

CAA
environmental review
2003





Ministry Working Group Stresses Dialogue In Environmental Permit Process

In December 2002 The Ministry of the Environment set up a committee to look at the special issues relating to environmental permits for airports. It included representatives of the defence forces, the Ministries of the Environment and Transport and Communications, one Regional Environment Centre and the Environmental Permit Authority, and the Civil Aviation Administration. In its report submitted to The Ministry of the Environment in October 2003, the working group recommended greater dialogue between airport operators and licensing authorities in order to create an overall picture of operational safety aspects and environmental impacts before assessing the need for environmental regulation. As regards aircraft noise it was recommended that airport operators be asked to submit a noise management plan before regulation is considered. In regard to de-icing agents it was proposed that airport operators always be asked to provide a separate assessment if regulations concerning runoff waters are thought necessary.

In order to clarify questions of authority and responsibilities relating to civil and military aviation, a change was also made in the environmental protection decree. This places direct responsibility on the defence forces for any regulation assigned to them in an airport environmental permit. The change in the military aviation decree defined responsibilities within the defence administration.

In November, the Ministries of Environment and Transport and Communications and the CAA arranged a joint seminar for the environmental administration to deal with the committee's report. Almost 50 participants attended the semi-

nar, including a comprehensive number from various Regional Environmental Centres and Permit Authorities.

Assessing the Need for Permits

During the financial year, discussions were held with Regional Environmental Centres on the operations, environmental impacts and need for permits of Oulu, Helsinki-Malmi, Kruunupy and Kuopio airports as well as all the airports in Lapland. In most cases the permit assessment will continue with an inspection to assess the airports' operations and relevant regulations as well as their impact on the environment.

In accordance with a decision of the Southwest Finland Regional Environment Centre an environmental permit was sought for Turku Airport. A permit was also applied for Maarianhamina Airport in accordance with Aland Island provincial regulations. A study on the spread of aircraft noise was also made for the Maarianhamina Airport permit application.

Environmental Management System Provides the Basis for Operation

In approving the operating plan and budget for the CAA, the Ministry of Transport and Communications made it a condition that the CAA implement an environmental management system in line with an operating plan set down for the traffic management sector. Since 2001 environmental management system, which is based on ISO 14001, has been used to create an operations model for environmental management and has enabled environmental reporting to begin. At the end of the year the Ministry finalized its plan for assessing the environmental management of the institutions and companies working in the sector. The CAA has taken part in the preparatory work led by the Ministry.

Data collection instructions in the environmental management system were revised to enable annual reporting to take place within the timetable for the auditing of accounts. On the basis of the expert assessment requested on the 2001 environmental report it was decided that partial verification of the CAA's environmental information should be started for the report for 2004.

Seminar for airports' environmental officers were organized during the review year, covering questions of reporting, initiation of internal auditing and waste management development.

Running In the Runway at Helsinki-Vantaa

Operations on the third runway of the country's primary airport were gradually increased during the review year. The runway was opened at the end of 2002. Studies of the effects of actual traffic on aircraft noise in the area were begun and will be completed during 2004.

Exhibition for Experts and the Public

The CAA took part in the noise abatement conference in Jyväskylä with an exhibition on Finnish air traffic and aircraft noise at Helsinki-Vantaa Airport, and also in an exhibition on "Our environment and traffic" at the Ministry of Transport and Communications. The CAA aroused particular attention at the Jyväskylä event for its noise control planning work.

Tighter Procedures to Avoid Environmental Damages

The environmental management system incorporates a reporting procedure through which information on environmental accidents is handled in order to refine operating instructions.



Two cases of environmental damage occurred at CAA airports. In one case, three cubic metres of liquid formiate used in runway de-icing flowed into a nearby lake through the rainwater drain during practice with new spraying equipment. The effects of the spill were evident in samples from the water system but little long term significance for the water quality is expected. In order to avoid similar incidents at other airports, the spraying equipment supplier has been ordered to provide more precise operating and safety instructions. In the other incident, fuel oil passed into the soil from a construction machine. The polluted soil was removed and taken away for treatment. Other minor incidents involved leaks of de-icing acetates and formiates and fire-extinguisher fluids into effluent drains.

