

RESEARCH ON THE EFFECTS OF
IMPULSIVE SOUNDS ON HUMAN BEINGS

- subgroup 1: Field enquiries
and measurements -

by drs. R.G. de Jong,
ing. R. van den Berg and
J.W. Stolk

Report D 56, February 1981
Volume 1

ING-TNO

postbus 214
2600 AE delft

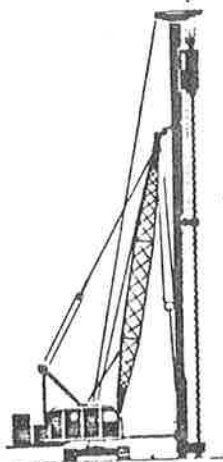
bezoekadres
schoemakerstraat 97
delft

telefoon 015 - 56 93 30

SECTION OF SOCIAL SCIENCES

A report about a research project
initiated by the
European Economic Community
and sponsored by the
European Economic Community
and the
Dutch Ministry of Health and
Environmental Protection

Contractnr : ENV-352-80N (B)



Met ingang van 1 januari 1981 is de
Gezondheidsorganisatie TNO
opgeheven en zijn alle rechten en
verplichtingen van deze Organisatie
overgegaan op de Centrale Organisatie
TNO

„Voor de rechten en verplichtingen van
de opdrachtgever met betrekking tot
dit rapport wordt verwezen naar de 'Al-
gemene Voorwaarden voor onder-
zoeks- en ontwikkelingsopdrachten
aan TNO, 1979', zoals gedeponneerd ter
Griffie van de Arrondissementsrecht-
bank te 's-Gravenhage en bij de Ka-
mers van Koophandel en Fabrieken.“

„© jaar van uitgifte rapport TNO,
's-Gravenhage.

Onverminderd de rechten van de op-
drachtgever mag niets uit deze uitgave
worden veeelvoudigd en/of open-
baar gemaakt worden door middel van
druk, fotocopie, microfilm of welke an-
dere wijze dan ook, zonder voorafgaan-
de schriftelijke toestemming van TNO.“



DIRECTIE

J. H. Mendels, directeur
Ir. M. L. Kasteleijn, p.v. directeur
Ir. R. G. de Lange, onderdirecteur

ONDERZOEKGEBIEDEN

Afdeling Water en Bodem

Dr. ir. D. W. Scholte Ubink

Afdeling Buitenlucht

Prof. ir. L. J. Brasser

Afdeling Binnenlucht

Ir. P. B. Meyer

Afdeling Geluid, Licht en Binnenklimaat

Ir. E. van Gunst

**ALGEMENE ONDERSTEUNING
MILIEU-ONDERZOEK**

P. E. Joosting, arts
Ir. M. J. Leupen, woninghygiënist

Sectie sociale wetenschappen

Drs. R. G. de Jong

VOORLICHTING

Mw. drs. M. E. Adriaanse

SUMMARY

This report covers the experiences of a pilot study into establishing the importance of impulsive sounds. Both organizational aspects, methodological and technical ones, and some important outcomes are reported.

The pilot study was carried out by face to face questioning of 50 respondents in two areas, both situated near a building area in which pile driving was going on. The questionnaire was highly structured, required about 45 to 50 minutes, was not boring for the respondents but appeared to include some difficulties for the interrogators, so that a very precise briefing is needed.

The results show that the selection of the locations and samples are very important issues in this particular study: the area in which the study is to be carried out determines the outcomes. This makes it necessary to adopt one out of two possible strategies: either to cover as many different situations and as many different sounds as possible, or to confine ourselves to a limited number of carefully selected situations and sounds. The first strategy allows us to say something about "the" importance of impulsive sounds but requires a huge operation. The second strategy allows us to say something about these impulsive sounds, but is easier to implement.

It seems not useful to incorporate a health section in project of this type. In analysing the results it appeared difficult to decide whether a sound is impulsive or not. This calls for a sharper definition of "impulse" than is given in the EC directive.

As a working hypothesis it can be derived from this pilot that: "daily existing impulsive sounds cause no more and no less annoyance than daily existing non-impulsive sounds do".

Another hypothesis which can be stated is that pile driving due to its temporary character does not cause as much annoyance as might be expected on the basis of its admitted noise level.

Chapter 3 deals with the measurements of impulse noise. Noise records were made at the locations and analysed in the laboratory. The analyses were carried out in different ways by means of a sound level recorder, a noise level analyzer and a transient recorder.

Equivalent sound pressure levels measured with these three kinds of apparatuses are compared with each other and with the equivalent sound pressure level calculated from the peakheight value, the decay time and the repetition rate.

They all appear to be in good agreement with each other.

Finally, we learned from this pilot that, for the data to be comparable, firm appointments have to be made about the selection of the areas, sampling, noise measurements and data processing.

CONTENTS

1. DESCRIPTION OF THE PROJECT	1
1.1 Introduction	1
1.2 Aim of the project	1
1.3 Organization and planning of the project	2
1.4 Choise and description of the locations	4
1.5 The questionnaire	5
2. THE SOCIAL SURVEY	6
2.1 Introduction	6
2.2 Characteristics of the sample	6
2.3 Some salient outcomes	6
2.3.1 The health section	6
2.3.2 Impulsive sounds versus non-impulsive sounds	7
3. IMPULSE NOISE MEASUREMENTS	13
3.1 Recording equipment	13
3.2 Noise measurement locations	15
3.3 Analysing methods	16
3.4 Analysing equipment	16
3.5 Analysis with sound level meter and level recorder	16
3.6 Analysis with a noise level analyzer	21
3.7 Analysis with a transient recorder	28
3.8 Conclusions and recommendations	30
4. SOME GENERAL POINTS OF DISCUSSION	31
4.1 Back to the aim of the project	31
4.2 Pile driving as a noise source	32
4.3 Some concluding remarks	33
4.3.1 Time of the day	33
4.3.2 The meaning of a sound	33
4.3.3 Specificity	33
4.3.4 Integration of the data	33
5. Literature	34

Annexes

1. Questionnaire in Dutch (indicating the corresponding question numbers in the English version)
2. Questionnaire in English

1. DESCRIPTION OF THE PROJECT.

1.1 Introduction.

The Directorate-General for Research, Science and Education of the Commission of the European Communities in Brussels has invited a series of research projects into the effects of impulsive noise on human beings.

These projects come within the framework of the Environment and Raw Materials Research Programmes.

In the research programme 1979/80, three groups of research teams in Europe studied the effects of impulsive noise on human beings from different angles:

- subgroup 1: field enquiries and measurements
- subgroup 2: physiological measurements in laboratory conditions on human volunteers
- subgroup 3: assessment of annoyance due to impulsive sounds compared with steady noise annoyance.

This report covers the work and outcomes of the Dutch research-team in subgroup 1: field enquiries and measurements.

In this subgroup there is co-operation between:

- the University of Southampton (United Kingdom);
- la Société d'Etudes pour le Développement Economique et Social (Paris, France);
- the Institute for Industrial Research and Standards (Dublin, Ireland);
- Instituut voor Milieuhygiëne en Gezondheidstechniek TNO (Delft, The Netherlands).

1.2 Aim of the project.

Already before 1 January 1980, much work was carried out to initiate the enquiries and measurements.

During several meetings in Brussels, the objectives of the present pilot study were formulated and from these objectives a first instigation was given for a scheme most suitable for the enquiry.

Formulation of the objectives:

"The pilot study "Field enquiry and measurements" should try to determine the methodology, the questionnaires, the techniques and instruments to be used in a large-scale enquiry on the importance of impulsive sounds in the environment.

This importance should be assessed by:

- a) the frequency of quotations of some noises which can be considered typical impulsive ones among a list of different noises in questionnaires.

- b) the degree of psychological reactions (from bothering effects to influence on health and well-being) expressed in the questionnaires.
- c) the differences in noise levels measured by two sound level meters on "slow" and "impulsive" settings as specified in the EEC directive 79/113 (O.J. L 33 of 8/2/79). Other ways of measuring the impulsiveness of environmental sounds can be checked and compared with each other."

1.3 Organization and planning of the project.

Outlines for the organization and planning of the project are given in the Technical Annexe of the contract and read as follows:

"In 1980 a pilot study in few European countries will be achieved for:

- a) setting up a questionnaire for interviews with about 50 people in each country to evaluate the importance attributed to noises which would be classified as impulsive. For this study the impulsive noises are defined only by their duration (shorter than 0.5 second) and measured according to the EEC Directive 79/113 published in the Official Journal of the European Communities L 33, volume 22, 8 February 1979, pages 15 to 30, particularly paragraph 7.3.1.

The 50 people who cannot be chosen as representative of the whole population might be selected within categories most affected by noises in general, for instance living in high-density populated areas and having low income.

The questionnaires should contain a number of questions common for all teams plus specific ones dealing with the environment in general. Noises from different categories should be quoted (transport, domestic, construction, industrial, leisure) among which some impulsive noises would be included and general questions on subjective feeling on noises would be asked.

- b) measuring the noise levels in the environment of some of the people participating in the interviews to assess how often the noises are impulsive according to the EEC Directive.

All participants in this coordinated project should respect minimum requirements compulsory for all teams to be agreed upon in periodic meetings at Brussels during the project.

The final questionnaire should be adopted in May in order that interviews and noise measurements take place before summer holidays. The analysis of results and questionnaires should then be completed for the end of 1980."

So far the Technical Annexe of the Contract.

In the first few months of 1980, preparations for the execution of the field work were made.

Some questionnaires recently used in the Netherlands were translated into English and sent to the ISVR (which has undertaken to co-ordinate the enquiry) to see to it that the questionnaire to be drawn up had certain elements in common with the Dutch ones.

In this period, our Institute also drafted a working paper on the sound measurements to be executed [1], while possible locations for the enquiry were also selected (see p. 4 of this chapter).

After receipt of a draft questionnaire from the ISVR this was discussed, adapted, translated and tested in the field.

Six pilot interviews were held in one of the selected locations: Forellendaal - The Hague West. The most salient experiences were globally that:

- a) the questionnaire required about 45 to 50 minutes;
- b) disproportionately much time was needed for the health questions;
- c) the questionnaire was not boring for the respondents;
- d) the questionnaire contained difficulties in routing for the interrogators.

In accordance to the experiences of the four research groups the questionnaire was abridged and finalized.

On the above mentioned location sound measurements were also made. The results are given in a preliminary report [2]. On the basis of, among other things, this report, the definite measuring exercise was agreed upon.

The fieldwork for the main pilotstudy on the final noise measurements were carried out in the period of the second half of September and the first half of October.

On two locations (see 1.4) fifty respondents were interviewed, twenty-five on each location.

The fieldwork and data processing was carried out by highly skilled interviewers of Datagroep, a market and opinion research organization which does all the fieldwork for our Institute.

1.4 Choice and description of the locations.

At first we planned to execute our survey in the vicinity of industrial plants.

The Dutch Ministry of Health and Environmental Protection, through its Environmental Health Officers, provided us with a list of a dozen locations from where complaints had been turned in.

The inspection of possible locations took some days. A surprising, but somewhat disappointing experience from the technical point of view of the enquiry was that a combination of industrial impulsive sound of any perceptible level and flats in a populous district in the Netherlands is very scarce. And where this combination was found extensive enquiries and measurements were already held in these possible locations for the ICG research project OIL-09 on the characterization and assessment of industrial noise [3], the fieldwork of which project only was completed in January 1980, so too shortly to implement another enquiry. This finding forced us to aim the enquiry at noise from building sites (pile driving etc.).

Two areas were selected, not far apart, in the south-western part of The Hague.

The first area will be referred to as Forellendaal, the second area will be referred to as Arnold Spoelplein. Forellendaal comprised two flat blocks and is confined by the Kraayensteinlaan, Margarethe van Hennebergweg, and Forellendaal. The flats were built in 1975/1976 and are a part of a new district of the Hague (see also Figure 2A in 3.2).

One flat block counts twelve floors with one hundred and thirty-two apartments, the other counts partly six, partly seven floors with approximately one hundred apartments. Most apartments have a free view because the surrounding buildings count only two or three floors.

The distance from the homes till the noise source varied between four hundred and sixty metres.

The building site in question covers a large area. During the year preceding the survey people living in the selected flat blocks every now and then were exposed to various sorts of construction noise, of which pile driving was the most dominant one, at first from a rather large distance, later on, and also during the measurements, from sixty to eighty metres from the dwellings. Pile driving stopped one day before the survey started.

The Arnold Spoelplein (Figure 2B in 3.2) hardly one kilometre from Forellendaal, comprised only one flatblock. It is a ten-storied block with sixty apartments, confined by the Pisuissestraat, Lisztstraat and Aaltje Noorderwierstraat.

The flat was built in 1972/73 and stands in a very miscellaneous area, comprising somewhat older, well-conserved houses, four-storied apartment blocks, built in the late fifties or early sixties, new stores with apartments over them, and some old dwellings, bound to be demolished.

The distance from the homes to the noise source varied from two hundred to sixty metres. At the time of the survey and the measurements the distance between pileframe and apartments was about sixty metres. Pile driving had been going on for several weeks before the survey started.

1.5 The questionnaire

The eventual Dutch questionnaire consisted of one hundred and four questions, and was highly structured.

The questionnaire can be divided into five sections:

- . section 1 about satisfaction with the home and the area one lives in. (Q. 01/13)
- . section 2 health section (Q. 14/17 and 29/34)
- . section 3 ventilation and insulation of the home (Q. 18/28)
- . section 4 noise section (Q. 35/77)
- . section 5 demographic variables (Q. 78/104).

Interviewing time was about forty-five to fifty minutes.

The questionnaires have not been identical in the four participating countries. As it turned out after the fieldwork was done, in the phase of finalizing the questionnaire some divergences had sneaked in.

In the Dutch questionnaire the health section, though shortened, was maintained, while in the other countries it was dropped entirely. Furthermore the Dutch researchers used their freedom to insert some other relevant questions.

Registration of the time, needed for each section, was dropped. While the fieldwork was going on we received some printed final questionnaires from Datagroep, the organization which carried out the fieldwork. It appeared that some questions had been restated a little bit without notifying us. In most cases this will not have had any influence on the exact meaning of the question, in some cases we have our doubts.

In the first annex the Dutch questionnaire is given. The corresponding question numbers of the eventual English questionnaire are stated between brackets.

The second annex consists of the eventual English questionnaire, to allow an easy comparison and translation.

2. THE SOCIAL SURVEY

2.1 Introduction

As this pilot study mainly has the aim to determine the methodology and the questionnaires, as far as the social survey is concerned, we did not analyse in depth the results as such.

After a short discussion of the sample only the most salient outcomes are presented. The detailed answers to each question can be found in Annex 3, which has been printed as a separate volume (not included in this version).

Some critical remarks about the used questionnaire are made.

2.2 Characteristics of the sample

As the apartments, chosen for this pilot study, are rather new and luxurious it was no surprise to find out that the majority of the respondents belong to the higher and middle social classes.

There was no difference between the samples of the two locations in the variables of age and sex of the respondents. The samples differed, however, in the variables of having children (children, younger than eighteen, were only present in the families of the respondents at Forellendaal), marital status (at Forellendaal more respondents were married), the average time spent at home (at the Arnold Spoelplein more time was spent at home than at Forellendaal), working in evening and night shifts (less at Forellendaal), and living on a higher floor (less at Forellendaal).

