

Sealants with PCB in Skärholmen, Stockholm.

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Introduction

The amount of PCB that has been used in sealants in Sweden is not thoroughly known. It's been estimated that the volume PCB range from 100 to 500 tones (Hammar, 1992) and that use started in the late Fifties and stopped with a ban in 1972 for use in open systems. In 1997 a report published by The Swedish Environment and Protection Administration (Jansson et al 1997) discovered that sealants used in between concrete slabs leak PCB into the environment. The leakage can be seen both in air samples and in the ground outside the building.

According to a decision made by the Ecocycle Council for the Building Sector, (Byggsektorns lopps råd 1998) replacement of sealants should be performed before the end of year 2002, if the PCB concentration exceeds 500 mg/kg. If the concentration is below 500 mg/kg replacement may be carried out when periodic maintenance is required.

In order to be able to inform property owners where they are likely to find PCB-sealants, how much PCB they can contain today and how large a quantity of PCB a building can hold the Health and Environment Protection Administration of Stockholm made an inventory of sealants.

Materials and Methods

The investigated area Skärholmen is situated south west of the Stockholm center. Most of the buildings in the area are built 1950-1971. Samples of the sealants to be examined were collected, May to June 1998, from different locations on buildings, since they can be found around doors, under steps, around windows, in lofts, at the side of stairs, around facade stones, between concrete ground and dwellings, on balconies and isolation joints.

Samples were in the form of pieces 3-5 cms in length. Care was taken in order not to contaminate them and they were catalogued and archived. The samples were taken from 13 different buildings, built between 1966-1972.

The analysis was performed using the method reported upon in PCB i fogmassor published by the Swedish EPA (ibid. 1997). In the present study the analysis was carried out with a limit of determination <3.5 mg/kg for 7 PCB congeners. The congeners analyzed and weighted to a total PCB content was IUPAC 28, 52, 101, 118, 138, 153 and 180 (Schultz et al, 1989).

Volumes of PCB was calculated using the estimation that every sealant has the width of 15 mm, which correspond to a use of 0.2-0.3 kg per meter (Folkesson 1998).

Results and discussion

Of 29 different samples, 7 were not shown to contain PCB. Six sealants contained less than 500 mg/kg and need not be replaced before the end of year 2002. The results for all samples are shown in table 1.

The other 16 samples showed concentrations of PCB, in a weighted range varying from 2,300 to 250,000 mg/kg.

The different types of specific PCB mixtures used in sealants can be identified from the analysis and table 2 shows the found mixtures from the 29 samples.

Technical mixtures		%
Aroclor 1260	12	41
Aroclor 1254	4	14
Aroclor 1240	3	10
No identification	3	10
Not determined PCB	7	25

Table 2. Reported different specific PCB mixtures found in sealants.

Calculated length and PCB contents for sealants show that:

- Four estates withhold the amount of 70 kg of PCB, the largest quantity out of a total found of 82 kg.
- Sealants with PCB are found in all the different locations for sealants. All types of sealant should therefore be analysed for PCB content.

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References

Hammar T, 1992, "PCB i fogmassor", Länsstyrelsen i Kalmar län informerar 1992:10.

Jansson B, Sandberg J, Johansson N och Åstebro A, 1997, "PCB i fogmassor-stort eller litet problem?", Swedish Environment Protection Administration, rapport 4697.

Byggsektorns Kretsloppsrad,1998,"PCB i byggnader-Ett projekt inom Byggsektorns Kretsloppsrad", Program 1998-03-16 reviderat 98-09-08, 15 sidor.

Schultz DE, Petric G, Duinker C, 1989, "Complete characterization of polychlorinated biphenyl congeners in commercial Aroclor and Clophen mixtures by multidimensional gas chromatography-electron capture detection", Environ Sci Technol, 23 s 852-859.

Folkesson I, 1998, Svenska Fogbranschens Riksförening, personal interview.

Table 1.

Adress	Type of building	Sample site	Tot PCB mg/kg	Length sealant m	PCB kg
Värbergsplan 3-9	Residential	concrete slab	250 000	70	3,50
Värbergsplan 3-9	Residential	isolation joint	239 000	27	1,29
Auragränd 2	Industry	concrete slab	219 000	20	0,88
Värbergsvägen 63	Nursing home	concrete slab	213 000	400	17,04
Storsätragränd 28	Electrical substation	concrete slab	203 000	50	2,03
Våruddsringen 202	School	window	190 000	40	1,52
Våruddsringen 202	School	door	173 000	40	1,38
Värbergsvägen 63	Nursing home	concrete slab	92 000	80	1,47
Gillsätragränd 51	Detached house	window	92 000	2020	37,17
Bogsätravägen 46	School	door	90 000	4	0,07
Bogsätravägen 46	School	isolation joint	90 000	3	0,05
Gillsätragränd 51	Detached house	concrete slab	80 000	940	15,04
Bogsätravägen 46	School	door	69 000	30	0,41
Värbergsplan 3-9	Residential	door	15 000	100	0,30
Våruddsringen 202	School	window	9 447	120	0,23
Laxholmsbacken 2	Electrical substation	concrete slab	2 306	50	0,02
Värbergsvägen 63	Nursing home	concrete slab	70	60	0,0008
Gränsholmsbacken 18	Residential	other, stair	67	216	0,0029
Våruddsringen 202	School	window	47	60	0,00056
Auragränd 2	Industry	concrete slab	15	110	0,00033
Gillsätragränd 72	Detached house	door	5	300	0,00030
Fjäderholmsgränd 7	Residential	door	2	7	0,00000
Våruddsringen 202	School	concrete slab	not det	790	
Stångholmsbacken	Garage	isolation joint	not det	20	
Hällsättrabacken 38	Residential	door	not det	30	
Gränsholmsbacken 5	Residential	concrete slab	not det	10116	
Gränsholmsbacken 18	Residential	concrete slab	not det	10116	
Gränsholmsbacken 5	Garbage room	concrete slab	not det	40	
Lamholmsbacken 90	Detached house	concrete slab	not det	42	
Sum					82

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