Incidents of soil pollution were observed at four airports in connection with modification work following new Ministry of Trade and Industry regulations for

fuel filling stations. The fuel leaks had occurred gradually over a long period. There was no widespread pollution, however, and all the sites were restored by replacing the soil.

Major Environmental Studies for Utti Air Base Project

The most extensive environmental study during the review year concerned a project by the defence forces to develop the Utti garrison as the main transport helicopter base. The CAA drew up a report on aircraft and helicopter noise at Utti and participated in producing the Environmental Impact Statement (including reference to ground waters) for which the defence forces are responsible. At the same time, the CAA in conjunction with the defence forces negotiated with the authorities over the need for an environmental permit for the air base project and the airport.

ICAO Prepares Measures to Reduce Aircraft Emissions

International aviation environmental work concentrated on preparing for the sixth meeting of the environmental committee of the International Civil Aviation Organisation (CAEP), held in February, 2004. The most important work concerned the reduction of greenhouse gas emissions by international air traffic. Under the Kyoto agreement these measures are to be applied through the ICAO. The ICAO has studied emission charges, emissions trading and voluntary agreements as means of reducing emissions or limiting their growth. The Finnish CAA has monitored the preparatory work through such means as the European Civil Aviation Congress environmental committee.

Annual CAA aircraft emissions calculations are used in Finland's official reports of greenhouse gas emissions.

National De-icing Agent Study Supports the Use of Formiates

Soil trials by the MIDAS research project carried out by the Finnish Environment Institute between 2002 and 2003 confirmed laboratory results from previous years that formiates break down quickly in the soil. Studies near a road where they were used showed no indication of them in the groundwater and they are assumed to have broken down into carbon dioxide and water in the surface layer before being carried any further with the groundwater. Biodegradability tests showed that temperature significantly influenced the speed of breakdown but that formiates did start to break down even at low temperatures. Another decisive factor in the degrading process is the concentration of organic matter in the soil. The final report of the research project, which was partially funded by the CAA, was due for publication in March 2004.

Key Figures for Airports and Aviation

The appended figures and tables show the volumes of de-icing agents used at each airport as well as accrued waste and energy and water consumption. Time lines are also shown for these.

The tables also depict airport traffic volumes and aircraft exhaust emissions at airports. Emissions data for CAA ground equipment is also presented.

CAA calculations of aircraft exhaust gas emissions in Finnish airspace as a whole are published via the LIPASTO system: <http://lipasto.vtt.fi/>.

Vantaa February 16, 2004

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Table 1. Aircraft landings at CAA airports in 2003 and change from the previous year. Total landings declined in 2003 from the previous year, with the exception of commercial aviation. The number of landings at some airports showed relatively drastic changes between the various forms of aviation.

Airport	Year 2003				Change from previous year (%)			
	Commercial aviation	General aviation	Military aviation	Total	Commercial aviation	General aviation	Military aviation	Total
Enontekiö	77	12	0	89	28	-40	0	11
Halli	10	208	2 068	2 286	233	-15	1	0
Helsinki-Malmi	46	40 157	84	40 287	142	3	1	3
Helsinki-Vantaa	77 744	2 016	983	80 743	3	-16	-13	2
Ivalo	869	313	109	1 291	0	48	-40	2
Joensuu	1 766	1 911	101	3 778	-5	-28	-17	-18
Jyväskylä	2 462	5 785	3 140	11 387	-25	2	-10	-8
Kajaani	978	543	258	1 779	-1	225	-4	25
Kauhava	13	172	8 586	8 771	-63	-36	-20	-21
Kemi-Tornio	1 091	556	10	1 657	-12	-21	-76	-16
Kittilä	1 217	219	404	1 840	10	-40	99	10
Kruunupyö	1 764	2 614	319	4 697	-4	-28	-36	-22
Kuopio	2 531	2 820	5 704	11 055	6	4	-5	0
Kuusamo	702	276	25	1 003	3	41	79	12
Lappeenranta	1 654	1 887	68	3 609	-5	-38	-46	-26
Maarianhamina	2 471	690	0	3 161	-4	-42	0	-16
Oulu	6 331	3 096	1 275	10 702	6	-15	-13	-4
Pori	1 894	8 960	150	11 004	4	2	-14	2
Rovaniemi	2 595	2 751	5 549	10 895	5	-10	3	0
Savonlinna	1 114	260	12	1 386	-3	-21	-85	-11
Tampere-Pirkkala	4 893	7 183	5 913	17 989	-3	23	-9	4
Turku	6 131	8 500	514	15 145	-8	9	-29	0
Utti	9	525	4 976	5 510	-63	-32	13	6
Vaasa	4 585	3 295	241	8 121	3	33	-31	12
Varkaus	973	78	1	1 052	0	-41	-67	-5
Total	123 920	94 827	40 490	259 237	1	0	-8	-1