These differences must be kept in mind if one would like to try and compare the reactions in both locations.

In this report we shall only deal with the full results.

2.3 Some salient outcomes

2.3.1 The health section (Q. 29/34)

As only in the Dutch survey the health section was maintained, though in an abbreviated form, it seemed useful to pay more attention to it. In its present form the health section is not suited for any analysis with reference to impulse noise in general (a) and to pile driving in particular (b).

ad a. In relation to case (a) the health section can only be of value in comparing people, exposed to impulse noise, to people not exposed to impulse noise. So only in a relative way. And then, of course, the samples have to match perfectly, otherwise other variables can play an uncontrolled part.

In an absolute way it cannot be used at all, because an absolute standard is lacking.

ad b. As at both locations pile driving was going on for several weeks, or even months, and in the questionnaire an arbitrary distinction is made between symptoms which only started during the last two weeks and earlier, no relation can be established between the moment pile driving started and the moment the symptoms started.

This means, that it is only sensible to incorporate a health section in a next survey if we have access to a perfectly matched controlgroup or if we are able, in one way or another, to relate the moment of the beginning of the symptoms to the moment of the beginning of the impulse noise. But, also in these cases, we must be aware that we are not allowed to assume causality.

2.3.2 Impulsive sounds versus non-impulsive sounds

Though certainly it is not the purpose to make a definite analysis of the data it seems useful to mention some striking results which can have some meaning for a following project. In the key section of the questionnaire 54 specific sounds, or groups of sounds, are checked on their incidence. Eighteen were never heard in the selected environments; the respondents themselves added 4 other (groups of) sounds, so data became available about 40 specific (groups of) sounds.

These (groups of) sounds can be divided into:

- . 22 sounds from outside the blocks of apartments;
- . 12 sounds from neighbouring apartments;
- . 6 sounds from inside their own home.

Table 1 shows the 15 sounds most frequently mentioned, with in

- . column I: the number of respondents mentioning the sound;
- . column II: the proportion of respondents mentioning the sound and rating it on the positions 8 to 11 on a rating scale from 1 = like very much to hear the sound to 11 = don't like to hear the sound at all.
(Q. 44-51-58-65).
- . column III: the proportion of the respondents mentioning the sound and rating it as very much or moderately annoying (Q. 45-52-59-66).
- . column IV: an index of 6 activity interferences (Q. 46-53-60-67), called the Mean Relative Interference Index and calculated as follows:

$$MRAII = \frac{\text{sum of frequencies of activity interferences}}{6 n}$$

, n being the number of respondents mentioning a sound.

. column V: ranking from 1 = most annoying to 15 = least annoying, derived from a summation of the columns II, III and IV.

TABLE 1. Overview of the 15 sounds most frequently mentioned.

	I	II	III	IV	V
1. Police, fire or ambulance sirens	41	.00	.05	.04	12
2. Mopeds	36	.86	.81	.17	1
3. Tyres and brakes screeching	29	.69	.66	.12	4
4. Lorries passing by	24	.46	.50	.13	7
5. Motorbikes	23	.78	.74	.22	2
6. Pile driving	23	.57	.30	.03	9
7. Cars or vans passing by	19	.42	.47	.12	8
8. Churchbells	19	.00	.00	.02	13
9. Car, van or lorry horns	18	.56	.61	.16	5
10. A neighbours' plumbing system including WC cistern	18	.33	.33	.13	10
11. Car, van or lorry doors being slammed	17	.76	.71	.11	3
12. Neighbours carrying out (other) do-it-yourself work	16	.63	.38	.13	6
13. Vacuum cleaner (own home)	15	.00	.00	.00	14/15
14. Pneumatic hammers or drills	14	.57	.14	.06	11
15. Bells	12	.00	.00	.00	14/15

From this table it can be seen that mopeds and motorbikes are the most annoying noise sources in the two locations.

From another study[11] we know that this holds true for the whole Dutch population, so it gives support to the validity of this study. A striking result is, that pile driving is only mentioned by 23 out of 50 people who had been exposed to the noise of pile driving for at least several weeks! We shall come back to this issue later.

Another striking result is that bells and churchbells and, very surprising, also police, fire or ambulance sirens, appear to have a very deviant psychological meaning to the respondents. Less surprisingly this also appears to be the case with the sound from ones own vacuum cleaner.

In doing the next step the 22 sounds from outside the flat-block were divided into sounds with a probably impulsive

character and sounds with a probably non-impulsive character. This exercise was only carried out for the sounds from outside because the other sounds are often too ambiguous for us to decide whether these are prevalently impulsive or not.

The next table shows which sounds are regarded as prevalently impulsive and prevalently non-impulsive.

TABLE 2. Overview of the sounds from outside which are regarded as prevalently impulsive or prevalently non-impulsive.

Impulsive

1. Factory or plant hooters, sirens, whistles or bells.
2. Churchbells.
- * 3. Bells.
4. Ice cream van chimes or bells.
5. People shouting or screaming in or near discos, pubs or clubs.
- * 6. Car, van or lorry doors being slammed.
- * 7. Tyres or brakes screeching.
- * 8. Car, van or lorry horns.
9. Loading or unloading of vans or lorries near factories, shops, warehouses, depots or yards.
10. People shouting during their work time.
11. Pneumatic hammers or drills.
12. Pile driving.
13. Any other construction or demolition equipment.

Non-impulsive

1. Amplified music from discos, pubs or clubs.
2. Helicopters.
3. Planes.
4. Cars or vans passing by.
5. Lorries passing by.
6. Motorbikes.
7. Mopeds.
8. Police, fire or ambulance sirens.
9. Mechanical earth movers or diggers.

*these sounds are usually not confined to the daytime.

The next table shows for both the impulsive and the non-impulsive sounds:

- . I: their frequency of occurrence (Q. 43-50-57-64)
- . II: their mean score on an eleven-point scale (Q. 44-51-58-65)
(1 = like very much to hear,
11 = don't like to hear at all)
- . III: the percentage of the sounds scored on:
 - . very much or moderately annoyed
 - . only a little annoyed
 - . not at all annoyed
- . IV: the Mean Relative Activity Interference Index (see also Table 1, n being in this case the frequencies with which the sounds are mentioned).

TABLE 3. Impulsive versus non-impulsive sounds from outside (overall)

	I			II	III				IV
	less than one day	one day or several days	most days or every day	mean score on 11-point scale	very much or moderately annoyed	only a little annoyed	not at all annoyed	no answer	MRAII
impulsive	22	24	54	6.6	38	20	38	4	.08
non-impulsive	11	24	65	7.5	44	19	35	2	.13

From this table one would be inclined to draw the following conclusions:

1. non-impulsive sounds cause more "daily problems" than impulsive ones.
2. the score of the non-impulsive sounds on the 11-point scale, the degree of annoyance and the Mean Relative Activity Interference Index are somewhat higher than is the case with the impulsive ones.

N.B. No statistical significance tests were carried out; the approach is a qualitative one.

Earlier in this paragraph the deviant psychological meaning of churchbells, bells and sirens was mentioned.

That is why we will take these apart in the next table.

Also sound from building activities (pneumatic hammers or drills, pile driving, other construction or demolition equipment, insofar as they are impulsive) are taken apart from the impulsive groups. This results in the following table, the columns being the same as in Table 3.

TABLE 4 Impulsive versus non-impulsive sounds from outside (differentiated)

	I			II	III				IV
	less than one day	one day or several days	most days or every day	mean score on 11-point scale	very much or moderately annoyed	only a little annoyed	not at all annoyed	no answer	MRAII
churchbells, bells	39	51	10	2.5	0	0	97	3	.01
building activities	39	20	41	7.4	25	34	34	7	.04
other impulsive	6	16	78	7.7	61	21	15	3	.12
police, fire or ambulance sirens	12	32	56	6.1	5	27	66	2	.04
other non-impulsive	10	22	68	7.9	58	16	24	2	.16

This table reveals that the conclusions, drawn from Table 3, are incorrect. Not including bells and sirens the following conclusion can be drawn.

1. building activities, being only temporary and including periods in which no noise is produced, appear to be not as annoying as the daily existing impulsive sounds.
2. the daily existing impulsive sounds appear to cause no more annoyance than the daily existing non-impulsive sounds do. This could be used as a working hypothesis for a next stage.

It is possible to divide the impulsive sounds from outside into those which usually can only be heard during the daytime, and those which will usually occur during the whole 24 hours. In Table 2 this division has been indicated.

TABLE 5. Daytime sounds versus 24-hour sounds (both impulsive).

	I			II	III			IV	
	less than one day	one day or several days	most days or every day	mean score on 11-point scale	very much or moderately annoyed	only a little annoyed	not at all annoyed	no answer	MRAII
daytime sounds	37	26	36	6.2	19	24	50	7	.04
24-hour sounds	7	21	71	6.9	55	17	26	1	.11

From this table it can be seen - what in fact was already known - that sounds occurring only during the daytime cause less annoyance than sounds which occur every now and then during 24 hours.

Finally pile driving was compared with the other sounds from the building areas: pneumatic hammers or drills, mechanical earth movers or diggers, other construction equipment.

TABLE 6. Pile driving versus other sounds from the building area.

	I			II	III			IV	
	less than one day	one day or several days	most days or every day	mean score on 11-point scale	very much or moderately annoyed	only a little annoyed	not at all annoyed	no answer	MRAII
pile driving	30	22	48	7.5	30	30	35	5	.03
other sounds from building area	50	21	29	7.0	17	33	38	12	.03

From this it becomes clear that pile driving is the most frequently heard sound from the building areas, and also relatively the most annoying sound. Activity interferences occur at the same rate.

3. IMPULSE NOISE MEASUREMENTS.

3.1 Recording equipment

Two areas were chosen where people were exposed to pile drive impulses during a long time. At each location noise records of a few hours were made. These records were analysed in the laboratory afterwards. For precise analysis of the signal, linear recordings were made.

The best way of making a registration in unattended conditions of impulsive sounds and other environmental sounds inside and outside a dwelling without losing information is by recording on tape. In most cases the signal to noise ratio (S/N) of a tape recorder does not exceed 40 dB. So, dependent on the situation and the recording equipment we used two channels for different dynamic measuring ranges for each microphone position. For example one channel from 40 to 80 dB and a second one from 80 to 120 dB.

However, very important in recording impulsive sounds is the frequency characteristic.

At workplaces we found impulses with rise times from 0.1 to 100 milliseconds [4][5]. To registrate an impulse with a rise time of 0.1 ms, a frequency characteristic up to 25 kHz is necessary.

The rise time of an impulse in the environment at longer distances is probably longer than 1 ms (the absorption will be greater for high frequencies at longer distances).

For frequencies up to 20 kHz a 1/2" microphone, for instance B & K type 4165, can be used. Because of the lower limit of a 1/4" microphone, which is about 60 dB, it is better not to use this type of microphone.

It is important that there are no reflections at the microphone positions, so we made sure that the distance between microphone, walls and other reflecting surfaces outdoors to be at least three metres.

The upper frequency limit of the frequency characteristic of tape recorders decreases with decreasing tape speed.

In Table 7, the upper limits of the frequency-characteristics and signal to noise ratio for some recorders and the maximum playing time at different tape speeds are given.

Table 7. Frequency characteristics and playing times at different tape speeds for some recorders (amplitude modulation) specified by the manufacturer.

Type	Chan.	Tape speed (inch/second)						S/N ratio (dB)
		15/32	15/16	1 7/8	3.75	7.5	15	
RACAL Store 4D	4	-	5k	10k	19k	37k	75k	38
UHER 4400 Report	2x2	-	5k	8k	16k	20k	-	54
HP 3964A	8	2k	4k	8k	16k	32k	64k	38
Akai X201D	2x2	-	-	5k	14k	>20k	-	50
NAGRA IV SJ	2x2	-	-	4k	10k	>20k	40k	60
playing time (h) per channel								
normal tape 2300ft		16	8	4	2	1	1/2	
triple play 3600ft		24	12	6	3	3/2	3/4	

For our measurements, we choose a NAGRA IV SJ tape recorder, the records were made with a tape speed of 7.5" per second, so a flat frequency response up to 20 kHz and a signal to noise ratio of 60 dB was achieved.

At the locations the pile drive impulses show such a dynamic range that we only had to use one microphone channel.

The recording equipment consisted of (see Figure 1):

- two half-inch microphones, B & K type 4165
 - microphone power supply, B & K type 2804
 - magnetic tape recorder, NAGRA IV SJ.
- Acoustic calibration of the whole recording system was performed by
- sound level calibrator, B & K type 4230.

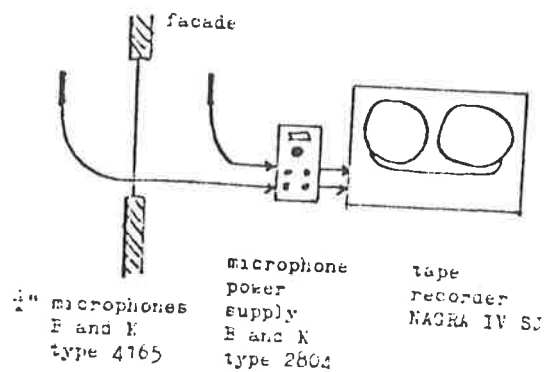


Figure 1. Recording equipment set up.

3.2 Noise measurement locations.

Two locations were chosen.

At each of the locations noise measurements were carried out on a few spots:

- location 1, spot 1.1 on the first floor (see Figure 2A)
- spot 1.2 on the sixth floor
- spot 1.3 on the seventh floor
- location 2, spot 2.1 on the first floor (see Figure 2B)
- spot 2.2 on the ninth floor

When measurements were carried out the distance between the blocks of flats and the pile frames was about 60 metres, except on spot 1.3 where the distance was about 80 metres. It concerned the same pile frame, measured at an earlier date.

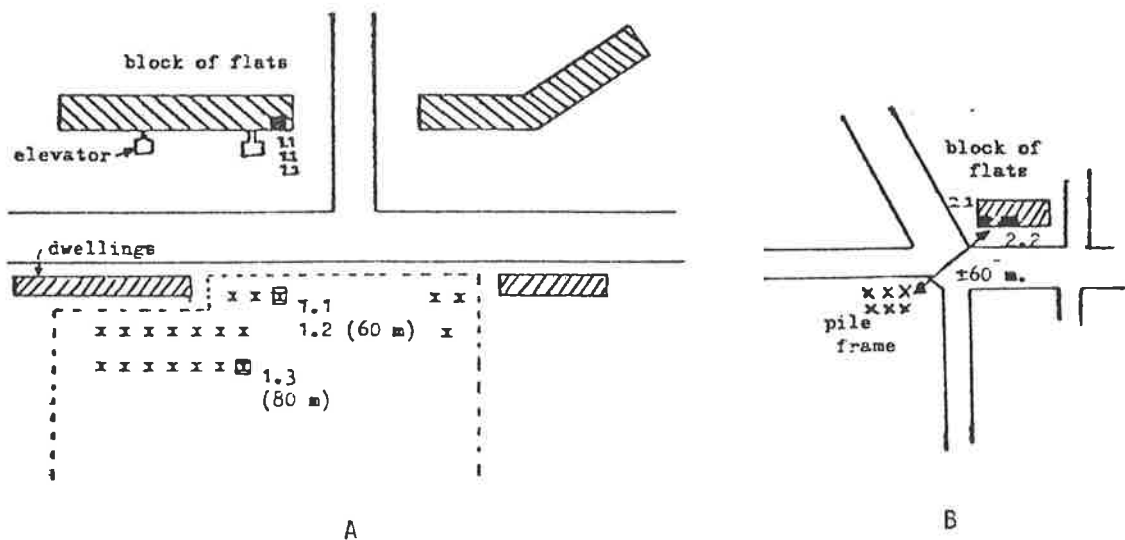


Figure 2. Plans of the locations.

