	85	97	72	38	76	-	97	87	
1:13:00	90	88	88	-	86	96	73	38	77	-	96	88	
1:14:00	90	88	88	-	86	96	74	38	78	-	96	88	
1:15:00	91	89	89	-	87	96	75	38	79	-	96	89	
1:16:00	91	89	89	-	88	96	75	38	80	-	96	89	
1:17:00	91	90	90	-	88	96	76	39	81	-	96	90	
1:18:00	92	90	90	-	89	96	77	39	81	-	96	90	
1:19:00	92	90	91	-	89	96	77	39	82	-	96	91	
1:20:00	92	91	92	-	90	95	78	39	83	-	95	91	
1:21:00	93	91	92	-	90	95	79	39	83	-	95	91	
1:22:00	93	91	93	-	91	95	80	38	84	-	95	92	
1:23:00	93	91	93	-	91	94	80	39	85	-	94	92	
1:24:00	94	92	94	-	92	93	81	39	86	-	94	93	
1:25:00	94	92	94	-	92	94	82	39	86	-	94	93	
1:26:00	95	92	95	-	92	94	82	39	86	-	95	93	
1:27:00	95	92	95	-	93	95	83	39	87	-	95	94	
1:28:00	95	93	95	-	93	95	84	39	87	-	95	94	
1:29:00	95	93	96	-	93	95	84	39	88	-	96	94	
1:30:00	95	93	96	-	94	95	85	39	89	-	96	95	
1:31:00	95	93	97	-	94	95	85	39	90	-	97	95	
1:32:00	95	93	97	-	94	95	86	39	90	-	97	95	
1:33:00	96	94	97	-	95	95	87	39	91	-	97	95	
1:34:00	95	93	98	-	95	95	87	39	91	-	98	95	
1:35:00	96	94	98	-	95	95	88	39	91	-	98	96	
1:36:00	95	94	98	-	95	95	89	39	91	-	98	96	
1:37:00	96	94	98	-	95	95	90	39	92	-	98	96	
1:38:00	96	94	98	-	96	94	90	39	-	-	98	96	
1:39:00	96	94	98	-	96	95	91	39	-	-	98	96	
1:40:00	96	94	99	-	96	95	92	39	-	-	99	96	
1:41:00	96	93	99	-	96	95	92	39	-	-	99	96	
1:42:00	96	93	99	-	97	95	93	39	-	-	99	96	
1:43:00	97	93	99	-	97	95	93	39	-	-	99	96	
1:44:00	97	93	99	-	97	96	94	39	-	-	99	96	
1:45:00	97	93	99	-	97	96	95	38	-	-	99	96	
1:46:00	97	92	99	-	97	96	95	38	-	-	99	96	
1:47:00	97	92	99	-	98	96	95	39	-	-	99	97	
1:48:00	97	93	99	-	98	96	95	39	-	-	99	97	
1:49:00	98	93	99	-	98	96	95	39	-	-	99	97	
1:50:00	98	92	99	-	98	96	95	39	-	-	99	97	
1:51:00	98	90	99	-	99	96	94	39	-	-	99	96	
1:52:00	98	90	99	-	99	96	93	39	-	-	99	96	
1:53:00	98	90	99	-	99	96	92	39	-	-	99	97	
1:54:00	99	91	99	-	99	96	91	39	-	-	99	97	
1:55:00	99	91	99	-	100	97	89	39	-	-	100	97	
1:56:00	99	91	99	-	100	97	86	39	-	-	100	97	
1:57:00	99	93	99	-	100	97	86	39	-	-	100	98	
1:58:00	99	93	99	-	100	97	88	39	-	-	100	98	
1:59:00	99	94	99	-	101	98	86	39	-	-	101	98	


 (Dr. Sirichai Pethrung)
 Authorized Testing Officer

Time (hr:min:sec)	Specimen Temperature(°C)											Max. (A-J)	Average (A-E)
	A	B	C	D	E	F	G	H	I	J			
2:00:00	100	96	99	-	101	98	84	39	-	-	101	99	
2:01:00	100	98	99	-	101	98	84	39	-	-	101	100	
2:02:00	101	100	99	-	101	98	85	39	-	-	101	100	
2:03:00	101	102	99	-	101	99	80	39	-	-	102	101	
2:04:00	102	105	99	-	102	100	85	39	-	-	105	102	
2:05:00	102	110	100	-	102	101	87	40	-	-	110	103	
2:06:00	102	114	103	-	102	102	87	39	-	-	114	105	
2:07:00	102	118	120	-	102	105	89	39	-	-	120	111	
2:08:00	103	124	127	-	103	109	90	39	-	-	127	114	
2:09:00	106	129	131	-	104	114	91	39	-	-	131	117	
2:10:00	109	134	135	-	106	121	91	39	-	-	135	121	
2:11:00	114	138	140	-	110	128	91	39	-	-	140	125	
2:12:00	121	142	144	-	114	134	92	39	-	-	144	130	
2:13:00	128	146	147	-	117	140	93	40	-	-	147	135	
2:14:00	135	151	152	-	121	145	93	39	-	-	152	140	
2:15:00	140	155	155	-	125	150	94	39	-	-	155	144	
2:16:00	146	158	160	-	129	155	94	39	-	-	160	148	
2:17:00	151	162	163	-	133	160	95	40	-	-	163	152	
2:18:00	155	166	166	-	137	164	96	40	-	-	166	156	
2:19:00	160	169	170	-	141	168	97	40	-	-	170	160	
2:20:00	164	173	174	-	145	173	98	40	-	-	174	164	
2:21:00	168	177	178	-	149	177	100	40	-	-	178	168	
2:22:00	173	180	181	-	153	181	99	40	-	-	181	172	