Table 2. Use of runway and aircraft de-icing agents in airport areas and accumulated waste for each airport in 2003. The CAA uses de-icing agents on the runways (urea, acetate and formiate) while the airlines and their ground handling companies use de-icing agents on aircraft surfaces (glycol). The waste volumes also include waste received under contract by the CAA from operators at its airports.

Airport	Building volume m ³	Runway and aircraft de-icing chemicals (Winter season 2002-2003)				Energy and water consumption (Year 2003)			Waste volumes (Year 2003)		
		Urea t	Acetate 100% t	Formiate 100% t	Glycol 100% factory solution m ³	Electricity MWh	Heat MWh	Water m ³	Landfill waste t	Recyclable waste t	Hazardous waste t
Enontekiö	13 995	0	1	0	8	0*	381	39	6	2	8.3
Halli	7 251	0	15	0	0	30	254	84	1	2	2.0
Helsinki-Malmi	89 268	0	2	6	0	823	2 383	1 031	148	26	0.7
Helsinki-Vantaa	512 089	0	749	10	2 598	41 261	30 309	77 306	746	1 129	100.6
Ivalo	24 995	4	46	0	17	899	1 986	2 887	44	29	0.6
Joensuu	42 025	0	31	3	5	626	1 923	4 433	5	5	2.1
Jyväskylä	28 308	0	47	1	13	1 162	2 104	4 437	15	18	5.8
Kajaani	17 632	8	11	0	8	487	1 161	2 136	12	4	16.0
Kauhava	8 157	17	10	0	0	92	381	226	3	1	0.4
Kemi-Tornio	18 626	0	20	0	27	644	1 566	889	107	5	16.3
Kittilä	19 018	4	20	4	28	1 271	1 085	1 907	40	1	0.9
Kruunupyö	20 788	5	37	3	9	505	1 056	2 986	2	57	0.5
Kuopio	61 452	0	41	9	20	1 688	2 745	9 094	140	19	0.5
Kuusamo	14 155	0	5	9	16	440	727	556	23	44	0.2
Lappeenranta	14 984	0	19	0	8	481	1 060	1 523	4	11	83.1
Maarianhamina	14 553	0	3	0	1	475	988	4 208	15	11	3.0
Oulu	65 135	0	83	43	98	3 296	3 341	6 218	44	20	1.2
Pori	24 930	0	37	0	1	594	1 903	1 475	17	9	0.8
Rovaniemi	100 251	4	31	7	75	3 953	5 615	6 954	52	12	9.6
Savonlinna	12 902	1	15	3	2	437	400	1 429	6	5	1.9
Tampere-Pirkkala	53 514	0	87	0	33	1 765	1 941	2200	27	56	11.0
Turku	40 312	2	45	9	45	2 286	1 782	5 450	51	34	68.3
Utti	3 560	0	0	13	0	56	142	180	1	8	6.2
Vaasa	51 095	0	73	0	51	1 397	2 869	3 841	12	51	6.0
Varkaus	10 834	0	8	0	2	494	369	334	6	3	2.9
Total	1267 531	45	1 436	120	3 065	65 162	68 471	141 823	1 527	1 562	349

* Electricity consumption includes heating energy

Table 3. Aircraft fuel consumption and exhaust gas emissions below 915 metres (3,000 feet) altitude (during LTO cycle) and fuel consumption and exhaust gas emissions from CAA ground equipment for each airport in 2003. Overall emissions and fuel consumption during aircraft LTO cycles rose between 3-10 % at the airports in 2003 because of 5 % increase of number of LTO cycles. Total emissions and fuel consumption for CAA ground equipment fell between 7-10% from the year before.

