

Calculation

Basic information

Client: Danish Concrete Institution
Scenario name: DIFLAGER
Consultant: DIFT
Reference no.:
Company type: Industry, plastics
Basic bldg. construction: Concrete
Last revision: 02-12-2005 15:51:00
Revision No.: 13

Calculation options

Post flash-over model enabled: **x**
Time limit [min]: 12
Plumemodel: McCaffrey

Fire brigade

Fire brigade active: -
City area: **x**
24 hour: **x**
Distance/fire station [km]: 5.0
Calculated response time [min]: 9
Time before manual alarm [min]: 10

Fire start

Fire start room: Concrete hall
Fire start, type: Solid material fire
Fire start, name: Rack,PS/carton, 96m3
Fire start, code: -
Optical smoke potential [dB/m]: 300.0
Height of stock [m]: 4.00
Width of stock [m]: 1.00
Length of stock [m]: 24.00

Fire installations

Room name	[----- In operation -----]						Windload [m/s]
	AFV Heat	AFV Smoke	AFV Timer	Sprinkler	AFA Heat	AFA Smoke	
Concrete hall	x	-	-	-	-	x	5.00
Steel plate hall	x	-	-	-	-	x	0.00

RHR and smoke layer temperature in all rooms

Time	Rate of heat release [kW]	[----- Smoke layer temp. [°C] -----]	
		Concrete hall	Steel plate hall
00:00:00	0	20	20
00:00:27	138	20	20
00:00:57	651	20	20
00:00:58	686	20	20
00:00:58		Room 'Concrete hall': Smoke-detected fire alarm (AFA) activated	
00:01:27	1,632	53	20
00:01:56	3,155	72	20
00:02:15	4,368	89	20
00:02:15		Room 'Concrete hall': Heat-detected smoke venting initiated	
00:02:15	4,368	89	20
00:02:15		Fire is declining	
00:02:15		Room 'Concrete hall': Heat-detected smoke venting operational	
00:02:44	6,166	108	20
00:03:13	8,103	128	20
00:03:43	10,375	152	20
00:03:47	10,711	156	20
00:03:47		Room 'Concrete hall'/'Surroundings': Breakage of window(s), temperature greater than 140 °C	
00:04:17	13,331	189	20
00:04:39	15,514	208	20
00:04:39		Critical condition in room 'Concrete hall': Heat radiation from smoke layer greater than 2.5 kW/m ²	
00:05:08	18,741	227	20
00:05:38	22,469	247	20
00:06:07	26,592	270	20
00:06:37	31,287	293	20
00:07:06	36,596	316	20
00:07:36	42,603	342	20
00:08:05	49,354	373	20
00:08:29	52,730	385	20
00:08:29		Critical condition in room 'Concrete hall': Smoke free height less than 2.20 m	
00:08:58	55,690	348	20
00:09:28	58,260	379	20
00:09:35	58,804	392	20
00:09:35		Room 'Concrete hall': Entry by fire brigade is no longer possible	
00:09:58	60,462	423	20
00:09:58		Fire brigade arrived, preparing extinguishing	
00:10:27	61,957	435	20
00:10:55	63,181	443	20
00:10:58	63,318	443	20
00:10:58		Fire brigade ready, extinguishing started	
00:11:22	63,318	447	20
00:11:51	62,549	447	20
00:12:00	62,280	446	20
00:12:00		MAX. CALCULATION TIME - CALCULATION ABORTED!	