 (Dr. Sirichai Pethrung)
 Authorized Testing Officer

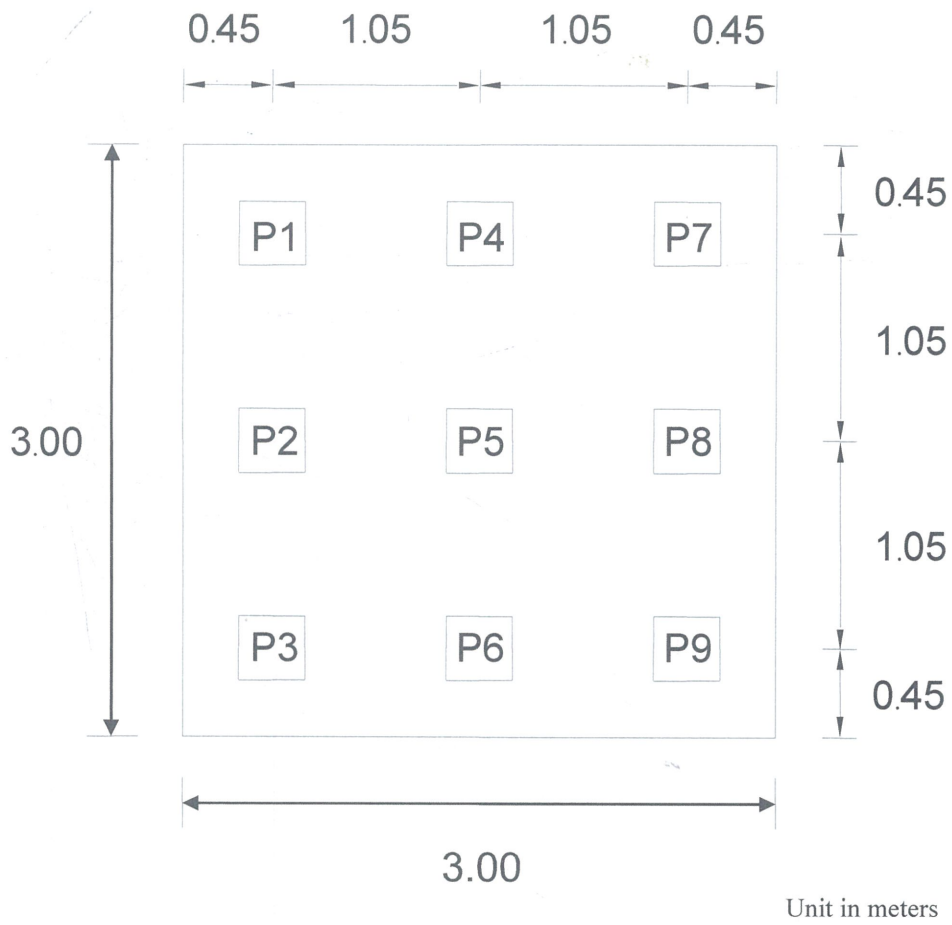
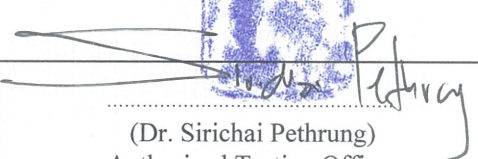