- A: Forellendaal
- B: Arnold Spoelplein

3.3 Analysing methods.

To determine annoyance of impulsive sounds the usual A-weighting has appeared to be a good choice because of the limited transfer properties of the ear. So the A-filter was used throughout the analysis of the signals recorded.

In the official journal of the EEC no.L33, a definition of impulse noise is given : " noise has an impulsive character when the noise level difference between the "slow" and "impulse" responses of a sound level meter is equal to or more than 4 dB."

The meter responses "slow" and "impulse" are defined in the revised IEC recommendation 179, IEC Standard Publication 651 [6].

3.4 Analysing equipment

The equipment for analysing the recorded signals consisted of :

- tape recorder, NAGRA IV SJ
- noise level analyzer, B & K type 4426
- level recorder, B & K type 2307
- portable level recorder, B & K type 2306
- measuring amplifier, B & K type 2607
- differential amplifier, Newport 50A
- transient recorder, Transiscope TR1030 DIFA
- XY recorder, Linsys LY1800

3.5 Analysis with sound level meter and level recorder

Measuring the noise level difference between "slow" and "impulse" response can be done in different ways:

- 3.5.1. Reading two sound level meters simultaneously, one set on "slow" response ,the other on "impulse" response.

The output signals can be recorded on a level recorder. For instance, the DC output signal of a measuring amplifier B & K type 2607 is dependent on the meter setting. In Figure 3, the different decay times of the two meter responses are clearly seen. The signals were plotted twice to get them on the same paper.

In this way the environmental noise can be monitored unattendedly, but the sources of the (impulsive) signals are unknown.

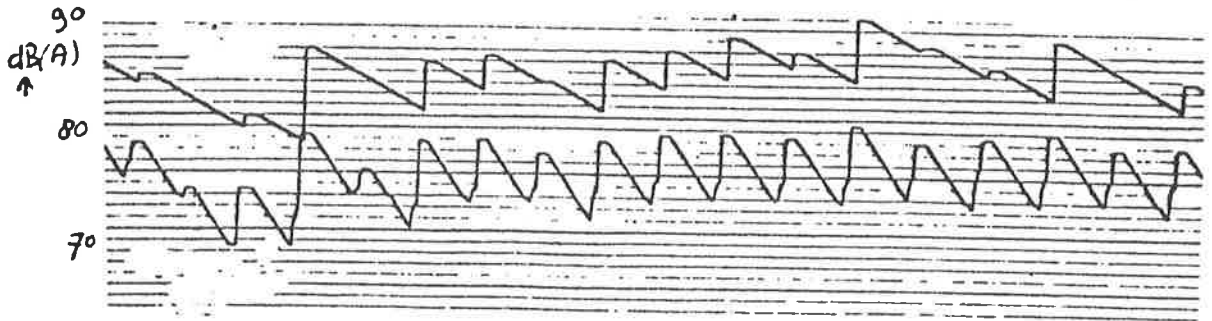


Figure 3. Time history of noise levels caused by pile driving. DC output measuring amplifier with different meter response settings. WRITING SPEED : 1000 mm/s
PAPER SPEED : 10 mm/s.
Upper curve: "impulse" response,
Lower curve: "slow" response.

3.5.2. It is also possible to do the "slow" and "impulse" settings on the level recorder by means of the WRITING SPEED setting.

The WRITING SPEED settings of the level recorder may correspond with the meter responses "RMS slow" and "impulse". For explanation see [7] pp.33-34. Setting the WRITING SPEED at 31.5 mm/s this will be in accordance with the "slow" response and 500 mm/s is in accordance with the "impulse" response (see Figure 4). The equipment set up for this type of analyses is given in Figure 5. In Figure 6, an example of this type of analyses is given. In these cases the signals were also plotted twice on the same paper.

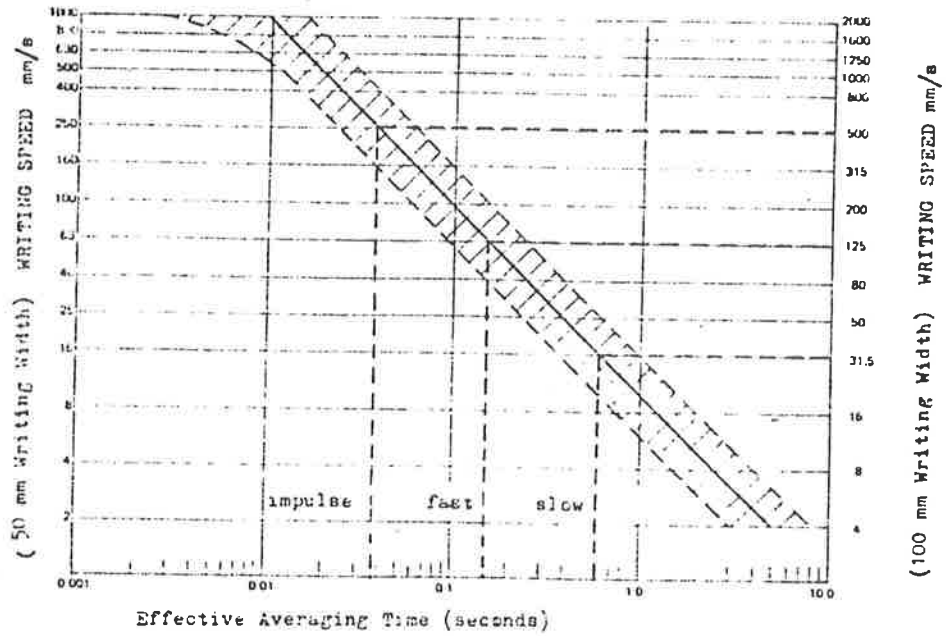


Figure 4. Approximate relationship between WRITING SPEED and effective averaging time, based on empirical data [7].

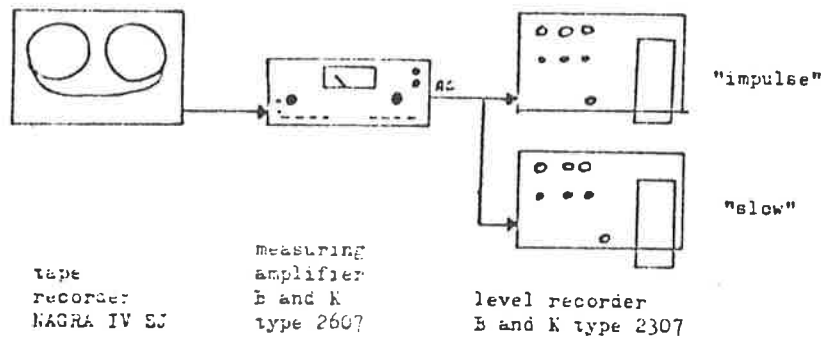


Figure 5. Equipment set up for analysing the signal levels by level recorder setting at different writing speeds.

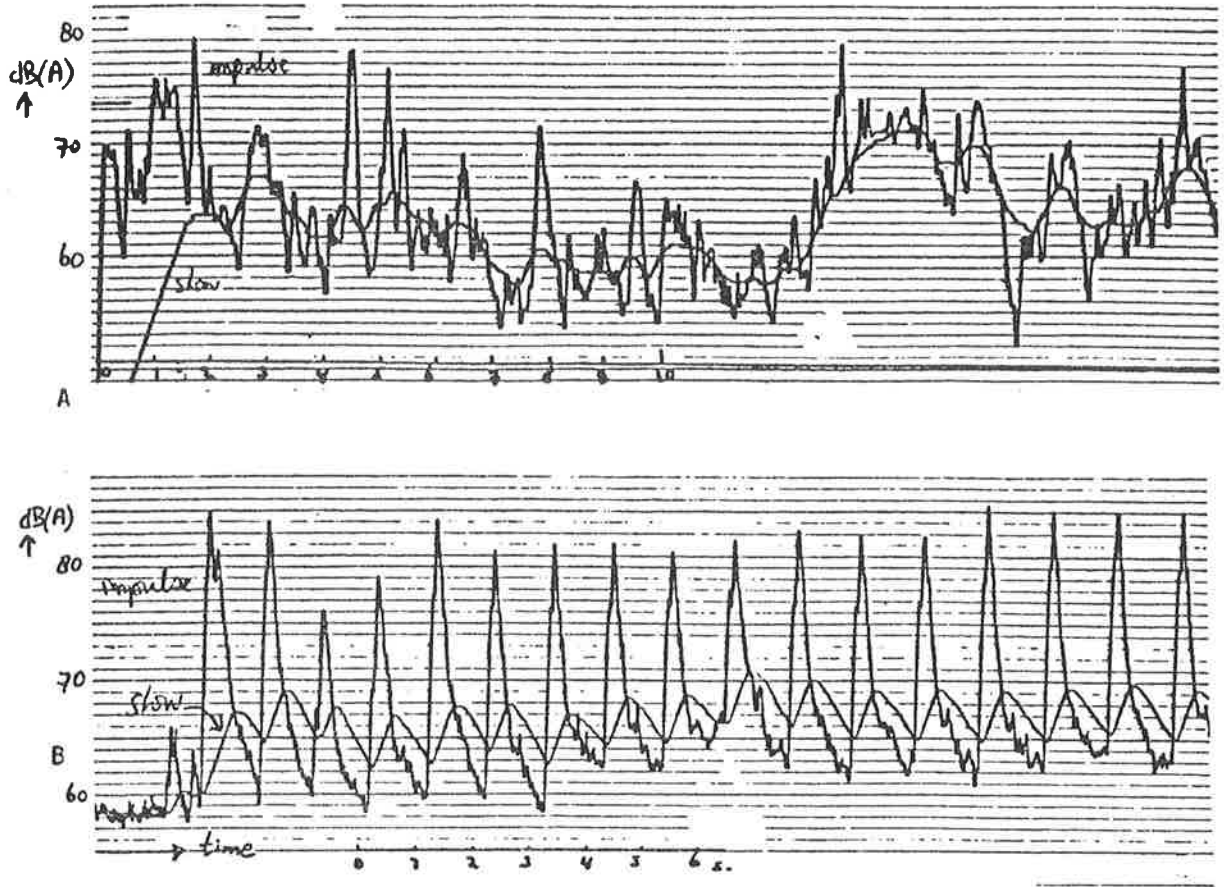


Figure 6. Time histories of noise levels from a school yard (A) and pile driving (B) at "slow" and "impulse" response. WRITING SPEED settings: 31.5 mm/s (slow) and 500 mm/s (impulse), PAPER SPEED: 10 mm/s.

3.5.3. By means of a differential amplifier it is possible to measure the level difference between two signals directly. Because of the different decay times of "slow" and "impulse" response the instantaneous difference is growing just after an impulse. This type of analysis was carried out for pile driving impulses. In Figure 7, the equipment set up is given and in Figure 8 a time history. Above: the "slow" and "impulse" settings of the measuring amplifier, below: the level difference between the two signals.

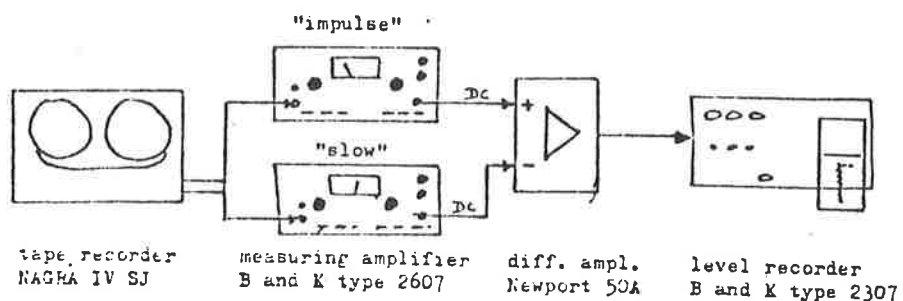


Figure 7. Equipment set up for analysing the level difference between "slow" and "impulse" response.

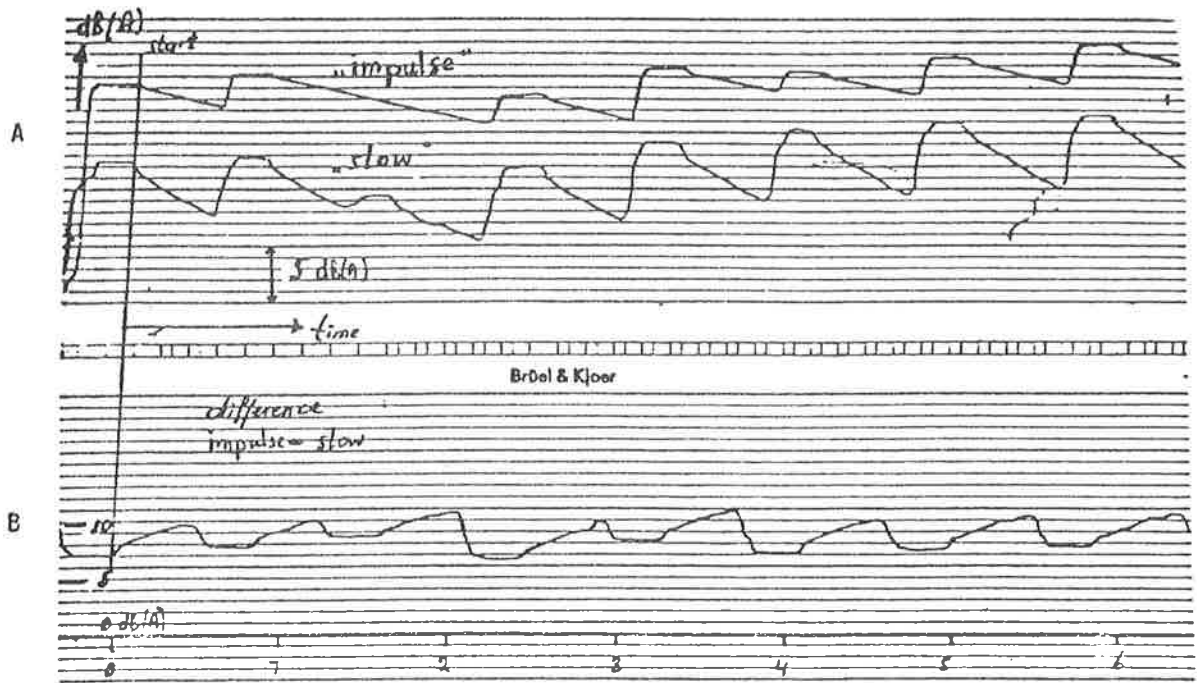


Figure 8. Time history of noise levels caused by pile driving.
A: meter settings on "slow" and "impulse" response.
B: level difference by differential amplifier.
PAPER SPEED : 3 cm/s.