Simulation results for each room

Concrete hall

<i>Time</i>	<i>Smoke room [dB/m]</i>	<i>Smoke layer [dB/m]</i>	<i>Floor layer [m]</i>	<i>Layer temp. [°C]</i>	<i>Heat radiation [kW/m²]</i>	<i>Floor pressure [N/m²]</i>
00:00:00	0.00		5.99	20		-0.010
00:00:27	0.03		5.99	20		14.100
00:00:57	0.28		5.99	20		14.348
00:00:58	0.30		5.99	20		14.361
00:00:58	Room 'Concrete hall': Smoke-detected fire alarm (AFA) activated					
00:01:27	0.60	7.40	5.61	53	0.48	30.918
00:01:56	0.60	10.66	4.80	72	0.64	84.802
00:02:15	0.60	13.23	4.25	89	0.79	145.649
00:02:15	Room 'Concrete hall': Heat-detected smoke venting initiated					
00:02:15	0.60	13.23	4.25	89	0.79	143.245
00:02:15	Fire is declining					
00:02:15	Room 'Concrete hall': Heat-detected smoke venting operational					
00:02:44	0.59	15.92	3.68	108	0.99	-6.016
00:03:13	0.58	18.68	3.08	128	1.26	-8.868
00:03:43	0.56	21.78	2.46	152	1.61	-12.394
00:03:47	0.56	22.21	2.37	156	1.67	-12.920
00:03:47	Room 'Concrete hall'/'Surroundings': Breakage of window(s), temperature greater than 140 °C					
00:04:17	0.29	25.86	3.46	189	2.17	-3.724
00:04:39	0.20	27.27	3.96	208	2.51	-2.091
00:04:39	Critical condition in room 'Concrete hall': Heat radiation from smoke layer greater than 2.5 kW/m ²					
00:05:08	0.13	27.63	4.26	227	2.89	-0.582
00:05:38	0.09	27.99	4.28	247	3.37	-0.019
00:06:07	0.06	29.11	4.12	270	4.03	-0.186
00:06:37	0.04	30.51	3.83	293	4.81	-0.748
00:07:06	0.02	31.96	3.44	316	5.73	-1.727
00:07:36	0.01	33.78	3.00	342	6.95	-3.070
00:08:05	0.01	35.99	2.55	373	8.53	-4.610
00:08:29	0.00	37.40	2.19	385	9.32	-6.095
00:08:29	Critical condition in room 'Concrete hall': Smoke free height less than 2.20 m					
00:08:58	0.00	34.43	1.05	348	7.53	-8.151
00:09:28	0.00	36.02	0.09	379	9.25	-17.262
00:09:35	0.00	37.20	0.02	392	10.00	-19.152
00:09:35	Room 'Concrete hall': Entry by fire brigade is no longer possible					
00:09:58	0.00	41.46		423	11.97	-21.952
00:09:58	Fire brigade arrived, preparing extinguishing					
00:10:27	0.00	44.52		435	12.82	-22.460
00:10:55	0.00	46.09		443	13.39	-22.604
00:10:58	0.00	46.21		443	13.46	-22.617
00:10:58	Fire brigade ready, extinguishing started					
00:11:22	0.00	46.87		447	13.71	-22.843
00:11:51	0.00	47.11		447	13.72	-22.984
00:12:00	0.00	47.09		446	13.68	-22.986
00:12:00	MAX. CALCULATION TIME - CALCULATION ABORTED!					

Steel plate hall

Time	Smoke room [dB/m]	Smoke layer [dB/m]	Floor layer [m]	Layer temp. [°C]	Heat radiation [kW/m ²]	Floor pressure [N/m ²]
00:00:00	0.00		5.99	20		-0.005
00:00:27	0.00		5.99	20		1.186
00:00:57	0.00		5.99	20		1.207
00:00:58	0.00		5.99	20		1.208
00:00:58	Room 'Concrete hall': Smoke-detected fire alarm (AFA) activated					
00:01:27	0.00		5.99	20		2.600
00:01:56	0.01		5.99	20		7.132
00:02:15	0.01		5.99	20		12.250
00:02:15	Room 'Concrete hall': Heat-detected smoke venting initiated					
00:02:15	0.01		5.99	20		12.048
00:02:15	Fire is declining					
00:02:15	Room 'Concrete hall': Heat-detected smoke venting operational					
00:02:44	0.01		5.99	20		-0.506
00:03:13	0.01		5.99	20		-0.746
00:03:43	0.01		5.99	20		-1.027
00:03:47	0.01		5.99	20		-1.066
00:03:47	Room 'Concrete hall'/'Surroundings': Breakage of window(s), temperature greater than 140 °C					
00:04:17	0.01		5.99	20		-0.313
00:04:39	0.01		5.99	20		-0.176
00:04:39	Critical condition in room 'Concrete hall': Heat radiation from smoke layer greater than 2.5 kW/m ²					
00:05:08	0.01		5.99	20		-0.049
00:05:38	0.01		5.99	20		-0.002
00:06:07	0.01		5.99	20		-0.016
00:06:37	0.01		5.99	20		-0.063
00:07:06	0.01		5.99	20		-0.145
00:07:36	0.01		5.99	20		-0.258
00:08:05	0.01		5.99	20		-0.367
00:08:29	0.01		5.99	20		-0.438
00:08:29	Critical condition in room 'Concrete hall': Smoke free height less than 2.20 m					
00:08:58	0.01		5.99	20		-0.225
00:09:28	0.03		5.99	20		-0.532
00:09:35	0.03		5.99	20		-0.662
00:09:35	Room 'Concrete hall': Entry by fire brigade is no longer possible					
00:09:58	0.03		5.99	20		-0.903
00:09:58	Fire brigade arrived, preparing extinguishing					
00:10:27	0.03		5.99	20		-0.937
00:10:55	0.03		5.99	20		-0.942
00:10:58	0.03		5.99	20		-0.942
00:10:58	Fire brigade ready, extinguishing started					
00:11:22	0.03		5.99	20		-0.959
00:11:51	0.03		5.99	20		-0.973
00:12:00	0.03		5.99	20		-0.973
00:12:00	MAX. CALCULATION TIME - CALCULATION ABORTED!					