Figure A-1: Location of thermocouples inside the furnace


(Dr. Sirichai Pethrung)
Authorized Testing Officer

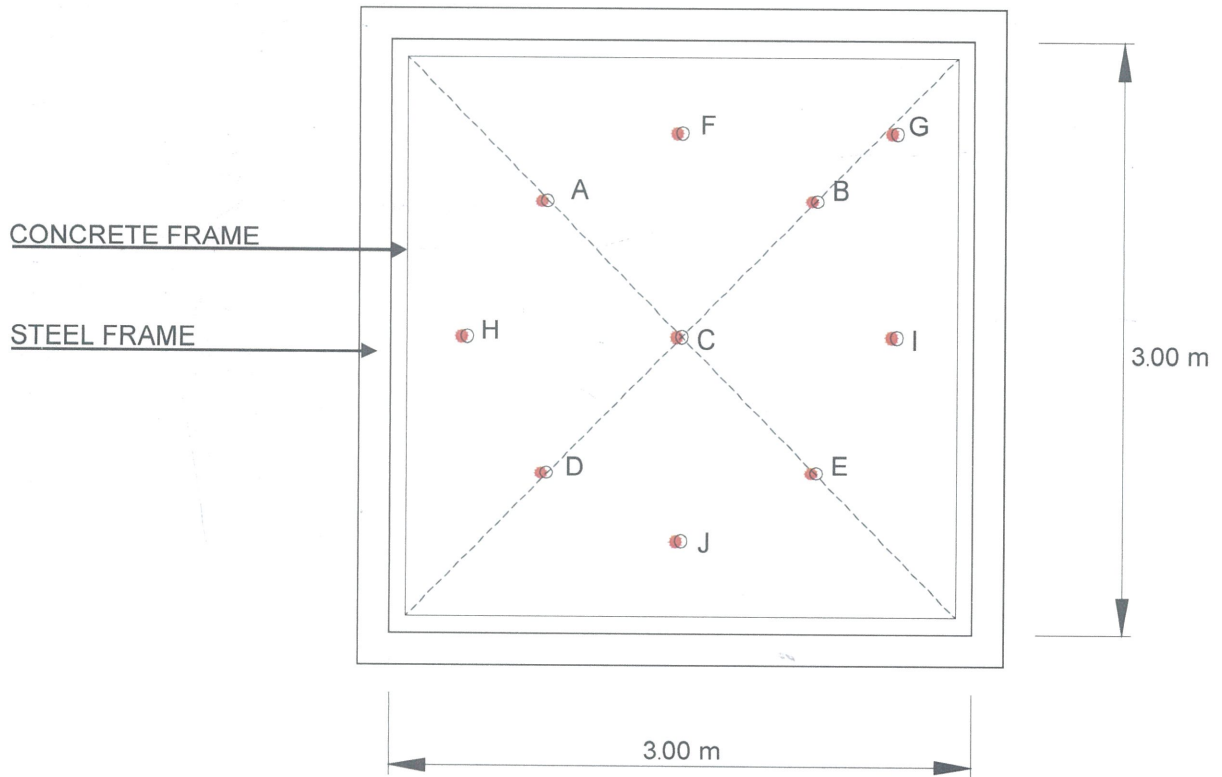

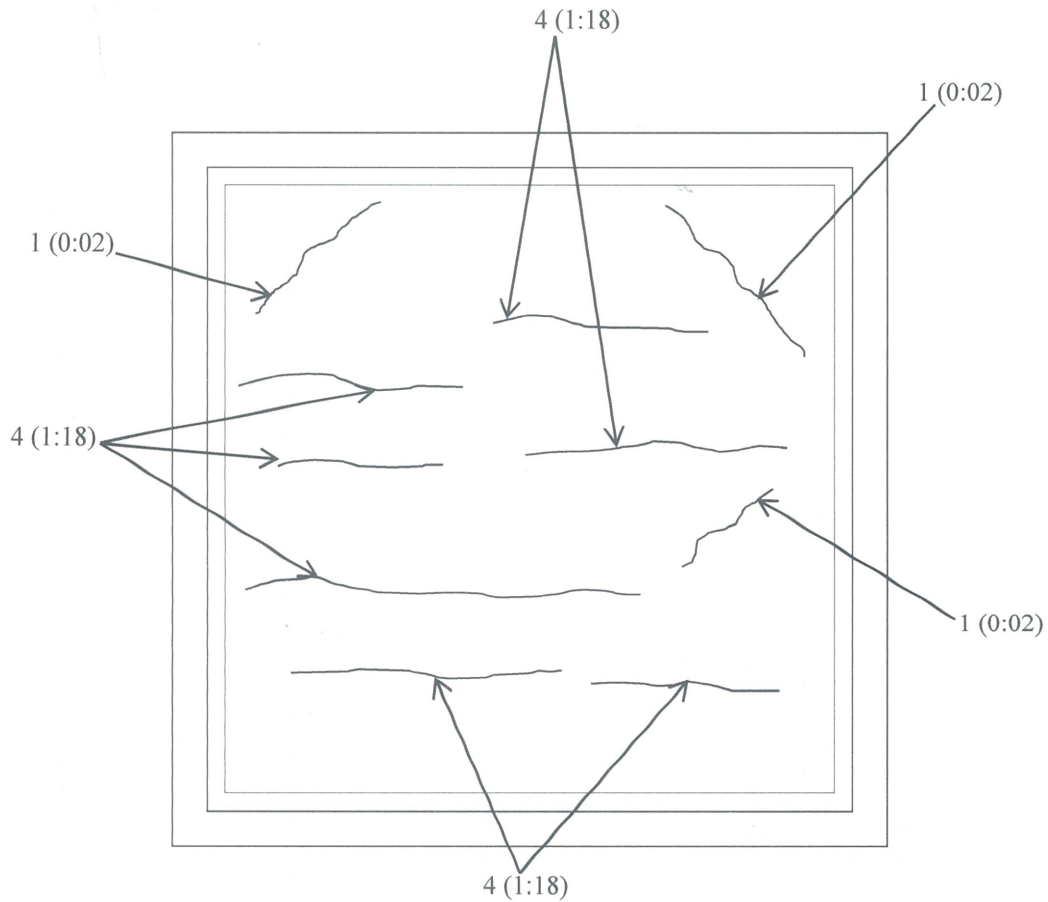


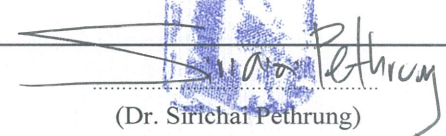
Figure A-2: Location of thermocouples on the specimen