3.6 Analysis with a noise level analyzer

Pile driving noise as a source of impulse noise has been analysed by a noise level analyzer, B & K type 4426. In 3.6.1. results from analyses carried out for different meter functions and sample periods are presented.

- 3.6.1. The values of L1, L10, L50, L90, L99 and Leq were measured by the outside and inside microphone positions with "fast", "slow" and "impulse" response. Sample periods of 0.1 and 10 seconds were used. These values are presented in Table 8 and plotted in Figure 9.

Table 8. A-weighted noise level distribution of pile driving impulses, during pile driving.

sample period	Outside microphone position					
	RMS fast		impulse		RMS slow	
	0.1	10	0.1	10	0.1	10
L(1)	81.8	80.5	86.5	86.8	77.5	78.0
L(10)	77.5	78.0	83.8	85.5	76.0	76.8
L(50)	66.0	66.3	80.5	80.3	72.0	71.8
L(90)	57.5	56.8	77.0	78.3	68.8	69.5
L(99)	54.8	54.5	57.8	57.3	57.0	57.5
L(eq)	72.3	73.1	81.0	81.5	72.3	72.7

sample period	Inside microphone position					
	RMS fast		impulse		RMS slow	
	0.1	10	0.1	10	0.1	10
L(1)	45.5	48.5	50.0	51.0	41.0	42.8
L(10)	41.3	42.5	47.3	48.0	39.0	39.5
L(50)	30.5	29.5	43.5	43.3	36.0	35.8
L(90)	25.0	24.5	40.0	40.5	33.0	33.3
L(99)	23.3	23.0	26.3	28.0	26.3	27.3
L(eq)	36.5	37.9	44.3	44.6	36.4	36.9

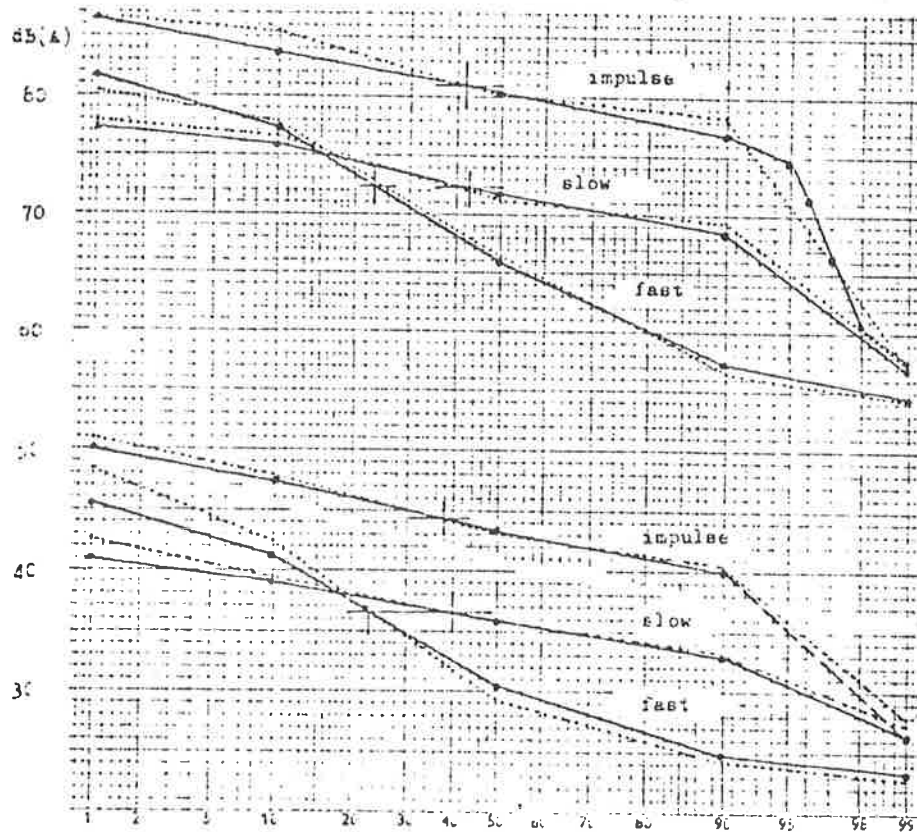


Figure 9. Statistical level distribution, different meter responses and sample periods, microphone positions inside and outside. (— = 0.1 s, - - - = 10 s).

Because of the regularity of pile driving impulses there is no difference between the A-weighted noise level distributions measured at the shortest (0.1s) and the longest (10s) sample period, in spite of the undersampling of the signal with SAMPLE PERIOD settings of 10 s. The choice of the sample period is dependent on the duration and the number of the impulses. From Figure 10, it is clear that a sample period of 10 seconds is much too slow, but because most pile driving impulses are of the same waveform and peakheight and the measuring time is sufficiently long, the same results from measurements with a sample period of 0.1 and 10 seconds are obtained. Measurements with sample periods as short as possible give the best results. Shorter measuring times are possible then.

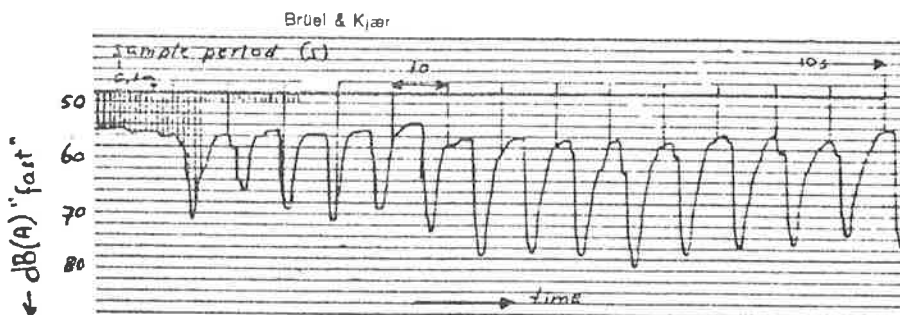


Figure 10. An example of different sample rates.

3.6.2. The noise level analyzer has also the possibility of measuring the maximum value ("hold" mode) in a sample period instead of the value at the instant of the sampling (see Figure 11).

The A-weighted outside noise levels, meterfunctions "RMS fast" and "RMS slow" at different sample periods (0.1 and 10 s) and the detector in position "instant" and "max.level" (hold mode) are given in Table 9. If the "impulse" response is used together with "max.level", then the "impulse" circuit does not conform to IEC 179 or [7] because it has a 35 ms decay time instead of the 3 s time constant specified by the standard.

Table 9. A-weighted noise level distribution, outside, instantaneous and hold mode of pile driving impulses, during pile driving.

RMS fast	sample period detector	0.1 s		10 s	
		inst.	hold	inst.	hold
	L(1)	81.8	82.8	83.8	85.5
	L(10)	77.8	78.8	80.0	84.5
	L(50)	65.3	66.8	65.8	81.8
	L(90)	57.8	58.5	56.3	79.8
	L(99)	55.0	55.8	54.5	72.0
	L(eq)	72.4	73.7	73.5	82.0

RMS slow	sample period detector	0.1 s		10 s	
		inst.	hold	inst.	hold
	L(1)	77.5	78.5	78.0	84.5
	L(10)	76.0	76.0	76.8	79.5
	L(50)	72.0	73.3	71.8	76.5
	L(90)	68.8	70.0	69.5	75.0
	L(99)	57.0	58.3	57.5	72.0
	L(eq)	72.3	73.5	72.3	77.4

The statistical level distribution is independent of the "hold" and "instantaneous" mode for short sample periods (0.1 s). For longer sample periods (10 s) there is a great discrepancy between both modes at the low levels [from L(10) up to L(99)].

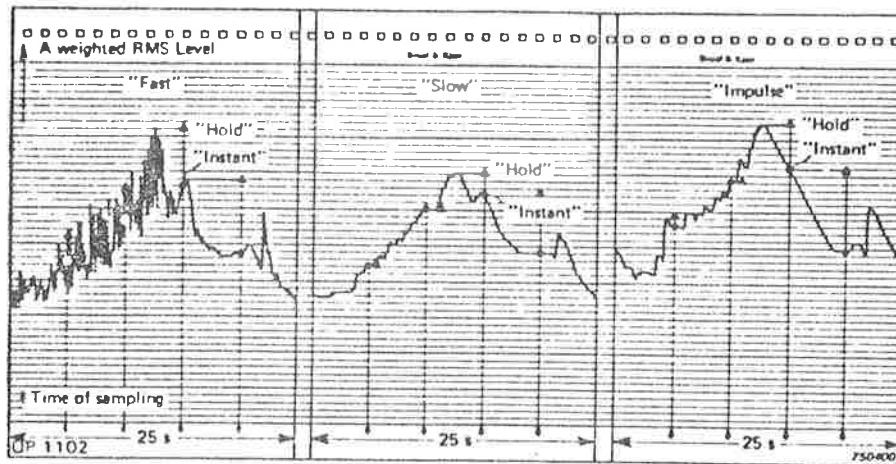


Figure 11. Recordings of detector output of typical traffic noise showing the effect of time constant and the "hold" function on value stored in memory [8].

3.6.3. Resulting from 3.6.1., we concluded that analysing with the noise level analyzer B & K type 4426 with meter settings of 0.1 s sample period and instantaneous mode has appeared to be best. Therefore we have made the analyses for next spots in this way.

The impulse noises from the pile frame were analysed with the noise level analyzer during pile driving. In Table 10, the A-weighted equivalent sound levels for the different measuring spots and meter responses are given. The statistical distributions are plotted in Figure 12. Also the distribution of traffic noise is plotted. It can be seen that for pile driving, which is a very regular sound source, the equivalent noise level, $L(eq)$, is at the 50% value, $L(50)$. The maximum sound pressure levels (Table 11) of the pile driving impulses show a difference of 5-9 dB(A) between the "slow" and "impulse" meter responses.

Table 10. $L(eq)$ values - dB(A)

Spot	Pile driving				(Traffic noise and other background noise)			
	outside		inside		outside		inside	
	imp.	slow	imp.	slow	imp.	slow	imp.	slow
1.1	85.0	76.3	48.1	41.7	-	-	-	-
1.2	81.4	74.6	49.2	43.9	67	-	-	-
1.3	81.0	72.3	44.3	36.4	-	-	-	-
2.1	84.9	76.7	-	-	68.7	63.7	-	-
2.2	83.5	76.1	58.1	51.9	67.9	64.3	49.0	46.3

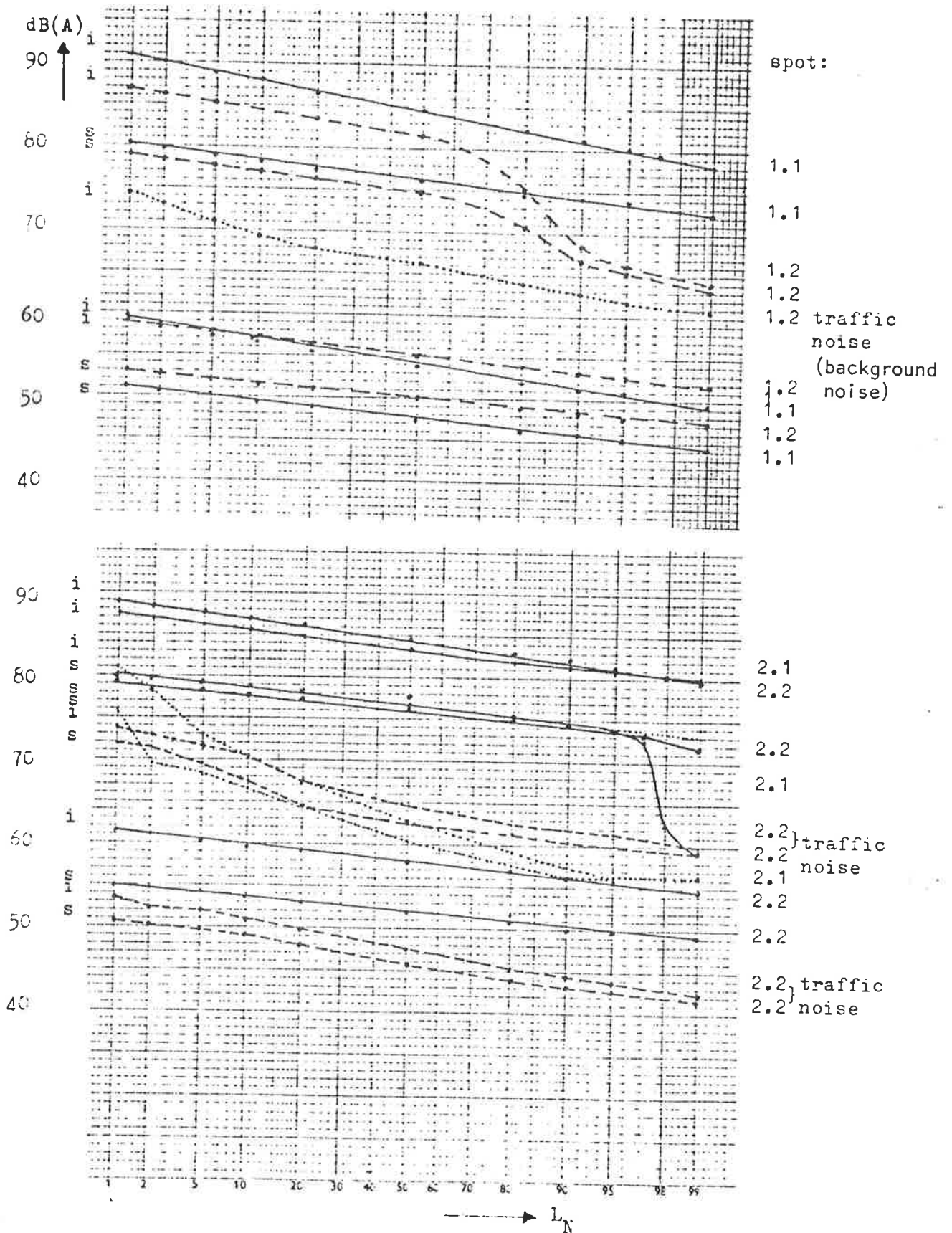


Figure 12 Statistical level distributions of impulse noise (pile driving) and traffic noise at different measuring spots, inside and outside, 10 Hz sampling rate, "slow" and "impulse" response.

Table 11. Maximum values of the impulses at different meter responses - dB(A)

Spot	Outside			Inside		
	max. peak	imp.	slow	max. peak	imp.	slow
1.1	100	83	78	62	51	42
1.2	98	84	77	62	52	45
1.3	100	87*)	78*)	-	50*)	41*)
2.1	101	87	78	-	-	-
2.2	99	84	76	70	60	52

*) L(1) value

A survey by Jakobsen [9] shows that for impulsive noise with crest factors below 25 dB, the L_{eq} , the $L(1)$ and the $L(95)$ were measured within a limit of ± 0.5 dB(A) with any system or sampling rate investigated and that the noise level distributions are nearly identical. He compared three data logging systems with sampling rates of 1 Hz and 10 Hz. One of these systems was a noise level analyzer, B & K type 4426. Four types of impulsive sounds were measured: pile driving at 70m distance (!), electric typewriter, hammering on a wooden block and gunshots outdoors at 1m distance. The crest factors, $L(\text{peak})-L(\text{eq})$, were 25.5 dB, 20.8 dB, 30.3 dB and 40.1 dB, respectively. The L_{eq} 's of the noise examples measured with the data logging systems are in agreement with the L_{eq} measured by the precision integrating sound level meter B & K type 2218. It is shown that it is possible to obtain reliable measurements of the noise occurring in practice with crest factors up to 40 dB, a size which occurs very rarely.

