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NOISE CONTROL IN REFUSE DISPOSAL

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In the Federal Republic of Germany the Federal Immission Control Law (BImSchG) regulates the questions of environmental protection, including noise protection. The purpose of the law is to protect human beings as well as animals, plants and other objects from harmful effects and, in so far as installations subject to licensing are concerned, from dangers, considerable disadvantages and considerable nuisances, and to prevent such harmful effects on the environment. The BImSchG distinguishes installations subject to licensing, installations not subject to licensing and vehicles, each of them being dealt with by different adapted regulations. The way this law is put into practice and how the Federal Environmental Agency assists these efforts is demonstrated by three examples.

Refuse incinerator plants are subject to licensing. They have to be established and operated in such a way, that fixed immission reference values are not exceeded in the neighbourhood of the installation and that the relevant noise control measures are in line with the state of the art of noise control. These immission reference values vary according to time of day and land-use. To determine the state of the art the Federal Environmental Agency promoted a research project "Present and Future Development in the Noise Control of Refuse Incinerator Plants". The report contains proposals for various noise control measures, in particular use of low noise machinery and vehicles, encapsulating installations or parts of them, restriction of use as well as organisational and structural measures. Beginning with a plant without any sound

proofing (type M 0) these measures are installed in such a way, that the night values of the emission are lowered in 5-dB-steps (types M 5, M10, M15) up to a maximum of 20 dB (type M20). The day values are not reduced in the same manner because refuse delivery should not be induly hindered and immission reference values are 15 dB higher than the night values. The results of this research work are summarized in table 1: for three types of plants of different capacity the sound power levels without measures (M 0) and with extensive measures (M20) for the day and night times as well as the area related sound power levels are presented.

capacity t/h	area m^2	type	sound power level dB(A) day/night	area related sound power level $dB(A)/m^2$ day/night
12	17.000	M 0	112/110	69/68
		M20	101/ 90	59/48
30	20.000	M 0	115/114	73/71
		M20	106/ 94	62/50
80	28.000	M 0	119/118	75/73
		M20	111/ 98	66/53

Table 1. Summary of technical data and results for refuse incinerator plants

The costs for these measures have been estimated to not exceed 3% of the replacement costs of the plant, a value that should be acceptable. The Federal Environmental Agency published the results in order to encourage a more well-founded discussion on establishing and operating refuse incinerator plants in the future.

Containers for collecting disposable glass are installations not subject to licensing. The BImSchG prescribes that they have to be produced according to the state of the art. Throwing of bottles into containers is quite noisy and can disturb the vicinity, so that some local governments have forbidden the setting up of containers near dwellings. For this reason noise control measures for these containers have been worked out by order of the Federal Environmental Agency. There are various possibilities of noise control measures: covering the ground of the containers with a rubber mat (10-15mm, hardness 60-

65 ShoreA), covering the inside top with absorbing material, sealing up all unneccessary openings with foam rubber gaskets, closing the charging openings with cross-wise cut rubber rosettes, and designing the charging openings in form of mufflers. Using these measures the maximum impulse sound pressure level in 1 m perpendicular to a charging opening could be reduced to values smaller than 90 dB(AI) (throwing bottles in the empty container) and smaller than 85 dB(AI) (throwing bottles in the partially filled container). This means reductions of up to 27 dB. Additional costs due to noise control measures are calculated to be 20 - 35% of the costs of production. Manufacturers, operators and local governments have been informed of these results. In addition the "Jury Umweltzeichen" (ecologically beneficial product labelling committee) has awarded a special "environmental label" to containers not exceeding the above mentioned values of 90/85 dB(AI). Consequently many local governments prescribe that only containers with the "environmental label" should be set up in the vicinity of dwellings.

Refuse collection vehicles in the Federal Republic of Germany have to adhere to the limiting values of the Federal Motor Vehicle Construction and Use Regulation. As yet there are no noise limits for the mountings of these vehicles. By order of the Federal Environmental Agency noise control measures have been developed and tested in practice. The main object was the reduction of high sound impulses coming from impacts; but other measures have also been employed: use of low noise hydraulics, encapsulating the cylindrical body and use of absorbing materials. In this way the maximum impulse sound pressure level was reduced by up to 20 dB(AI), the energetically averaged sound pressure level for a working cycle was reduced by about 10 dB(A). The value for the working cycle is now 75 dB(A) in a distance of 7 m. Thus the noise emission by the working mountings is now about the same as that of the truck chassis including the motor. Further reduction of emission will only be possible using low noise trucks, as developed, for instance, on order of the Federal Environmental Agency in Germany 1982. At present it is being examined whether garbage vehicles with low noise values as developed in this research project, should get legislative incentives. These incentives, for instance, could be exemptions from the restriction to operate garbage vehicles in the early

morning hours.

SUMMERY

Noise control research has been carried out concerning particular noisy and annoying sources within three areas of refuse disposal: inciniration, collection and transportation. It is shown which measures and reductions are possible and how the establishment of low noise products in the German market is promoted.