(Dr. Sirichai Bethrung)
Authorized Testing Officer

APPENDIX B: OBSERVATIONS

No.	Time (hr:min)	Observations
1	0:02	Inclined cracks were observed at the upper corners of the specimen.
2	0:30	No significant change was observed.
3	1:00	No significant change was observed.
4	1:18	Multiple horizontal cracks were observed on the unexposed face of the specimen.
5	1:30	No significant change was observed.
6	2:00	No significant change was observed.
7	2:30	No significant change was observed.
8	3:00	No significant change was observed.
9	3:30	No significant change was observed.
10	4:00	The test was terminated by the client. During the test, all integrity criteria were fulfilled (no sustained flaming and no through gap such that the 6 mm diameter gap gauge could penetrate).




 (Dr. Sirichai Pethrung)
 Authorized Testing Officer

APPENDIX C: DRAWINGS & DETAILS OF THE SPECIMEN

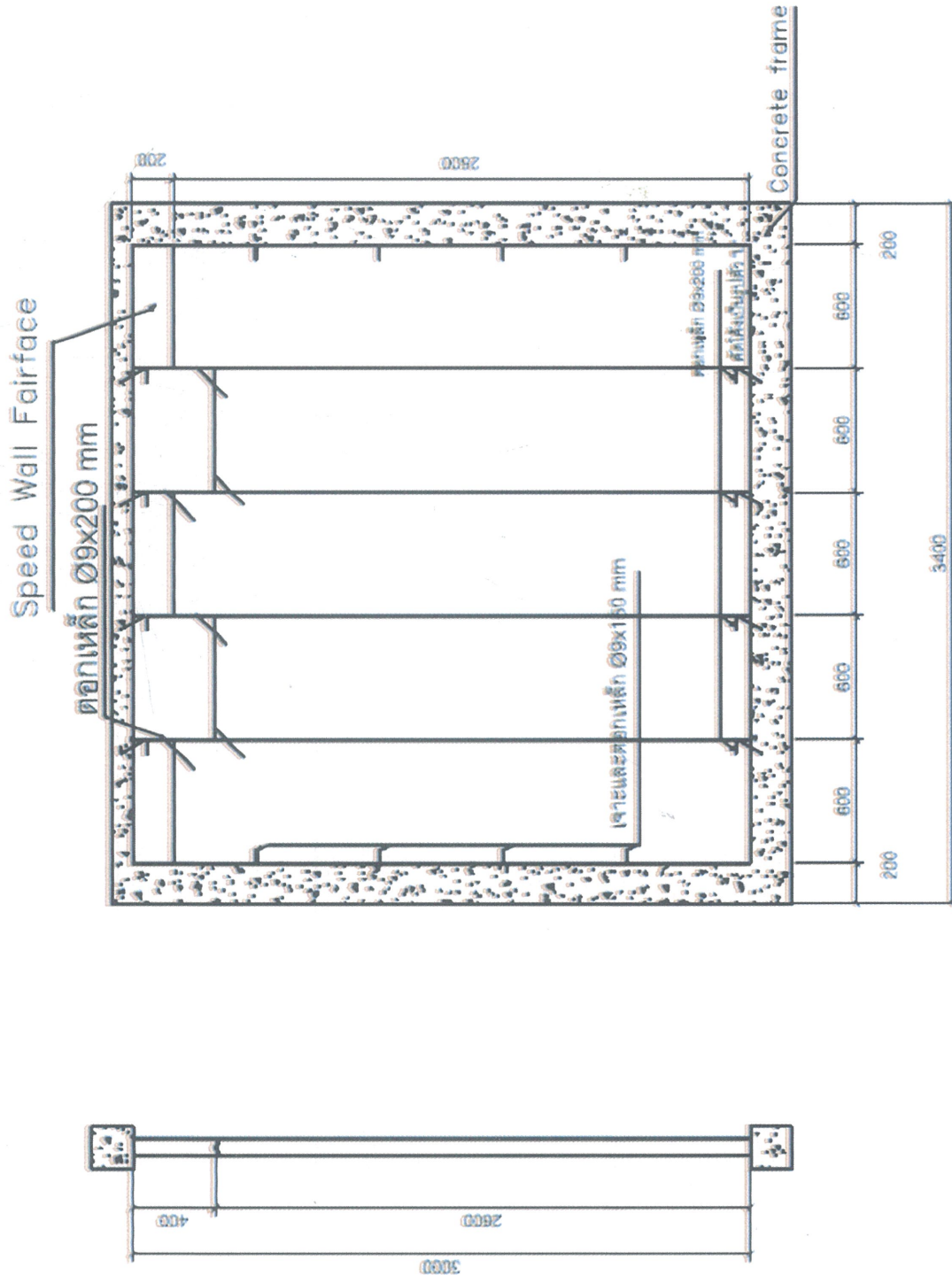



Figure C-1: Details of the specimen (as provided by the client)