The $L(\text{eq})$ value of the background noise does not contribute to the total $L(\text{eq})$ value of a workday. Assuming that in an eight-hour day the pile frame is at work half the time, the $L(\text{eq})$ value over a day will be 3 dB lower than the value given in Table 10.

3.7 Analysis with a transient recorder.

Atherley and Martin [10] have found a formula to calculate the equivalent A-weighted sound level, assuming that the envelope of the impulse shows an exponential decay (see Figure 13):

$$L(A_{eq}) = 85.4 + 20 \log p(h) + 10 \log n + 10 \log t(e) + 10 \log (1 - e^{-2t(e)/n}) \quad [\text{dB(A)}]$$

where $t(e)$ is the time taken for the pressure wave form to decay to $1/e$ of its initial peak height,

$p(h)$ is the peak height,

n is the impulse repetition frequency.

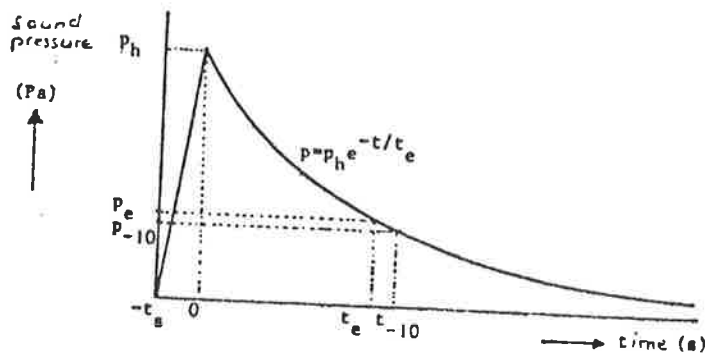


Figure 13. The parameters of an impulse.

To be sure of the exactness of the equivalent sound pressure level L_{eq} measured by the noise level analyzer B & K 4426, a transient recorder with a 32 kbytes memory was used to calculate this value. One impulse was recorded by the transient recorder with a sample period of 20 microseconds during 640 ms. In Figure 14 a graph of a pile driving impulse made by the transient recorder and an XY recorder is shown.

The following parameters were calculated by transient recorder:

- $L_{peak} = 99.4 \text{ dB(A)}$, or $p(h) = 1.9 \text{ Pa}$.
- rise time $t(s) = 8 \text{ ms}$
- decay time $t(e) = 130 \text{ ms}$
- repetition frequency $(n) = 0.83 \text{ Hz}$

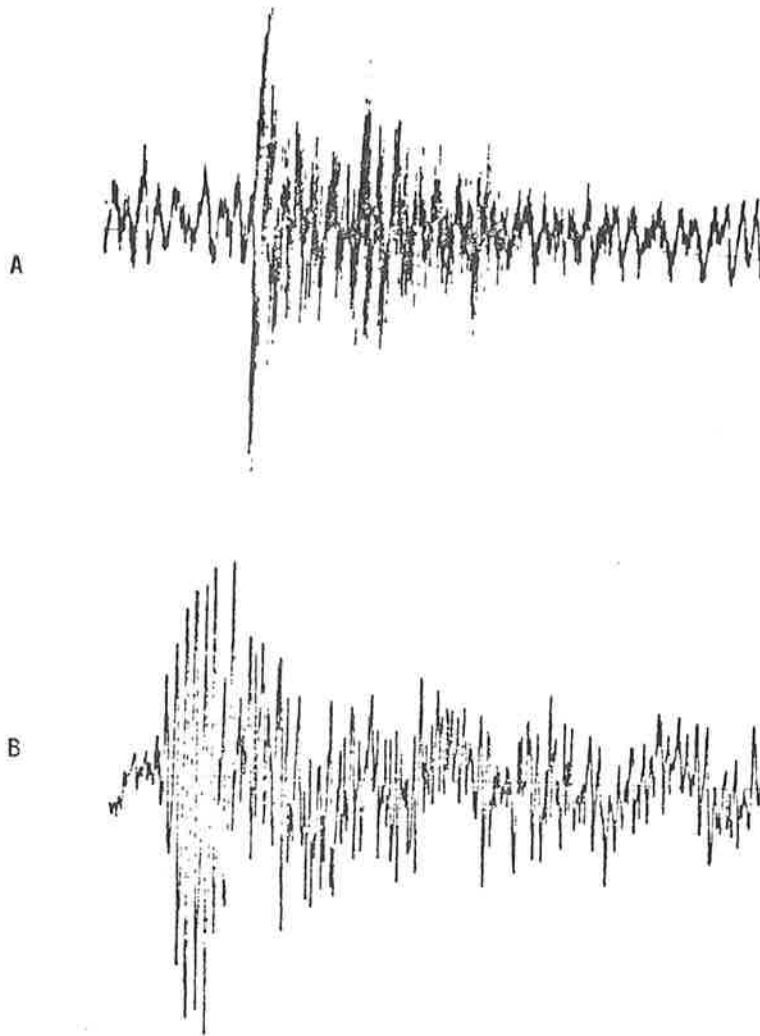


Figure 14. Pile driving impulse,
visible time 640 ms (A) and 100 ms (B).

The equivalent sound pressure level, calculated over 360 ms was 83.0 dB(A). Corrected for the impulse repetition frequency n , $+10 \cdot \log n$, $L(eq)$ is 77.8 dB(A). The crest factor, $L(peak) - L(eq)$ is 21.6 dB or 12x when stated as a multiplier.

With the calculated values filled in into the above formula:

$$L(Aeq) = 75.6 \text{ dB(A)}$$

$L(Aeq)$ shows a good agreement with the values measured with the transient recorder and the noise level analyzer with "slow" response.

3.8 Conclusions and recommendations

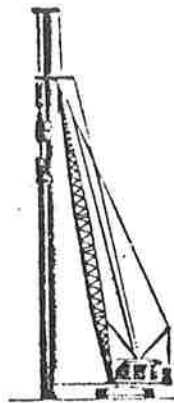
The difference between "slow" and "impulse" responses for pile driving impulses is 5-9 dB(A), so this complies with the directions of the EEC [79/113, O.J.L33 of 8/2/79].

This survey and the experiments done by Jakobsen [9] show a good agreement between L(Aeq) measurements with :

- data logging systems, like the noise level analyzer, B & K type 4426, "fast" and "slow" response, 10 Hz sampling rate,
- L(eq) section of a precision integrating sound level meter, B & K type 2218, for which use it is specified with a crest factor capacity of 1000x (60 dB)
- a transient recorder, 50 kHz sampling rate,

and calculated with the formula of Atherley and Martin [10].

Because of unattended analysing at the measuring spot with a level recorder or noise level analyzer, the information about the source of the impulse signals gets lost and therefore registration on a magnetic tape recorder and analysing in the laboratory seem necessary. Attention must be paid to the signal to noise ratio and the frequency response, which restricted the registration time (see 3.1).



4. SOME GENERAL POINTS OF DISCUSSION

4.1 Back to the aim of the project.

At this stage it seems sound to return to the aim of the project, to see whether this was reached or not.

The aim of the project had been formulated as follows:

"The pilot study "Field enquiry and measurements" should try to determine the methodology, the questionnaires, the techniques and instruments to be used in a large-scale enquiry on the importance of impulsive sounds in the environment."

This importance should be assessed by:

- a) "the frequency of quotations of some noises which can be considered typical impulsive ones among a list of different noises in questionnaires."

Some remarks about this statement must be made.

First, the importance is deduced from the comparison of the obtained frequencies with which both, the impulsive and the non-impulsive sounds included in the questionnaire, are mentioned as to be heard in the environment.

Though the number of different sounds in our checklists is rather extensive, it cannot possibly be complete because of practical reasons. This makes the outcome of the comparison of the obtained frequencies of quotations a rather arbitrary one, as it is depending on the sounds you happened to include in the questionnaire. So we can only speak about a relative importance. Second, it appears not always possible to decide which is "a typical impulsive sound" and which is not. The sounds from one given source can have different appearances in different situations. In some situations these will be "typical impulsive", in other situations this certainly will not be so.

Distance from the source, for instance, is one variable which alters a situation. At larger distances the difference of the sound levels measured in the positions "slow" and "impulse" on a sound level meter can fall to less than four decibel, which is the criterion value in defining whether a sound is impulsive or not.

Other variables can also alter a situation.

This means that a given noise source can only be decided to immit "a typical impulsive sound" in a given area, when the source is either a stationary one or always follows the same route, so the immission levels are rather stable (apart from any meteorological conditions).

- b) "the degree of psychological reactions (from bothering effects to influence on health and well-being) expressed in the questionnaires."

As has been made clear in 2.3.1 effects on health can only be related (only on a probability base, not on a causal one)

to a (group of) noise source(s) under very specific conditions.

For a study of this type it appears to be not useful to include a health section.

As far as the bothering effects are concerned the techniques, used in the questionnaire, appear to be adequate.

- c) "the differences in noise levels measured by two sound level meters on "slow" and "impulse" settings as specified in the EEC directive 79/113 (O.J. L 33 of 8/2/79). Other ways of measuring the impulsiveness of environmental sounds can be checked and compared with each other."

A difference of four dB in noise levels measured by two sound level meters on "slow" and "impulse" response as specified is achieved very easily for many kinds of noise sources.

- However, not specified is the duration of impulsive sounds, so when a continuous noise is started it might cause also a difference of 4 dB in the "slow" and "impulse" settings.
- No more specified is at which moment the difference of 4 dB must occur. Because the "impulse" response has a higher decay time constant than the "slow" response it is possible that the difference in the noise levels measured by these meter-responses grows just after the impulse.
- It is not clear whether the difference in noise levels measured simultaneously by "slow" and "impulse" response is a good measure for the annoyance, caused by impulsive noise.
- For long duration measurements, the frequency of the impulse noise and the difference in the level distribution, for instance $L_1 - L_{95}$, might be a better measurement. In this way the background noise is also accounted for.
- This survey shows a good agreement between L_{eq} measurements of regular impulse noise with
 - a noise level analyzer at "slow" and "fast" settings and the L_{eq} measured and calculated with a transient recorder.
- Different ways to measure the difference between sound levels measured with "slow" and "impulse" settings are carried out.

4.2 Pile driving as a noise source

As already mentioned in 2.3.2., only 23 of the 50 respondents who were exposed to the noise of pile driving at least for several weeks mentioned to hear the noise.

Partially this can be explained by the fact that some people in the sample are working elsewhere in the daytime (19 of the 50). However, also some people who usually are at home in the daytime do not mention the noise of pile driving. And some respondents who do mention pile driving add to it: "but that is only temporarily".

From this it seems plausible to conclude that the temporary nature of pile driving makes people adopt a relatively lenient attitude to the immitted noise.

By its nature the noise of pile driving takes a very particular place among all other impulse noises and can certainly not be regarded as representative of "the impulse noises".

4.3 Some concluding remarks

4.3.1 Time of the day

Sounds should be differentiated by those occurring only in the daytime, those occurring only at night and those occurring both in the daytime and at night.

4.3.2 The meaning of a sound

Enquiries on specific sounds should be made more significant by adding (a) question(s) about what the respondent him/herself considers to be the most distinctive feature of the sound at issue.

4.3.3 Specificity

In questions on sounds the description of a sound should not be applicable to varying sounds, but should allow only one single explanation (e.g. "drilling" instead of "do-it-yourself-work"). Moreover the sound question should apply to only one sound source and not to two or three sources together (e.g. not "doorbell or doorknocker" but "doorbell" and "doorknocker" separately).

4.3.4 Integration of the data

In carrying out this pilot study every participant was free to choose any situation in which impulsive sounds occur. For the main study it may be good to match the acoustical environments as good as possible. Only then it is feasible to integrate the data.

IMG-TNO
1981-02-20
RGdJ/PB

5. LITERATURE

- [1] Berg, R. van den
Impulsive Noise Measurements in the Environment
Memo 80-78, GLB-IMG-TNO, Delft, March 1980

- [2] Berg, R. van den
Impulse noise measurements in the environment
Memo 80-168, GLB-IMG-TNO, Delft, September 1980

- [3] Overzicht onderzoekprojecten industrielawaai
Onderzoekprogramma Interdepartementale Commissie
Geluidhinder
Rapport nr. IL-HR-00-01,
Ministerie van Volksgezondheid en Milieuhygiëne
Leidschendam, September 1976.

- [4] Leeuw, A.R.
Impulsgeluid in de Nederlandse industrie, deel 1,
overzicht van een honderdtal metingen in fabrieken
Report B 435, Delft, IMG-TNO, 1980

- [5] Berg, R. van den
Impulsgeluid in de Nederlandse industrie, deel 2,
dB(A) metingen van impulsgeluid
Report B 436,
Delft, IMG-TNO, 1980

- [6] International Electrotechnical Commission
IEC Standard, Sound level meters,
publication 651, first edition,
Geneve 1979.

- [7] Bruel & Kjaer
Instruction Manual
Level Recorder type 2307

- [8] Bruel & Kjaer
Instruction Manual
Noise Level Analyzer type 4426

- [9] Jakobsen, J.
Measurement of impulsive noise
with a data logging system.
Applied Acoustics 13 (1980) p. 457-469

- [10] Atherley G.R.C. and A.M. Martin
Equivalent-continuous noise level as a measure of
injury from impact and impulse noise.
Ann. Occup. Hyg. 14 (1971) p. 11-28

- [11] Jong, R.G. de
Inventarisatie van geluidhinder in Nederland
ICG rapport BG-HR-18-01
Ministerie van Volksgezondheid en Milieuhygiene
Leidschendam (1980)

ANNEX 1

The Dutch Questionnaire

(5b) 10 Is er iets bijzonder onprettig aan het wonen in deze omgeving ?

ja 1 neen 2

11 Wat is er bijzonder onprettig ? Enq.: DOORVRAGEN

(6) 12 Enq.: GEEF KAART 2. Mensen kunnen wonen in heel verschillende gebieden met elk hun eigen voordelen en problemen. Wij zijn geïnteresseerd in wat u voelt als de goede en als de slechte dingen bij het wonen in deze omgeving. Wilt u voor elk van de zaken die ik u op ga noemen zeggen in hoeverre ze goed of slecht bij deze omgeving passen. Ik neem ze u een voor een op. Geeft u uw antwoord maar aan de hand van deze kaart. Enq.: NOTEER IN SCHEMA

	heel goed 5	goed 4	niet goed, niet slecht 3	slecht 2	erg slecht 1	weet niet 0	
a. het aanwezig zijn van plantsoenen, parken, open terreinen e.d.	15
b. De kwaliteit van de plaatselijke scholen	16
c. Openbaar vervoer	17
d. De aanblik van huizen en gebouwen	18
e. Rustige omgeving wat lawaai betreft	19
f. de verstandhouding met de buren	20
g. de afstand tot winkels	21
h. de afstand tot gebouwen-, bureaus of andere instellingen waar u wel eens noodzakelijk naar toe moet	22
i. de wijze waarop de wegen en straten worden onderhouden	23
j. afstand tot uitgaansgelegenheden	24
k. nabijheid van gelegenheden voor hobbies sporten of andere vormen van tijdverdrijf	25
l. de zuiverheid van de lucht	26

(7) 13 Indien u één ding in de omgeving kon veranderen wat zou u kiezen ?