Airport	Aircraft emissions * (Year 2003)							Emissions from CAA ground equipment (Year 2003)						
	LTO cycle no.	CO (t)	HC (t)	NO _x (t)	SO ₂ (t)	CO ₂ (t)	Fuel (t)	CO (t)	HC (t)	NO _x (t)	Particles (t)	SO ₂ (t)	CO ₂ (t)	Fuel (t)
Enontekiö	100	1	0.1	0.8	0.1	189	61	0.3	0.1	0.4	0.02	0.001	54	17
Halli	247	2	0.1	0.0	0.0	10	3	0.3	0.1	0.4	0.02	0.001	53	17
Helsinki-Malmi	36 437	266	3.6	0.6	0.1	780	249	0.3	0.1	0.3	0.02	0.001	38	12
Helsinki-Vantaa	79 017	545	81	544	45	141 055	45 088	11.6	3.4	16.9	0.93	0.025	2 217	704
Ivalo	1 266	8	1.3	9.3	0.7	2 181	697	2.2	0.4	1.2	0.07	0.003	187	60
Joensuu	3 061	13	0.9	7.5	0.6	1 991	637	0.7	0.2	1.3	0.07	0.002	154	49
Jyväskylä	6 932	34	1.4	7.1	0.6	2 040	652	0.4	0.2	1.1	0.06	0.001	140	44
Kajaani	1 481	8	1.5	7.7	0.6	2 022	646	0.4	0.1	0.7	0.04	0.001	93	29
Kauhava	209	1	0.1	0.0	0.0	20	6	0.5	0.1	0.6	0.03	0.001	80	26
Kemi-Tornio	1 581	8	1.9	10.2	0.8	2 661	851	0.6	0.2	1.3	0.07	0.002	154	49
Kittilä	1 413	11	2.1	13.4	1.0	3 100	991	0.6	0.3	1.8	0.10	0.002	224	71
Kruunupyö	2 857	12	1.0	6.2	0.5	1 720	550	0.3	0.1	0.5	0.03	0.001	78	25
Kuopio	5 004	27	2.1	14.3	1.2	3 728	1 192	0.7	0.3	2.1	0.12	0.002	250	79
Kuusamo	1 035	6	1.4	7.0	0.6	1 756	561	0.6	0.2	1.1	0.06	0.001	130	41
Lappeenranta	3 188	14	0.7	1.1	0.2	501	160	0.8	0.2	0.7	0.04	0.001	94	30
Maarianhamina	3 101	33	3.1	1.8	0.2	688	220	0.3	0.1	0.4	0.02	0.001	51	16
Oulu	8 487	68	7.9	48.9	3.9	12 267	3 921	1.4	0.4	2.1	0.12	0.003	279	89
Pori	10 718	60	4.7	2.6	0.3	1 093	349	0.6	0.1	0.7	0.04	0.001	86	27
Rovaniemi	4 184	39	4.2	22.9	1.8	5 700	1 822	1.9	0.8	5.1	0.29	0.007	676	215
Savonlinna	1 300	3	0.3	1.1	0.1	369	118	0.6	0.1	0.5	0.03	0.001	68	22
Tampere-Pirkkala	11 445	60	2.4	13.2	1.3	4 076	1 303	0.6	0.3	1.8	0.10	0.002	221	70
Turku	12 515	83	5.6	11.8	1.3	4 168	1 332	0.6	0.3	2.1	0.11	0.002	239	76
Utti	632	5	0.1	0.0	0.0	15	5	0.3	0.1	0.2	0.01	0.000	40	13
Vaasa	6 803	33	3.3	11.6	1.1	3 520	1 125	0.8	0.2	0.6	0.03	0.001	86	27
Varkaus	1 048	2	0.2	0.6	0.1	246	79	0.2	0.1	0.3	0.02	0.000	42	13
Total	204 061	1 340	131	744	62	195 897	62 619	27.8	8.5	44.4	2.45	0.063	5 737	1 822

* Aircraft emissions calculations do not include military flights, helicopters or sail planes. Data unavailable for aircraft particles.
1 litre of kerosene = 0.800 kg

Table 4. Consumption of heat, electricity and water by CAA properties in 2003. Calculations per passenger do not include Kauhava, Halli, Utti and Helsinki-Malmi airports. Overall consumption of electricity and particularly water have fallen from the previous year. Consumptions per passenger have fallen more than overall consumption because of the increase in passenger numbers.