(Dr. Sirichai Pethrung)
Authorized Testing Officer

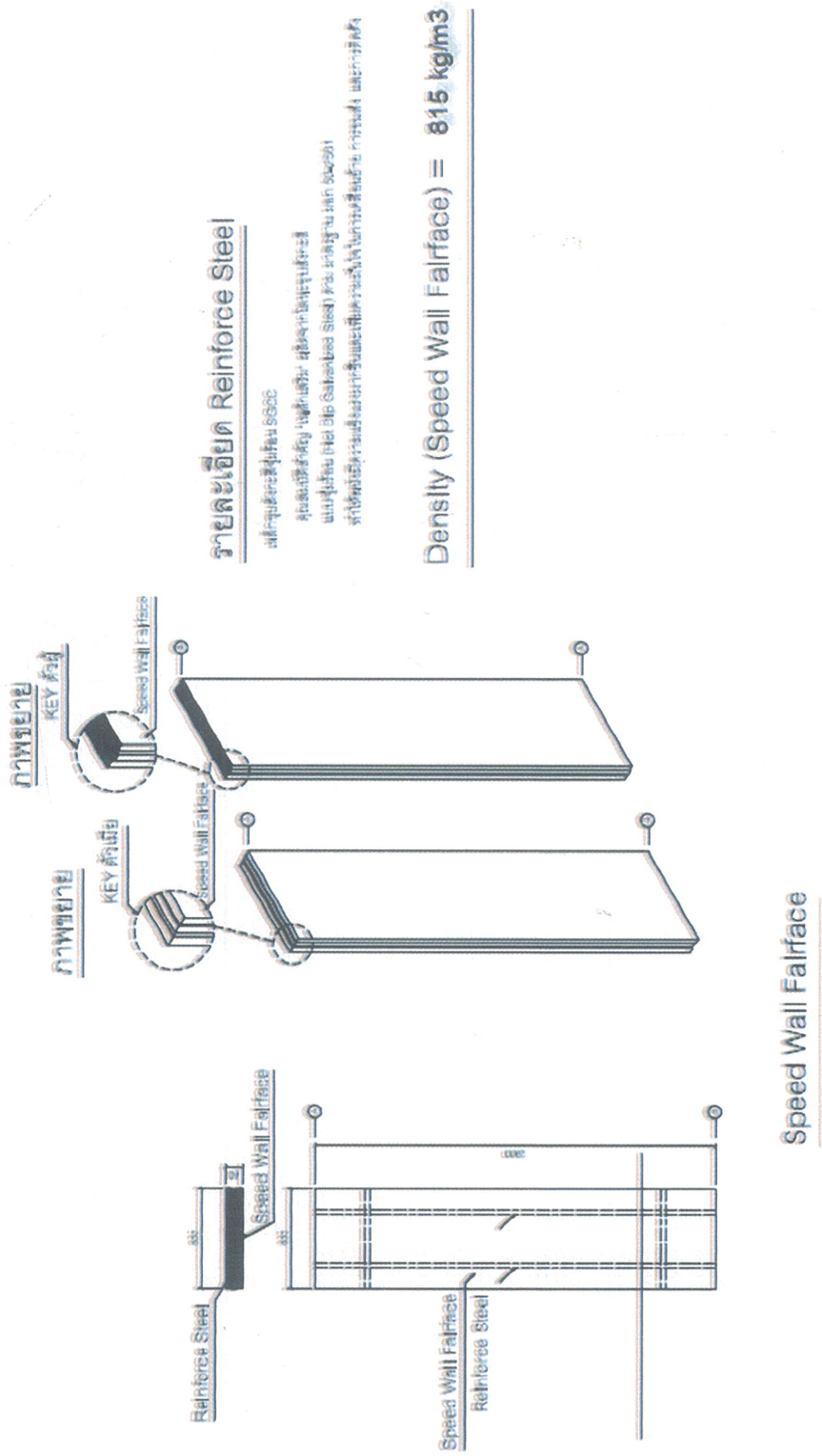
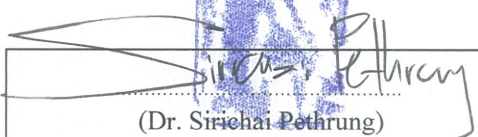


Figure C-3: Details of the specimen (as provided by the client)