0	1	2	3	4	0	2	4	6	8	2
---	---	---	---	---	---	---	---	---	---	---

(10b)

22	Waarom heeft u de ramen van de slaapkamer de rest van het jaar 's nachts dicht ?						34										
	Enq.: NAAR VRAAG 24																
23	Waarom heeft u de ramen van uw slaapkamer 's nachts nooit open ?						35										
24	Ligt uw slaapkamer op het noorden, oosten, zuiden of westen ?						36										
	noorden . 1 .	oosten . 2 .	zuiden . 3 .	westen . 4 .	noorden + zuiden . 5 .	oosten + westen . 6 .											
25	Ligt uw woonkamer op het noorden, oosten, zuiden of westen ?						37										
	noorden . 1 .	oosten . 2 .	zuiden . 3 .	westen . 4 .	noorden + zuiden . 5 .	oosten + westen . 6 .											
26	Zijn er in deze woning ramen met dubbel glas ?						38										
	ja . 1 .	neen . 2 .															
27	Welke vertrekken hebben dubbel glas ?						39										
28	Waarom hebben deze vertrekken dubbel glas ? Enq.: DOORVRAGEN						40										
29	Ik zou u graag enige vragen willen stellen over hoe u zich voelde gedurende de laatste twee weken. Enq.: GEEF KAART 3. Hoe voelde u zich wat betreft uw gezondheid de afgelopen twee weken. Geeft u uw antwoord maar aan de hand van deze kaart ?						41										
	heel goed . 1 .	goed . 2 .	matig . 3 .	slecht . 4 .	zeer slecht . 5 .												
30	Tijdens de afgelopen twee weken hebt u toen last gehad van (Enq.: NOEM KLACHTEN OP UIT SCHEMA OP PAGINA 5)						42										
	Enq.: INDIEN U BIJ GENOEMDE KLACHT EEN STREEP HEEFT GEZET BIJ -JA- VRAAG 31 STELLEN. NOTEER IN SCHEMA OP PAGINA 5																
31	Is (Enq.: NOEM KLACHT) begonnen in deze laatste twee weken of is het daarvoor begonnen ? Enq.: NOTEER IN SCHEMA OP PAGINA 5						43										
<table border="1" style="width:100%; text-align:center;"> <tr> <td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>0</td><td>2</td><td>4</td><td>6</td><td>8</td><td>2</td> </tr> </table>							0	1	2	3	4	0	2	4	6	8	2
0	1	2	3	4	0	2	4	6	8	2							

(11a)

(11b)

		VRAAG 30		VRAAG 31								
		neen	ja	begon laat- ste twee weken	begon daar- voor							
	a. maagstoornis zoals indigestie	0 .	A .	1 .	2 .	38						
	b. een gevoel van bedruktheid (verdriet, neerslachtigheid)	0 .	A .	1 .	2 .	39						
	c. hoofdpijnen	0 .	A .	1 .	2 .	40						
	d. slecht gehumeurd	0 .	A .	1 .	2 .	41						
	e. hartkloppingen of bonzen van het hart	0 .	A .	1 .	2 .	42						
	f. wonden, zweren, huiduitslag of andere huidaandoeningen	0 .	A .	1 .	2 .	43						
	g. moeilijkheden met inslapen	0 .	A .	1 .	2 .	44						
	h. problemen van 's nachts wakker liggen	0 .	A .	1 .	2 .	45						
	i. oververmoeidheid of moeheid	0 .	A .	1 .	2 .	46						
	j. een gevoel van nervositeit	0 .	A .	1 .	2 .	47						
	k. oorsuizingen	0 .	A .	1 .	2 .	48						
	l. andere moeilijkheden met uw oren	0 .	A .	1 .	2 .	49						
	m. brandwonden, kneuzingen, snijwonden of andere ongelukjes	0 .	A .	1 .	2 .	50						
32	Heeft u de afgelopen twee weken nog last van andere klachten gehad die ik u niet gevraagd heb ?					51						
	ja . 1 .	neen . 2 .										
33	Welke klachten zijn dat dan ? Enq.: NOTEER IN SCHEMA HIERONDER	Enq.: NAAR VRAAG 35				52						
8	Enq.: NOTEER IN SCHEMA DE TWEE MEEST OPMERKELIJKE KLACHTEN EN STEL NU VOOR ELKE KLACHT VRAAG 34.					53						
34	Is (Enq.: NOEM KLACHT) begonnen in deze laatste twee weken of is het daarvoor begonnen ? Enq.: NOTEER IN SCHEMA	VRAAG 34				54						
	VRAAG 33	begonnen in laatste twee weken		begonnen daarvoor		55						
	1.	1 .		2 .		56						
	2.	1 .		2 .		57						
35	Wanneer u hier binnenshuis bent, hoort u dan geluiden die u hinderen, storen of ergeren ?					58						
	ja . 1 .	neen . 2 .										
		Enq.: NAAR VRAAG 38										
		0	1	2	3	4	1	3	5	7	9	1

(12a)

(19) 55 Ik ga u nu een aantal geluiden noemen van plaatsen waar mensen aan het werk zijn.
 — H Enq.: NEEM INVULFORMULIER C VOOR U EN VUL DAAROP DE VRAGEN 56 t/m 61 IN :

(19a) 56 Wanneer u binnenshuis bent hoort u dan wel eens(Enq.: NOEM GELUIDEN INVULFORMULIER C)
 — J Enq.: VOOR ELK GELUID DAT O.P. BIJ VRAAG 56 HOORT DE VRAGEN 57 T/M 61 STELLEN.

(19b) 57 Enq.: GEEF KAART 5. Hoe vaak hoort u (Enq.: NOEM GELUID) Geeft u uw antwoord maar
 aan de hand van deze kaart.

(19c) 58 Enq.: GEEF KAART 6 Als u dit geluid hoort hoe vindt u dat dan ? Geeft u uw antwoord maar
 aan de hand van deze kaart. Noemt u maar het cijfer dat voor uw antwoord
 staat. Enq.: NOTEER CIJFER IN SCHEMA

(19d) 59 Enq.: GEEF KAART 7 In het algemeen genomen, als u dit geluid van(Enq.: NOEM
 GELUID) hoort in welke mate wordt u dan door dit geluid gehinderd ?
 Geeft u uw antwoord maar aan de hand van deze kaart. Noemt u maar de
 letter die voor uw antwoord staat.

(19e) 60 Als u binnenshuis bent en u hoort(Enq.: NOEM GELUID) maakt dit dan wel eens
 dat

a. u ervan schrikt (NOTEER IN SCHEMA)
 b. u ervan wakker wordt (NOTEER IN SCHEMA)
 c. het u moeilijkheden geeft bij het horen van de radio of T.V. (NOTEER IN
 SCHEMA)
 d. het een gesprek onderbreekt ? (NOTEER IN SCHEMA)
 e. het uw inslapen uitstelt ? (NOTEER IN SCHEMA)
 f. u uw deuren en ramen meer sluit dan u eigenlijk zou willen ? (NOTEER IN
 SCHEMA)

(19f) 61 Als u dit geluid hoort gaat uw woning dan trillen of gaat er iets rammelen of rinkelen
 of is dat niet het geval ?

(21) 62 Nu zou ik het graag willen hebben over geluiden van dingen die mensen soms van hun burens horen of van
 bezoekers van de burens.

— K Enq.: NEEM INVULFORMULIER D VOOR U EN VUL DAAROP DE VRAGEN 63 t/m 68 IN.

(21a) 63 Wanneer u binnenshuis bent hoort u dan wel eens(Enq.: NOEM GELUIDEN
 INVULFORMULIER D).

— L Enq.: VOOR ELK GELUID DAT O.P. BIJ VRAAG 63 HOORT DE VRAGEN 64 t/m 68 STELLEN.

(21b) 64 Enq.: GEEF KAART 5. Hoe vaak hoort u(Enq.: NOEM GELUID). Geeft u uw antwoord maar
 aan de hand van deze kaart.

(21c) 65 Enq.: GEEF KAART 6. Als u dit geluid hoort, hoe vindt u dat dan ? Geeft u uw antwoord maar
 aan de hand van deze kaart. Noemt u maar het cijfer dat voor uw antwoord
 staat.

(21d) 66 Enq.: GEEF KAART 7. In het algemeen genomen, als u dit geluid van(Enq.: NOEM
 GELUID) hoort, in welke mate wordt u dan door dit geluid gehinderd ?
 Geeft u uw antwoord maar aan de hand van deze kaart. Noemt u maar
 de letter die voor uw antwoord staat.

(21e) 67 Als u binnenshuis bent en u hoort(Enq.: NOEM GELUID) maakt dit dan wel eens
 dat

a. u ervan schrikt (NOTEER IN SCHEMA)
 b. u ervan wakker wordt ? (NOTEER IN SCHEMA)
 c. het u moeilijkheden geeft bij het horen van de radio of T.V. (NOTEER IN
 SCHEMA)
 d. het een gesprek onderbreekt (NOTEER IN SCHEMA)
 e. het uw inslapen uitstelt ? (NOTEER IN SCHEMA)
 f. u uw deuren en ramen meer sluit dan u eigenlijk zou willen ? (NOTEER IN
 SCHEMA)

(21f) 68 Als u dit geluid hoort gaat uw woning dan trillen of gaat er iets rammelen of rinkelen
 of is dat niet het geval (NOTEER IN SCHEMA)

	0	1	2	3	4	0	2	4	6	8	2
--	---	---	---	---	---	---	---	---	---	---	---

(23) 69 Nu zou ik het graag willen hebben over geluiden die u hoort van huishoudelijke apparaten of installaties die u zelf in de woning hebt ?

M Enq.: NEEM INVULFORMULIER E VOOR U EN VUL DAAROP DE VRAGEN 70 t/m 75 IN

(23a) 70 Wanneer u binnenshuis bent hoort u dan wel eens (Enq.: NOEM GELUIDEN INVULFORMULIER E).

P Enq.: VOOR ELK GELUID DAT O.P. BIJ VRAAG 70 HOORT DE VRAGEN 71 t/m 75 STELLEN.

(23b) 71 Enq.: GEEF KAART 5. Hoe vaak hoort u (Enq.: NOEM GELUID). Geeft u uw antwoord maar aan de hand van deze kaart.

(23c) 72 Enq.: GEEF KAART 6. Als u dit geluid hoort, hoe vindt u dat dan ? Geeft u uw antwoord maar aan de hand van deze kaart. Noemt u maar het cijfer dat voor uw antwoord staat.

(23d) 73 Enq.: GEEF KAART 7. In het algemeen genomen, als u dit geluid van (Enq.: NOEM GELUID) hoort, in welke mate wordt u dan door dit geluid gehinderd ? Geeft u uw antwoord maar aan de hand van deze kaart. Noemt u maar de letter die voor uw antwoord staat.

(23e) 74 Als u binnenshuis bent en u hoort (Enq.: NOEM GELUID) maakt dit dan wel eens dat

- a. u ervan schrikt ? (NOTEER IN SCHEMA)
- b. u ervan wakker wordt ? (NOTEER IN SCHEMA)
- c. het u moeilijkheden geeft bij het horen van de radio of T.V. (NOTEER IN SCHEMA)
- d. het een gesprek onderbreekt ? (NOTEER IN SCHEMA)
- e. het uw inslapen uitstelt ? (NOTEER IN SCHEMA)
- f. u uw deuren en ramen meer sluit dan u eigenlijk zou willen ? (NOTEER IN SCHEMA)

(23f) 75 Als u dit geluid hoort gaat uw woning dan trillen of gaat er iets rammelen of rinkelen of is dat niet het geval ? (NOTEREN IN SCHEMA)

(25) 76 Vindt u dat u gevoeliger, even gevoelig of minder gevoelig bent voor geluiden dan anderen ?

1 gevoeliger • •	2 even gevoelig • •	3 minder gevoelig • •	
------------------------	---------------------------	-----------------------------	--

65

77 Enq.: GEEF KAART 8. Hoe gevoelig bent u voor geluiden ? Geeft u uw antwoord maar aan de hand van deze kaart.

1 helemaal niet gevoelig • •	2 niet ge- voelig • •	3 net niet gevoelig • •	4 net ge- voelig • •	
5 gevoelig • •	6 erg gevoelig • •	7 niet te zeggen • •		

66

(26) 78 Nu wilde ik graag een aantal algemene vragen stellen

a. Hoeveel personen telt uw gezin ?	[]	personen	67
b. Hoeveel kinderen van 4 jaar of jonger zijn er ?	[]	personen	68
c. Hoeveel kinderen van 5 t/m 17 jaar zijn er ?	[]	personen	69
(d) d. Hoeveel personen van 18 t/m 39 jaar zijn er ?	[]	personen	70
e. Hoeveel personen van 40 t/m 59 zijn er ?	[]	personen	71
(e) f. Hoeveel personen van 60 jaar en ouder zijn er ?	[]	personen	72

Enq.: TOTAAL b t/m f MOET GELIJK ZIJN AAN a !

0	1	2	3	4	1	3	6	7	9	1
---	---	---	---	---	---	---	---	---	---	---

(27) 79

Enq.: GEEF KAART 8. Is deze woning uw eigendom of een huurhuis? Geeft u uw antwoord maar aan de hand van deze kaart. Noemt u maar de letter die voor uw antwoord staat.

KAART 2

A . 1 . | B . 2 . | C . 3 . | D . 4 . | F . 5 . | G . 6 .

5 0

andere . 7 . t.w.:

6 2

80

Hoeveel uren van de dag brengt u zo gemiddeld niet thuis maar ergens anders door?

uur

8

9

(29) 81

NOTEER: geslacht O.P.

man . 1 .

vrouw . 2 .

10

(31) 82

Wat is uw leeftijd?

jaar

11

(30) 83

Bent u gehuwd, ongehuwd, weduw(e) (naar) gescheiden?

ongehuwd . 1 .

gehuwd . 2 .

weduw(e) (naar)/gescheiden . 3 .

12

(32) 84

Hoe oud was u toen u van school of universiteit kwam?

jonger dan . 1 .

15 jaar . 2 .

16 jaar . 3 .

17 jaar . 4 .

18 jaar . 5 .

19 jaar . 6 .

20 jaar . 7 .

15 jaar .

jaar .

jaar .

jaar .

jaar .

jaar .

of ouder .

volgt nog dag onderwijs . 8 .

13

85

Bent u momenteel werkzaam? Bent u werkzoekend, gepensioneerd, of nog anders?

werkzaam . 1 .

werkzoekend . 2 .

gepensioneerd/ziek/afgekeurd . 3 .

huisvrouw . 4 .

student . 5 .

andere . 6 . t.w.

14

86

Heeft u een volledige werkkring waarin u 31 uur of meer per week werkt of een deeltijd werkkring van 30 uur of minder per week?

volledig . 1 .

deeltijd . 2 .