	Year 2003	Change
Heating consumption	68.5 GWh	1 %
Specific heat consumption normalised for temperature	56.4 kWh/m ³	3 %
Heating consumption per passenger	5.0 kWh/pax	0 %
Electricity consumption	65.2 GWh	-13 %
Specific electricity consumption	51.3 kWh/m ³	-12 %
Electricity consumption per passenger	4.9 kWh/pax	-14 %
Water consumption	141.8 tm ³	-19 %
Water consumption per passenger	10.6 l/pax	-20 %
Passengers	13.191 milj.	1 %

Fig 1. Quantities of runway de-icing agents used at CAA airports each winter between 1991 - 2003. The water content (50%) of liquid acetates and formiates has been deducted from the total calculations. Although the winter of 2002-2003 was longer than normal, the cold weather allowed de-icing agent use to remain at the previous winter's level.

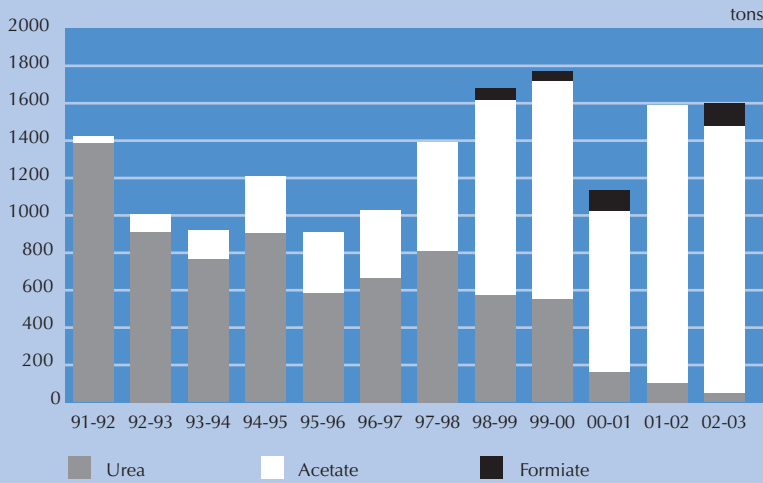


Fig 2. Oxygen consumption and nitrogen load caused by runway de-icing agents each winter between 1991 - 2003. Pollution has declined significantly in the past ten years with the termination of urea as an agent.

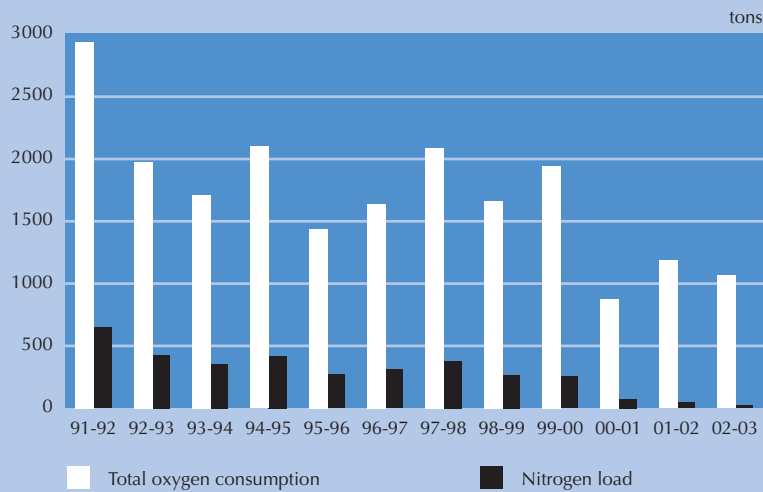


Fig 3. Quantities of aircraft de-icing fluid used each winter at CAA airports between 1997 - 2003. Consumption of glycol fluid in the winter of 2002-2003 was higher because the winter was exceptionally long.