 (Dr. Sirichai Pothrung)
 Authorized Testing Officer

APPENDIX D: PHOTOGRAPHS

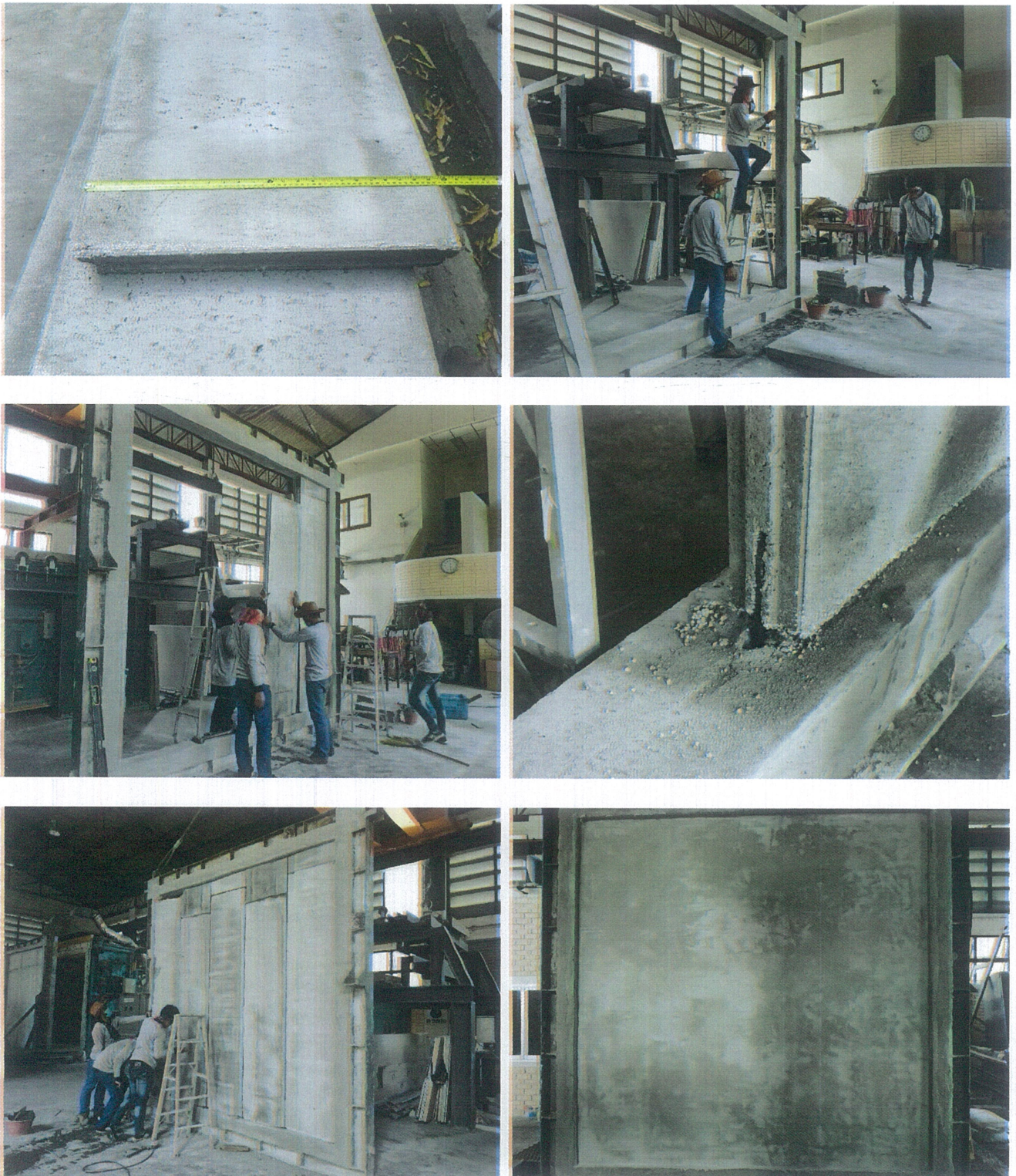
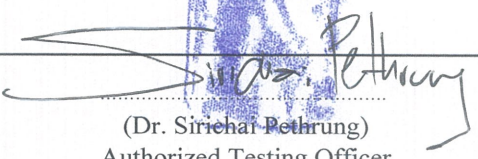
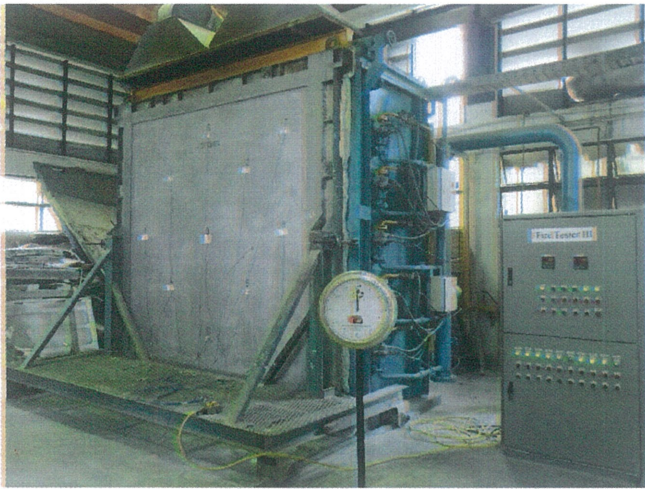
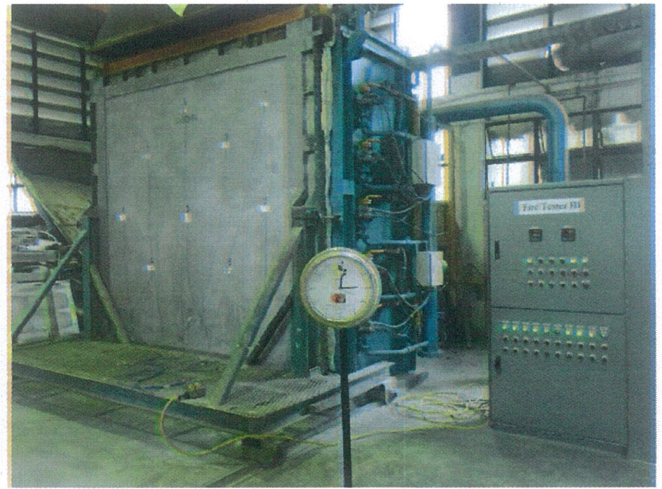