15

(33b) 87

Werkt u in ploegdienst? INDIEN JA: Wat voor dienst?

ja, af en toe nachtdienst . 1 .

ja, uitsluitend nachtdienst . 2 .

ja, alleen dag of avonddienst . 3 .

ja . 4 .

andere t.w.:

neen . 0 .

16

17

(34a) 88

Enq.: STREEP AAN O.P. is GEZINSHOOFD

neen . 1 .

ja . 2 .

18

Enq.: NAAR VRAAG 91

89

Is het gezinshoofd momenteel werkzaam, werkzoekend, gepensioneerd of nog anders?

werkzaam . 1 .

werkzoekend . 2 .

gepensioneerd/ziek/afgekeurd . 3 .

student . 5 .

andere . 6 . t.w.

19

Enq.: NAAR VRAAG 91

(34b)

.....

0 1 2 3 4 0 2 4 6 8 8 2

102	Eng.: NOTEER TYPE WONING				
	eengezinswoning vrijstaand . . . 1 . . .	eengezinswoning 2 onder 1 kap . . . 2 . . .	eengezinswoning hoekhuis . . . 3 . . .		
	eengezinswoning hoekhuis in een rij . . . 4 . . .	Bungalow vrijstaand . . . 5 . . .	Bungalow 2 onder 1 kap . . . 6 . . .		
	flat/maisonette/portiek woning/etagewoning			- oorspronkelijk zo gebouwd . . . 7 . . .	
				- daartoe verbouwd . . . 8 . . .	35
	kamers of verdieping (zonder eigen opgang) . . . 9 . . . anders . . . 0 . . . t.w.: -----				

R INDIEN U BIJ VRAAG 102 EEN STREEP BIJ FLATS E.D. GEZET HEEFT VRAAG 102A INVULLEN ANDERS NAAR VRAAG 103

102A	a. woning is gelegen op de	<input type="text"/>	verdieping		36
	b. de woonlaag begint op de	<input type="text"/>	e verdieping		37
	c. gebouw bestaat uit	<input type="text"/>	bouwlagen		38

S d. woning is een tussenwoning . . . 1 . . . e. hoekwoning . . . 2 . . .
 Eng.: DE VOLGENDE GEGEVENS INVULLEN NADAT U HET GESPREK BIJ O.P. BEEINDIGD HEBT
 103 Leek het gehoorvermogen van O.P. u: normaal . . . 1 . . . licht verminderd . . . 2 . . . zwaar verminderd . . . 3 . . .

INDIEN VERMINDERD : BESCHRIJF DE MATE VAN VERMINDERING

40

104	EEN STREEP :				
	A	B	C	D	
	boven- laag . . . 1 . . .	boven- laag . . . 3 . . .	boven- laag . . . 5 . . .	boven- laag . . . 7 . . .	
	onder- laag . . . 2 . . .	onder- laag . . . 4 . . .	onder- laag . . . 6 . . .	onder- laag . . . 8 . . .	41

NUMMER ENQUETEURS	DATUM (39)	VOLGNUMMER

0	1	2	3	4	0	2	4	6	8	2
---	---	---	---	---	---	---	---	---	---	---



DA 8761 INVULFORMULIER A	vraag 42		vraag 43				vr 44	vr 45	vraag: 46						vraag 47							
	te horen		Minder dan één dag	Eén of enkele dagen	De meeste dagen	Iedere dag	keuring over geluid	Ergerenis	a Schrikken		b Makker worden		c T.V., Radio		d Conversatie		e Slapen		f Deuren en ramen		Trillingen	
	ja	nee	...	...	...	...	...	...	ja	nee	ja	nee	ja	nee	ja	nee	ja	nee	ja	nee	ja	nee
A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	
Fabrieks of bedrijfs toeters, sirenes fluiten of bellen.	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
Kerkklokken (gebeier)	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
Torenklokken (tijdslaan)	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
Schieten of ontploffingen van militaire terreinen	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
Knallen van vogelverschrikkers	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
Bellen, claxons, toeteren e.d. van straathandelaren (ijscowagen winkel a. huis)	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
Sirenes van politie, brandweer, ambulance	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
Muziekversterkers van disco, bar, of club	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
Geschreeuw of gekrijs van mensen in of bij disco, bar of club	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
Bellen of sirenes van alarminstallaties	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
Geweerschoten (jacht) van particuliere terreinen.	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2						



DA 8761 INVULFORMULIER E	vraag 70		vraag 71				vr 72	vr 73	vraag 74						vraag 75									
	Geluid horen		Minder dan één dag	Eén of enkele dagen	De meeste dagen	Iedere dag	Neming over geluid	Ergebnis	a Schrikken		b Wakker worden		c T.V. Radio		d Conversatie		e Slapen		f Deuren en ramen		Trillingen			
	ja	nee	...	...	...	...	...	...	ja	nee	ja	nee	ja	nee	ja	nee	ja	nee	ja	nee	ja	nee		
A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	
Wasmachine	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Vaatwasmachine	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Stofzuiger	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Naaimachine	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Koelkast	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Invriezer vrieskast	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Mixer	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
CV syteem	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
ENIG ANDER APPARAAT DAT OPVALLEND GELUID MAAKT T.W.	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
-----	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Hebt u een waterleiding systeem wat een beetje trilt of bromt.	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3	4			1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	0	1	2	3																			

-
- erg tevreden
 - redelijk tevreden
 - niet tevreden, niet ontevreden
 - tamelijk ontevreden
 - erg ontevreden

KAART 1

Bij enquête DA 8761

-
- heel goed
 - goed
 - niet goed, niet slecht
 - slecht
 - erg slecht
-

KAART 2

Bij enquête DA 8761

- heel goed

- goed

- matig

- slecht

- heel slecht

KAART 3

Bij enquête DA 8761

-
- 1 Absoluut bevredigend
 - 2
 - 3
 - 4
 - 5
 - 6
 - 7 Absoluut onbevredigend

KAART 4

Bij enquête DA 8761

Aantal dagen per week

4 Iedere dag

3 De meeste dagen

2 Een of enkele dagen

1 Minder dan één dag

KAART 5

Bij enquête DA 8761

-
1. ik hoor het erg graag
 - 2.
 3. positieve
waardering
 - 4.
 - 5.
 6. neutraal, kan me niet schelen, niet positief en ook niet negatief
 - 7.
 - 8.
 9. negatieve
waardering
 - 10.
 11. ik hoor het helemaal niet graag
-

-
- A heel erg
 - B tamelijk
 - C slechts een beetje
 - E helemaal niet

KAART 7

Bij enquête DA 8761

- helemaal niet gevoelig

- niet gevoelig

- net niet gevoelig

- net gevoelig

- gevoelig

erg gevoelig

KAART 8

Bij enquête DA 8761

-
- A - eigenaar; bewoner
 - B - huur : van particulier : gemeubileerd
 - C - huur : van particulier : ongemeubileerd
 - D - huur : gemeentewoning
 - F - huur : woningbouwvereniging
 - G - bedrijfswoning :
 anders : te weten
-

ANNEX 2

The English Questionnaire

Project (1-3) EEC ENVIRONMENTAL STUDY (10-15) Blank

Resp. Code (4-6) Resp. Code (16-18)

Card No. (7-8) Card No. (19-20)

Interviewer (9)

1	<p>During the interview I shall sometimes ask about your opinions on this area. When I ask about this area I'm referring to the two or three streets or roads around here. Firstly though: What year did you move to this particular address ?</p> <p style="text-align: right;">Write in year 19 <input type="text"/> <input type="text"/> <input type="text"/></p> <p style="text-align: right;">Always lived here <input type="text"/> <input type="text"/></p>	(21-22)	
2a)	<p>Would you like to move from this house/flat ? <u>IF YES; PROBE WHETHER HAVE ARRANGED.</u></p> <p style="text-align: right;">Yes <input type="text"/> <input type="text"/></p> <p style="text-align: right;">No <input type="text"/> <input type="text"/></p> <p style="text-align: right;">Move arranged <input type="text"/> <input type="text"/></p> <p>b) <u>IF WOULD LIKE TO MOVE, OR MOVE ALREADY ARRANGED</u> What are your main reasons for wanting to move (moving) ?</p> <p><u>PROBE 'ANYTHING ELSE' - RECORD FULLY</u></p>	(23)	b) Q.3 b)
		(24-25)	
		(26-27)	
		(28-29)	
3	<p>Taking everything together, how satisfied are you with this area as a place to live in ? Are you READ OUT</p> <p style="text-align: right;">very satisfied <input type="text"/> <input type="text"/></p> <p style="text-align: right;">fairly satisfied <input type="text"/> <input type="text"/></p> <p style="text-align: right;">rather dissatisfied <input type="text"/> <input type="text"/></p> <p style="text-align: right;">very dissatisfied <input type="text"/> <input type="text"/></p> <p style="text-align: right;">(No feelings either way) <input type="text"/> <input type="text"/></p>	(30)	
4	<p>Forgetting for a moment about the area, how satisfied are you on the whole with this particular house/flat ? Are you READ OUT</p> <p style="text-align: right;">very satisfied <input type="text"/> <input type="text"/></p> <p style="text-align: right;">fairly satisfied <input type="text"/> <input type="text"/></p> <p style="text-align: right;">rather dissatisfied <input type="text"/> <input type="text"/></p> <p style="text-align: right;">or, very dissatisfied <input type="text"/> <input type="text"/></p> <p style="text-align: right;">(No feelings either way) <input type="text"/> <input type="text"/></p>	(31)	

CARD 1

5a) Is there anything you particularly like about living in this area ?
PROBE : "ANYTHING ELSE?" UNTIL FINAL "NO" RECORD FULLY

Col./ Code	Skip to
(32-33)	
(34-35)	
(36-37)	
(38-39)	
(40-41)	
(42-43)	
(44-45)	
(46-47)	

b) Is there anything you particularly dislike about living in this area ?
PROBE : "ANYTHING ELSE?" UNTIL FINAL "NO" RECORD FULLY

6 Different people live in many kinds of areas with different sorts of advantages and problems. We are interested in what you feel are the good and bad things about living in this area. Thinking of the area around here. please tell me how you would rate it on (having parks and open spaces)?

SHOW CARD A

(Dont know) Very Good Good Average Poor Very poor

	(Dont know)	Very Good	Good	Average	Poor	Very poor	
Having parks and open spaces	8	5	4	3	2	1	(48)
The quality of local schools	8	5	4	3	2	1	(49)
Public transport services	8	5	4	3	2	1	(50)
The appearance of houses and buildings	8	5	4	3	2	1	(51)
The quietness of the area	8	5	4	3	2	1	(52)
How nice the neighbours are	8	5	4	3	2	1	(53)
Being close to shops	8	5	4	3	2	1	(54)
Nearness to places you need to go to	8	5	4	3	2	1	(55)
The way roads and streets are kept up	8	5	4	3	2	1	(56)
Being close to places for entertainment	8	5	4	3	2	1	(57)
Nearness to places for hobbies, pastimes or sports	8	5	4	3	2	1	(58)
The cleanness of the air	8	5	4	3	2	1	(59)

CARD 1

7 If you could change just one thing about living round here, which would you choose ?

REFER BACK TO 5b) IF NECESSARY AND REMIND OF ITEMS

Col./ Code	Skip to
(60-61)	

8 People from certain areas sometimes feel that some aspect of the area they live in gives rise to unpleasant symptoms or has a general bad effect on their health. Others feel there are certain factors they experience living in their particular area that have a favourable effect on their health.

How about you:

a) Do you consider there is anything in particular about living around here that has an undesirable effect on your health ?

Yes
No

(62)
1
2

b)

IF YES AT a)

SPECIFY PARTICULAR FACTOR _____

(63-64)

b) Is there anything in particular about living around here that has a desirable effect on your health ?

Yes
No

(65)
1
2

Q9

IF YES AT b)

SPECIFY PARTICULAR FACTOR _____

(66-67)

TIME :

CARD 1/2

		Col./ Code	Skip to
9a)	<p>When the weather is not too cold do you usually try to have the windows open or do you usually keep them closed?</p> <p>Keep open Keep closed</p> <p><u>IF KEEP CLOSED, ASK:</u></p> <p>b) Why is that ?</p> <p><u>PROBE "ANYTHING ELSE" UNTIL FINAL "NO"</u> Mentioned noise specifically Did not mention noise</p>	<p>(68)</p> <p>1 2</p> <p>(69)</p> <p>1 2</p>	<p>Q10 b)</p>
10a)	<p>For sleeping at night, how many months of the year would you say you have the windows open in your bedroom ?</p> <p>NUMBER OF MONTHS</p> <p><u>IF LESS THAN 12 MONTHS, ASK;</u></p> <p>b) Why is that ?</p> <p><u>PROBE "ANYTHING ELSE" UNTIL FINAL "NO"</u> Mentioned noise specifically Did not mention noise</p>	<p>(70-71)</p> <p>(72)</p> <p>1 2</p>	
11a)	<p>Are any of the windows in this house/flat double glazed ?</p> <p>Yes No</p> <p><u>IF YES, ASK:</u></p> <p>b) Why is that ?</p> <p><u>PROBE "ANYTHING ELSE" UNTIL FINAL "NO"</u> Mentioned noise specifically Did not mention noise</p> <p>SPARE</p> <p>Card 2 dup. {</p>	<p>(73)</p> <p>1 2</p> <p>(74)</p> <p>1 2</p> <p>(75-80)</p> <p>(1-3) (4-6) (7-8)</p>	<p>b) Q12</p>

Col./ Code	Skip to

In this study we want to find what different kinds of things people hear at home. We are also interested in finding out people's feelings about the things they hear. Some people like to hear certain things because they feel the atmosphere at home seems dead if things are too quiet, or because being too quiet makes them feel uneasy or lonely. Other people dislike some of the things they hear at home and regard them as noisy or too loud.

Firstly, we are interested in things you hear from some distance away. Even if you only hear something rarely, or it is very faint - we still want to know you hear it.

TIME

a) When you are indoors here at home can you ever hear ?

ASK THIS QUESTION FOR EACH ITEM LISTED BELOW. FOR EACH SOUND SOURCE CODED A AT (a) ASK (b) TO (f) BELOW, BEFORE REPEATING (a) FOR THE NEXT SOURCE. RECORD ANSWERS IN GRID.

