inter·noise 83

THE REDUCTION OF ANNOYANCE CAUSED BY ROAD TRAFFIC NOISE IN THE NEXT DECADE - MEASURES AND COSTS

Judith Lang

Versuchsanstalt für Wärme- und Schalltechnik am Technologischen Gewerbemuseum Wien
A-1200 Wien, Wexstraße 19-23

In 1981 a study on the development of measures against environmental pollution in Austria until 1990 was carried out including a part on noise control. [1]

An analysis of the annoyance caused by noise in Austria showed, that 1979 (last microcensus) in summary 42 % were annoyed, 13 % seriously annoyed and 8 % very seriously annoyed. Road traffic noise turned out to be the main noise source (in more than 70 % of all cases). When studying the development of noise control road traffic noise therefore is most important.

The study was carried out based on 3 different scenarios with respect to legislation and execution acc. to table 1. These take into account

- the noise emission of the vehicles (noise level limits for new vehicles and monitoring of noise emission of vehicles in the road)
- the control of road traffic noise (exceeding certain limits) to protect residential buildings alongside planned or existing roads by screens, earth berms, sound proof windows
- noise control in town and country planning, especially by means of noise maps and noise cadastres
- the enforcement of the standard ÖNORM B 8115 on sound insulation of windows and facades for newly constructed residential buildings

The reduction of annoyance and the expenditure for the control measures are shown in table 2 and table 3.

[1] Studie über die Entwicklung der Umweltschutzaufwendungen in Österreich 1980-1990; Kapitel Lärm . Forschungsbericht 5/82; Bundesministerium für Gesundheit und Umweltschutz

With scenario 1 the noise emission by road traffic can be assumed to stay unchanged. Already existing regulations prescribing noise control - measures alongside new roads and the decrease of traffic through residential quarters, the "sound proof window programme" introducted in several cities will result in an unchanged or slightly decreasing percentage of annoyed people.

With scenarios 2 and 3 lower maximum noise level limits for vehicles and their enforcement are foreseen, noise emission will also be decreased by new roads and existing roads with adequate noise control measures, especially if the level limits for these measures are lowered.

Table 1: 3 scenarios for noise control legislation

legislation with respect to	scenario 1	scenario 2	scenario 3
	legislation and execution		
vehicle noise	unchanged (ECE-noise emission limits, very little monitoring of vehicles in use)	noise emission limits reduced to ECE-limits 1981	noise emission limits reduced to ECE-WP 29 or to German proposal 1985
		stringent monitoring of vehicles in use by the "near field method" (near-field level registered in vehicle-documents)	
road traffic noise	immission level limits unchanged $L_{eq,A}$ ≤65/55 (day/night) for dwellings alongside newly planned roads		immission limits reduced to 60/50 (day/night) for newly planned roads and to 65/55 for existing roads
town and country planning	noise considered as until now	noise considered seriously with town and country planning; establishing of noise maps to show noisy and quiet areas	noise considered seriously with town and country planning; establishing of noise maps and "noise cadastres"
sound insulation in dwellings	unchanged (standard little enforced)	standard on sound insulating strictly enforced, monitoring in situ	

Table 2: Annoyance caused by road traffic for the 3 scenarios

	scenario 1	scenario 2	scenario 3
vehicle noise	unchanged	slightly reduced (considerably annoyed persons 10 % less)	reduced (considerably annoyed persons 20-25 % less)
new roads	some newly annoyed, others in existing roads with reduced traffic less annoyed, in summary unchanged		no annoyance by new roads, traffic in existing roads less because of new roads, therefore less annoyance
new buildings alongside existing roads	some single cases of annoyance possible, in summary nearly unchanged	are not constructed or only with adequate sound insulation; in summary annoyance decreasing	
existing buildings alongside existing roads	reduced	considerably reduced	extensively reduced
	by installation of new windows for energy conservation and sound insulation		
	to an unchanged small amount	for all dwellings with $L_{eq,A}$ >70/60	for all dwellings with $L_{eq,A}$ >65/55
in summary	unchanged or slightly reduced	considerably reduced	extensively reduced

Table 3: Expenditure to control road traffic noise according to the 3 scenarios

	scenario 1	scenario 2	scenario 3
vehicle noise	unchanged cost for vehicles and for administration	vehicle cost increased by 1-3 %	increased vehicle cost, passenger cars 5%, lorries and busses 5-10%
	staff and equipment for near field measurements: in each "land" 1 team (2 persons) + 1 instrument (AS 50.000,--)		
new roads	expenditure for noise protection unchanged: Autobahnen AS 6 Mill./km, federal roads AS 3,5 Mill./km for about 5,5% length		expenditure about doubled
new buildings alongside existing roads	unchanged	some small additional costs for higher sound insulation of windows and outer wall	
existing buildings alongside existing roads	expenditure for reconstruction of windows (new windows, tightening of windows) and other insulation measures repaid by energy conservation		
town and country planning	unchanged	expenditure for establishing noise maps and noise cadastres partly repaid by reduced administration work for single cases	