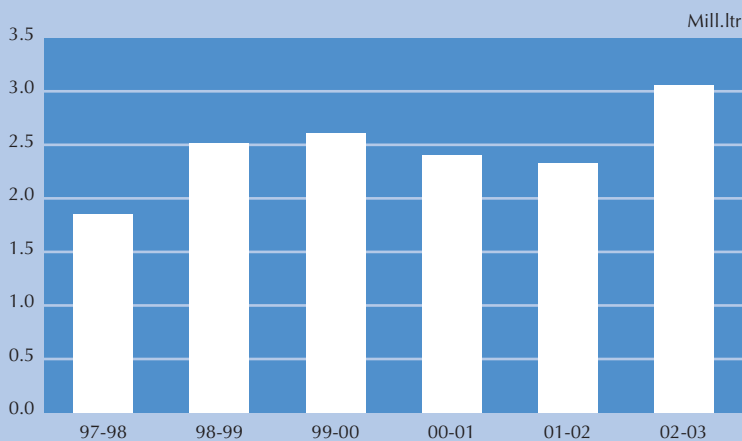


Fig 4. Proportions of landfill, recyclable and hazardous waste at CAA airports in 2003 and 2002.

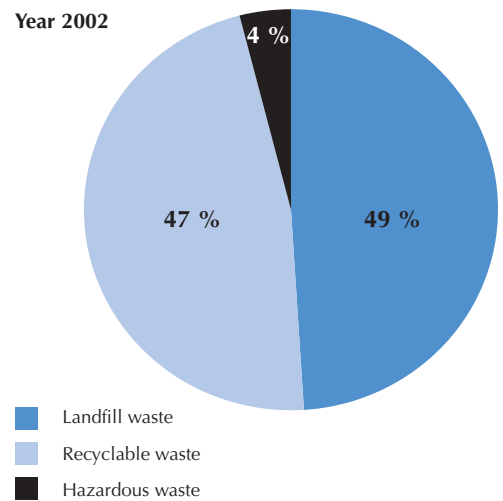
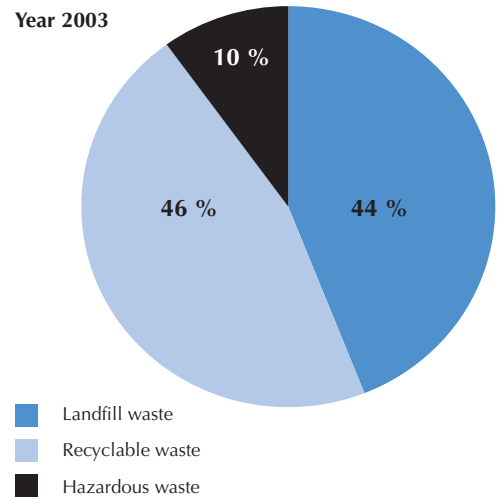


Table 5. Accumulated assorted, recyclable and hazardous waste collected by the CAA waste management system in 2003 and the change from the previous year. Recyclable waste includes separately collected bio-products, metal, glass, plastic, paper and cardboard, lubricating oil, used tyres, electrical and electronic refuse and separated building materials. Hazardous waste increased significantly from the year before because it includes polluted soil removed from filling stations being renovated at various airports.

Year 2003	Tons	Change
Landfill waste	1 527	9 %
Recyclable waste	1 562	18 %
Hazardous waste	349	186 %
Total	3 438	21 %



The CAA

- Maintains Finland's airport network and air navigation system.
- Is a commercial enterprise funded by its users, with independent authority over its operations, finances and spending. The government sets the CAA's general operating and earnings targets.
- Serves all air traffic operators and passengers.
- Is responsible for Finnish air safety.
- Is responsible for air traffic policy in conjunction with the Ministry of Transport and Communications and the department of foreign affairs.
- Is Finland's official aviation authority.

In 2003 the CAA's airport network consisted of 25 airports and the organization had an average workforce of 1,812 people.

The aim of the Civil Aviation Administration is to ensure safe, regular and economical air transport that places as little burden as possible on the environment.

CAA environmental organization