	(a)		(b)					(c)	d)	(e)						(f)				
	EVER HEAR		How often per week (CARD C)							FEEL ABOUT SOUND (CARD D)	ANNOY	ACTIVITY INTERFERENCE							VIBRATION	
	Yes	No	Less than one	Few times 1-3 days	Many times 1-3 days	Few times 4-7 days	Many times 4-7 days					(i) STARTLE	(ii) WAKE-UP	(iii) TV/RADIO	(iv) CONVER	(v) SLEEP	(vi) DOORS/WINDOWS		Yes	No
Factory or plant hooters, sirens, whistles or bells	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	(26-35)
Church bells	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	(36-45)
Bells	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	(46-55)
Shooting or explosions from military ranges	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	(56-65)
Shooting on private land	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	(66-75)
																				SPARE (76-80)
Bird Scarers	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	(9-12)
Ice Cream van chimes or bells	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	(19-28)
Police, fire or ambulance sirens	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	(29-38)
Amplified music from discos, pubs or clubs	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	(39-48)
People shouting or screaming in or near discos, pubs or clubs	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	(49-58)
Burglar alarm bells	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	(59-68)

FOR EACH SOUND HEARD - ask b) to f)

- b) SHOW CARD C How Often do you hear ? RECORD IN GRID
- c) SHOW CARD D When you hear how do you feel ? RECORD IN GRID
- d) On the whole, when you hear does it bother or annoy you very much ? 4 RECORD IN GRID
 moderately ? 3
 only a little ? 2
 or not at all ? 1
- e) When you are indoors at home and hear does that ever: (i) Startle you ?
 (ii) Wake you up ? RECORD IN GRID
 (iii) Make it difficult for you to hear the TV or radio ?
 (iv) Interfere with conversation ?
 (v) Stop you getting to sleep ?
 (vi) Make you keep your doors & windows shut more than you otherwise would ?
- f) When you hear does that ever make your house or things in it vibrate or shake or rattle ? RECORD IN GRID

IF MORE THAN ONE SOURCE IS CODED A IN 15 a) ASK:

6. Of all these sounds you hear at home, which one bothers or annoys you the most ? -----

REFER BACK TO 15 a) IF NECESSARY AND REMIND OF SOUND SOURCES HEARD

TIME [] :

SPARE (71-80)

Dup. { (1-3)
(4-6)
CARD04 (7-8)

Col./ Code

17. We would like to turn to the sounds from various forms of transport that you may hear when at home.

a) When you are indoors here at home can you ever hear

ASK THIS QUESTION FOR EACH ITEM LISTED BELOW. FOR EACH SOUND SOURCE CODED A AT a) ASK b) TO f) BELOW, BEFORE REPEATING a) FOR THE NEXT SOURCE.

RECORD ANSWERS IN GRID.

	(a)		(b)					(c)	(d)	(e)												(f)		
	EVER HEAR		How often-per week (CARD C)							FEEL ABOUT SOUND (CARD D)	ANNOY	ACTIVITY INTERFERENCE												
	Yes	No	Less than one	Few times 1-3 days		Many times 1-3 days						(i) STARTLE		(ii) WAKE-UP		(iii) T.V./RADIO		(iv) CONVERSATION		(v) SLEEP			(vi) DOORS/WINDOWS		VIBRATION
Helicopters	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	1	2	1	2	(9-18)
Planes	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	1	2	1	2	(19-28)
Train hooter, horns or whistles	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	1	2	1	2	(29-38)
Other sounds from trains	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	1	2	1	2	(39-48)
Car, Van or Lorry horns	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	1	2	1	2	(49-58)
Car, Van or Lorry doors being slammed	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	1	2	1	2	(59-68)
Tyres or brakes screeching	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	1	2	1	2	(69-78)
																								SPARE (79-90)
																								Sup. { (1-3) (4-6) (7-8) CARDS
Car or Vans passing by	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	1	2	1	2	(9-18)
Mopeds or motorbikes	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	1	2	1	2	(19-28)
Lorries passing by	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	1	2	1	2	1	2	(29-38)

FOR EACH SOUND HEARD - ask b) to f)

- b) SHOW CARD C How often do you hear ? RECORD IN GRID
- c) SHOW CARD D When you hear how do you feel ? RECORD IN GRID
- d) On the whole, when you hear does it bother or annoy you very much ? 4
 moderately ? 3 RECORD IN GRID
 only a little ? 2 IN GRID
 or not at all ? 1

- e) When you are indoors at home and hear does that ever: (i) Startle you ?
 (ii) Wake you up ? RECORD IN GRID
 (iii) Make it difficult for you to hear the TV or radio ?
 (iv) Interfere with conversation ?
 (v) Stop you getting to sleep ?
 (vi) Make you keep your doors and windows shut more than you otherwise would ?

f) When you hear does that ever make your house or things in it vibrate or shake or rattle ? RECORD IN GRID

IF MORE THAN ONE SOURCE IS CODED A IN 17 a) ASK:

8. Of all these sounds you hear from transport, which one bothers or annoys you most ? -----

REFER BACK TO 17 a) IF NECESSARY AND REMIND OF SOUND SOURCES HEARD.

(31-40)

TIME :

Another group of things people sometimes hear when they are at home are due to their neighbours or neighbour's visitors. Thinking of the nearest 5 or 6 homes to your own, when you are indoors at home, can you ever hear

ASK THIS QUESTION FOR EACH ITEM LISTED BELOW. FOR EACH SOUND SOURCE CODED A AT a) ASK b) TO f) BELOW, BEFORE REPEATING a) FOR THE NEXT SOURCE.

RECORD ANSWERS IN GRID.

Footsteps from people moving around on floors or stairs in neighbours home

Slamming or banging doors inside a neighbours home

Neighbours working on a car or van

Neighbours carrying out other do-it-yourself work. SPECIFY

Neighbours telephone

Neighbours door bell or knocker

Neighbours electric light switches or plug sockets being used

A neighbours plumbing system including WC cistern

Neighbours dog barking

Any other pets neighbours have SPECIFY

Musical instruments being played in neighbours home

TV, radio or stereo in neighbours home

Neighbours children playing

People shouting or screaming in a neighbours home

Neighbours mowing their lawn

Neighbours vacuum cleaners

Anything else from these neighbours SPECIFY

IF RESPONDENT LIVES IN A BLOCK OF FLATS OR APARTMENTS:

Neighbours using rubbish disposal chutes

Lift doors opening or closing due to neighbours

	(a)		(b)					(c)	(d)	(e)						(f)						
	EVER HEAR		How often-per week (CARD C)							ACTIVITY INTERFERENCE												
	Yes	No	Less than one	Few times 1-3 days	Many times 1-3 days	Few times 4-7 days	Many times 4-7 days			FEEL ABOUT SOUND (CARD D)	ANNOY	(i) STARTLE	(ii) WAKE-UP	(iii) T.V./RADIO	(iv) CONVERSATION		(v) SLEEP	(vi) DOORS/WINDOWS	VIBRATION			
Footsteps from people moving around on floors or stairs in neighbours home	A	0	1	2	3	4	5			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	(61-70)
Slamming or banging doors inside a neighbours home	A	0	1	2	3	4	5			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	(71-80)
Neighbours working on a car or van	A	0	1	2	3	4	5			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	(9-18)
Neighbours carrying out other do-it-yourself work. SPECIFY	A	0	1	2	3	4	5			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	(19-28)
Neighbours telephone	A	0	1	2	3	4	5			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	(29-38)
Neighbours door bell or knocker	A	0	1	2	3	4	5			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	(39-48)
Neighbours electric light switches or plug sockets being used	A	0	1	2	3	4	5			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	(49-58)
A neighbours plumbing system including WC cistern	A	0	1	2	3	4	5			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	(59-68)
Neighbours dog barking	A	0	1	2	3	4	5			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	(69-78)
																						SPARE (79-80)
Any other pets neighbours have SPECIFY	A	0	1	2	3	4	5			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	(9-18)
Musical instruments being played in neighbours home	A	0	1	2	3	4	5			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	(19-28)
TV, radio or stereo in neighbours home	A	0	1	2	3	4	5			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	(29-38)
Neighbours children playing	A	0	1	2	3	4	5			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	(39-48)
People shouting or screaming in a neighbours home	A	0	1	2	3	4	5			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	(49-58)
Neighbours mowing their lawn	A	0	1	2	3	4	5			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	(59-68)
Neighbours vacuum cleaners	A	0	1	2	3	4	5			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	(69-78)
																						SPARE (79-80)
Anything else from these neighbours SPECIFY	A	0	1	2	3	4	5			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	(9-18)

(1-3)
(4-6)
(7-8)

SPARE
CARD G

SPARE
CARD B

Dup {
1-6
CARD
09
1-8

FOR EACH SOUND HEARD - Ask b) to f)

b) SHOW CARD C How often do you hear ? RECORD IN GRID

c) SHOW CARD D When you hear how do you feel ? RECORD IN GRID

d) On the whole, when you hear does it bother or annoy you ... very much ? 4
moderately ? 3
only a little ? 2
or not at all ? 1 RECORD IN GRID

e) When you are indoors at home and hear does that ever (i) Startle you ?
(ii) Wake you up ? RECORD IN GRID
(iii) Make it difficult for you to hear the TV or radio ?
(iv) Interfere with conversation ?
(v) Stop you getting to sleep ?
(vi) Make you keep your doors & windows shut more than you otherwise would ?

f) When you hear does that ever make your house or things in it vibrate or shake or rattle ? RECORD IN GRID

IF MORE THAN ONE SOURCE IS CODED A IN 21a) ASK:

22. Of all these sounds you hear from your neighbours, which one bothers or annoys you most ?

REFER BACK TO 21a) IF NECESSARY AND REMIND OF SOUND SOURCES HEARD

(39-49)

23. How the things you hear from your own household equipment or appliances.

a) In this house do you have a ?
ASK THIS QUESTION FOR EACH ITEM LISTED BELOW. FOR EACH APPLIANCE CODED A AT a) ASK b) TO f) BELOW, BEFORE REPEATING a) FOR THE NEXT APPLIANCE.
RECORD ANSWERS IN GRID.

	(a)		(b)					(c)	(d)	(e)					(f)		Col./Code	
	EVER HEAR		How often-per week (CARD C)							ACTIVITY INTERFERENCE					VIBRATION			
	Yes	No	Less than one	Few times 1-3 days	Many times 1-3 days	Few times 4-7 days	Many times 4-7 days			FEEL ABOUT SOUND (CARD D)	ANNOY	(i) STARTLE	(ii) WAKE-UP	(iii) T.V./RADIO	(iv) CONVERSATION	(v) SLEEP		Yes	No
Washing Machine	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	(41-46)
Vacuum Cleaner	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	(50-54)
Sewing Machine	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	(59-64)
Fridge/Fridge Freezer	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	(68-74)
																		SPARE (77-84)
Freezer (only)	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	(9-17)
Liquidiser/Blender	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	(18-26)
Central Heating System	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	(27-35)
Plumbing system that vibrates a lot	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	(36-44)
Any other appliance or piece of household equipment you regard as particularly noisy. SPECIFY MOST NOISY	A	0	1	2	3	4	5			1	2	1	2	1	2	1	2	(45-52)

FOR EACH APPLIANCE IN THE HOUSE ASK b) to f)

b) SHOW CARD C How often do you hear your ? RECORD IN GRID

c) SHOW CARD D When you hear your how do you feel ? RECORD IN GRID

d) On the whole, when you hear your does it bother or annoy you very much ? 4
 moderately ? 3 RECORD IN GRID
 only a little ? 2
 or not at all ? 1

e) When you are indoors at home and hear your does that ever: (i) Startle you ? RECORD IN GRID
 (ii) Wake you up ? RECORD IN GRID
 (iii) Make it difficult for you to hear the TV or radio ?
 (iv) Interfere with conversation ?
 (v) Stop you getting to sleep?

f) When you hear your does that ever make your house or things in it vibrate or shake or rattle ? RECORD IN GRID

IF MORE THAN ONE APPLIANCE IS CODED A IN 23a) ASK:

4. Of all these sounds you hear from your household appliances, which one bothers or annoys you most ? _____
 REFER BACK TO 23a) IF NECESSARY AND REMIND OF APPLIANCES PRESENT IN HOME

TIME : []

5. Would you say that you were more sensitive or less sensitive to noise than other people ?

More 3
 Less 1
 (Same) 2

CLASSIFICATION SECTION

		CARD 10	Col./ Code	Skip Eq
26.	Now just a few questions about you and your household.			
a)	How many people live in your household, including yourself ?	NUMBER	<input type="text"/> <input type="text"/>	(57-58)
b)	How many are children aged <u>4 or less</u> ?	NUMBER	<input type="text"/> <input type="text"/>	
c)	How many are children aged <u>5 to 17</u> ?	NUMBER	<input type="text"/> <input type="text"/>	(59-60)
d)	How many of the adults are aged <u>18 to 59</u> ?	NUMBER	<input type="text"/> <input type="text"/>	(61-62)
e)	How many people are aged <u>60 or over</u> ?	NUMBER	<input type="text"/> <input type="text"/>	(63-64)
	CHECK THAT ENTRIES AT b) - e) TALLY WITH ENTRY AT a)			
27.	Is this accommodation owned or rented? <u>PROBE FOR DETAILS</u>			(65)
	Owner occupier			1
	Rent, private furnished			2
	Rent, private unfurnished			3
	Rent, Council/New Town Corporation			4
	Housing Association			5
	Tied to employment			6
	Other (SPECIFY) _____			
28.	TYPE OF ACCOMMODATION:			(66)
	<u>Complete house</u> - detached			1
	- semi-detached			2
	- terrace-end			3
	- terrace-middle			4
	<u>Bungalow</u> - detached			5
	- semi-detached			6
	<u>Self-contained flat/maisonette</u> - purpose built			7
	- converted			8
	<u>Rooms or 'flat'</u> (i.e. not self contained)			9
	Other (SPECIFY) _____			
29.	SEX OF RESPONDENT:			(67)
	Male			1
	Female			2

	CARD 10	Col./ Code	Skip to
30.	Are you married, single, widowed, divorced or separated ?	Single Married Separated/widowed/divorced	(68) 1 2 3
31.	What was your age last birthday ?	EXACT AGE	(69-70) |
32.	How old were you when you finished your full-time education at school or college ?	Under 15 15 16 17 18 19 20 or over Still in full-time education	(71) 1 2 3 4 5 6 7 8
33.a)	Are you in paid employment at present ? <u>PROBE FOR ALL DETAILS</u>	Working full-time (31 or more hrs) Working part-time (10-30 hrs) Seeking work Retired/sick Non-working housewife Full-time student Other (SPECIFY) _____	(72) 1 2 3 4 5 6 7 b) b) Q.34 Q.34 Q.34 Q.34
b)	<u>IF "WORKS" - CODES 1 OR 2 AT a)</u> Are you a shiftworker	No Yes, occasional nights Yes, permanent nights Yes, day or evening shifts only Yes, other (SPECIFY) _____	(73) 1 2 3 4 5

	CARD 11	Col./ Code	Skip to
37.a)	Had you heard about this study before this interview from friends, neighbours, or anyone else ? No Yes, from neighbours Yes, other people (DESCRIBE) _____ Yes, from elsewhere (DESCRIBE) _____ b) .IF "YES" - CODES 2-4 AT a) Did they mention that much of the interview was about sounds and things you could hear ? Yes No	(9) 1 2 3 4 (10) 1 2	Q.38 b) b)
38.	To achieve worthwhile scientific aims it will be necessary to collect some measurements of noise levels existing in the homes of people who answer this questionnaire. Would you be willing to allow a researcher to call in the future and make some noise measurements inside your home ? Yes No	(11) 1 2	
39.	<p style="text-align: center;"><u>END OF INTERVIEW</u></p> Time interview ended <input type="text"/> : <input type="text"/> Length of interview in minutes <input type="text"/> <input type="text"/> <u>Day of week</u> Monday Tuesday Wednesday Thursday Friday Saturday Sunday Date of interview: / /	(12-14) (15) 1 2 3 4 5 6 7	
	<p><u>NOW COMPLETE PAGE 22</u></p>		