Figure D-1: Specimen preparation prior to the test

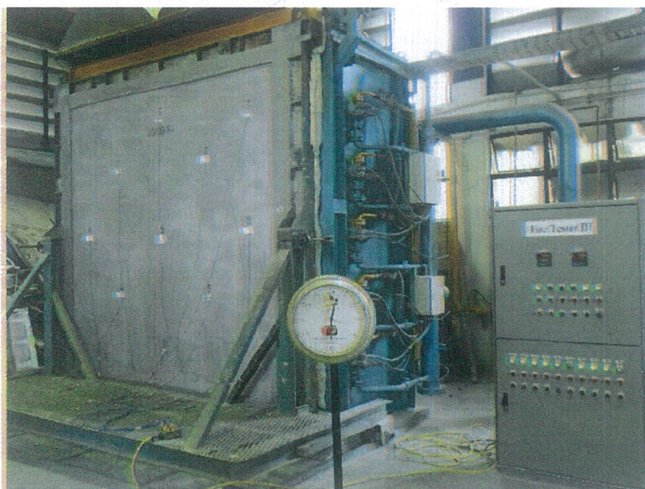

(Dr. Sirichai Pethrung)
Authorized Testing Officer



(a) 0:00 hr



(b) 0:15 hr



(c) 0:30 hr



(d) 0:45 hr




(e) 1:00 hr



(f) 1:15 hr

Figure D-2: The specimen during the test

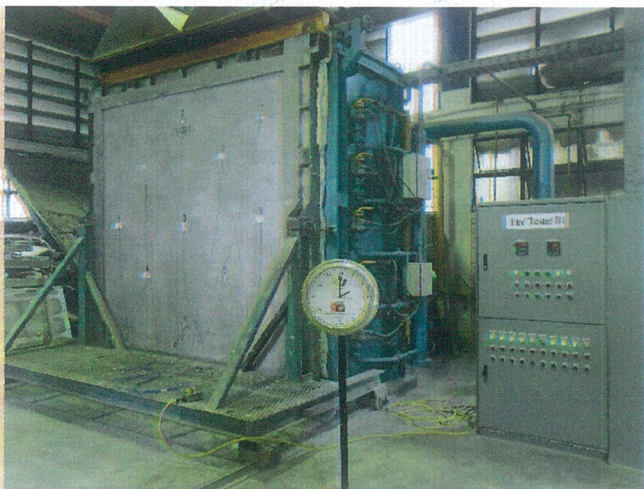

(Dr. Sirichai Pethrung)
Authorized Testing Officer



(g) 1:30 hr



(h) 1:45 hr



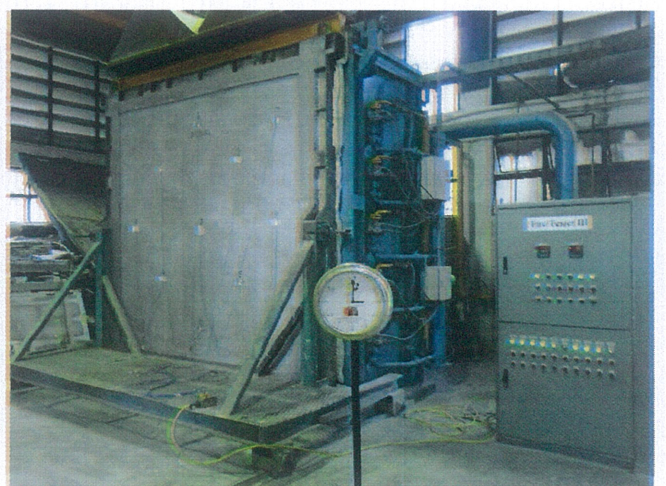
(i) 2:00 hr



(j) 2:15 hr




(k) 2:30 hr



(l) 3:00 hr

Figure D-2 (continued): The specimen during the test

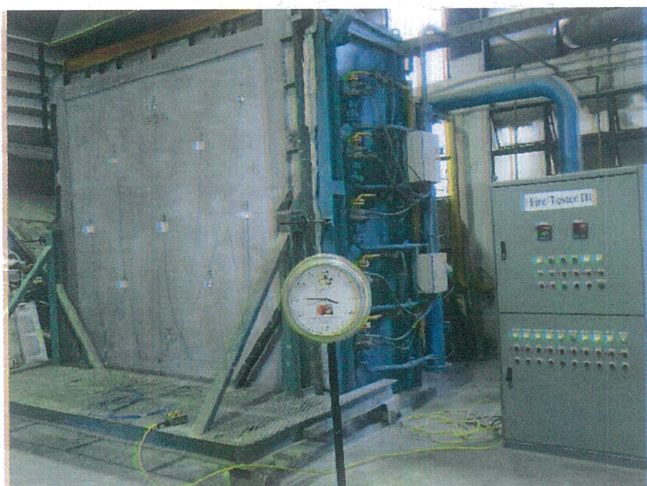

(Dr. Sirichai Pethrung)
Authorized Testing Officer



(m) 3:15 hr



(n) 3:30 hr




(o) 3:45 hr



(p) 4:00 hr

Figure D-2 (continued): The specimen during the test


(Dr. Sirichai Pethrung)
Authorized Testing Officer

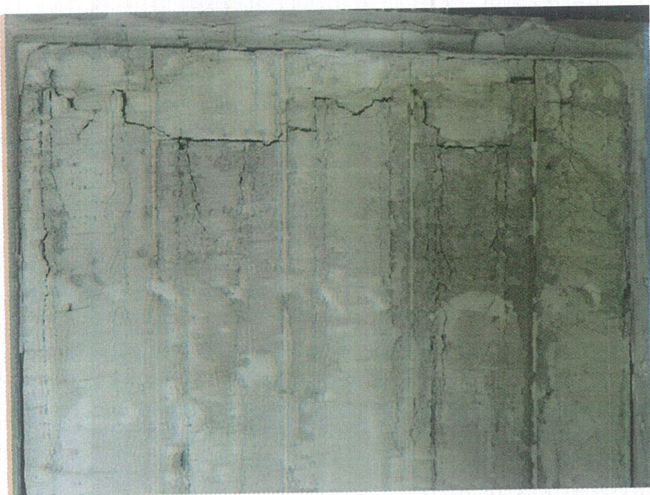
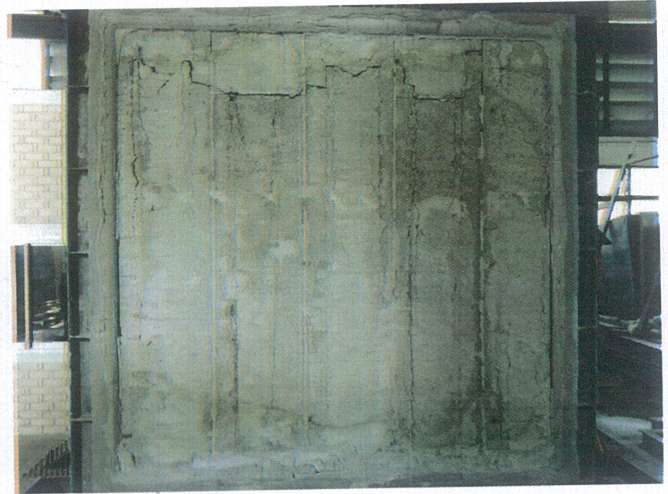
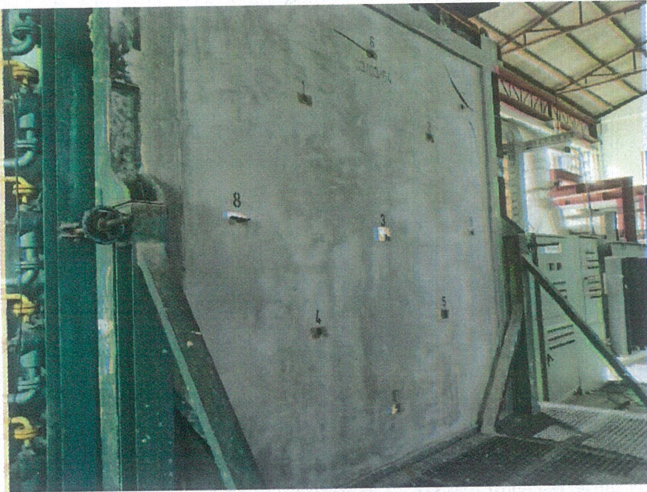
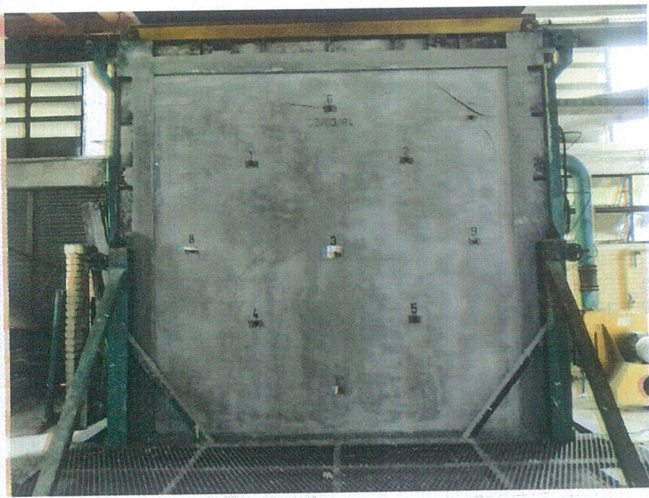



Figure D-3: The specimen after the test


(Dr. Sirichai Pethrung)
Authorized Testing Officer