Risks of Occupational Vibration Exposures

VIBRISKS

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1 Introduction

This document summarises the protocol that have been used by partners in VIBRISKS during the conduct of longitudinal and case-control epidemiological studies of whole-body vibration (WBV). Notes on the conduct, analysis and interpretation of case-control studies are given in Appendix 1. Moreover, Appendix 6 to this document also summarises the protocol for acquisition of WBV exposure data that have been used in VIBRISKS experimental studies as input for FE-modelling in order to predict spinal stress.

The longitudinal and case-control epidemiological studies on WBV in VIBRISKS involves, at baseline as well as at regular follow-ups, health and postural stress assessments through administration of questionnaires, WBV exposure measurement, exposure dose calculations and risk assessment.

The various partners within VIBRISKS have been conducting studies on different categories of vehicle drivers why the study protocol used by each partner have differered slightly. Nevertheless, there are enough similarities for adeqvate comparisons of results.

It should aslo be noted that the methods that are specified in this document are primarily developed for the studies being conducted within VIBRISKS. It is therefore recognised that further development may be appropriate in some areas. The guidance may thus be further developed in the light of experience gained in using the methods defined.

2 General aspects on WBV Exposure

The *determinants* of WBV exposure, such as information on kind of vehicles or machines driven, driving environment and ground surface, type of driver seat, and behavioral factors like style and speed of driving, adjustment and use of the seat shall be noted as a part of the measurement protocol.

The vibration magnitude should be measured during representative working conditions in three orthogonal axes on the supporting seat surface beneath the ischial tuberosities of the driver in accordance with the International Standard ISO 2631. Measurement should be recorded as frequency un-weighted acceleration time histories in the x-, y- and z-direction.

The *duration* of the exposure should be determined by estimation of daily, weekly and yearly exposure to WBV based on data obtained from the VIBRISKS self-administered questionnaire (Appendix 4 and 5) and/or as a part of the measurement protocol. If available, company

records on individual exposure to WBV can be used.

3 Reported and observed exposure durations

It is not easy to obtain an accurate estimate of the duration of exposure to whole-body vibration. There can be differences between actual and estimated durations of exposure. For research purposes, it is desirable to obtain accurate estimates of the durations of exposures to whole-body vibration. This may require direct observation or indirect measurement of the duration of vibration exposure. The discrepancy between actual and estimated durations of exposure has not been recognized in the evolution of dose-response relationships in guidance on the risks arising from whole-body vibration. In consequence, since actual exposures are often less than estimated exposures, accurately measured exposure durations may underestimate the risk if they are compared with current guidance.

4 Measures of vibration dose

Appendix 2 to this document specifies the method of calculating 15 alternative measures of dose for exposures to whole-body vibration in the current job. Two additional measures of doses for past and leisure exposure are also specified. The measures include those in past and current whole-body vibration standards, but also include some additional measures to assist the development of a better understanding of the relative importance of vibration magnitude, vibration frequency, vibration direction, and duration of vibration exposure. This measures of WBV doses have been used in the longitudinal and case-control studies of whole-body vibration conducted within VIBRISKS.

5 Simple table summarizing vibration exposures and symptoms

Appendix 3 list an example summary table that combines typical summary descriptions of the exposed population and their exposures to whole-body vibration with typical summary descriptions of relevant aspect of their health. The table in Appendix 3 is given for the purposes of illustration only since the actual measures will vary according to the objectives of each study.

6 Suggested key questions to be addressed by the data analysis

1. Prevalence of musculoskeletal symptoms in the neck, shoulder, and low back (the last 7 days, the last 12 months) in the cross-sectional survey of the study population
2. The VAS score for the musculoskeletal pains and the Roland Morris score.
3. Incidence of musculoskeletal symptoms at the follow up survey(s) of the study population
4. Comparison of VAS and Roland-Morris scores results between the cross-sectional and follow up survey(s)
5. Metrics of vibration exposure according to the protocol for dose calculations.
6. Ergonomic risk factors used according to WBV questionnaire
7. Possible exposure-response (for symptoms) or dose-effect (for score results) relationships at the cross-sectional survey
8. Possible exposure-response (for symptoms) or dose-effect (for score test results) relationships for the changes in the outcomes over time during the follow up period(s)
9. Contribution of the vibration and the ergonomic exposure factors (vibration dose measures and postures-lifting) used to construct doses to the prediction of the outcomes (symptoms and score results) over time, adjusted for personal, social and health covariates
10. Work ability "How much time did you have to take off work due to back/leg pain? (neck, shoulder)" in the cross-sectional studies and change of work ability at follow-ups.

7 Questionnaires

Four questionnaires are provided: two self-administered questionnaires for initial and follow-ups for the longitudinal studies (Appendix 4A and 4B, respectively) and two corresponding questionnaires for case control studies (Appendix 5A, 5B).

Questionnaires includes basic questions related the headings: *About your self*, *Current work*, *Past work*, *Your health*, *Other symptoms and feelings*. The whole-body vibration self-administered questionnaires, Initial assessment and Follow-up," for longitudinal studies contain 17 and 16 pages. The case control study questionnaire for "cases" is 15 pages and for "controls 12 pages.

In all epidemiological studies, past and present whole-body vibration and ergonomic exposure and concomitant factors (posture, individual characteristics, climate /coldness in the cabin) must be assessed in terms of job title(s), type of vehicles used, duration of exposure, and the age during the exposure.

Translated versions of the self-administered questionnaires for longitudinal studies in to Dutch,

Italian and Swedish are posted on the VIBRISKS webbsite (www.humanvibration.com).

8 References

ISO 2631-1, Mechanical vibration and shock. Evaluation of human exposure to whole-body vibration. Part 1: General requirements.

ISO/DIS 2631-5, Mechanical vibration and shock. Evaluation of human exposure to whole-body vibration. Part 5: Methods for evaluation of vibration containing multiple shocks.

prEN 14253:2002(E), Mechanical vibration. Measurement and calculation of occupational exposure to whole-body vibration with reference to health. Practical guidance.

APPENDIX 1

Notes on the conduct, analysis and interpretation of case-control studies

Notes prepared by:

Keith Palmer

Notes on the conduct, analysis and interpretation of case-control studies

Design issues

Cohort or longitudinal studies involve enumerating one or more groups of individuals at baseline and following them through time with ascertainment of outcome(s). Typically, the incidence risk or rate of a given disease is compared among one group with exposure and one without, or within exposed subgroups according to different levels of exposure. By contrast, a case-control study seeks to assemble cases at its starting point. Instead of estimating the risk of disease, the fraction with exposure is compared in those who fulfil the case definition and a reference group, chosen to give representative information on exposure in the population that gave rise to the cases. The comparison of exposure proportions in cases and referents can be used to approximate the incidence rate ratio for exposure - ie to give a similar estimate of relative effect to that in the cohort study. Conceptually, a case-control study can be thought of as nested within a hypothetical cohort, the cases being all of the disease occurrences within the cohort and the controls, a random selection of non-cases. Cases can be prevalent (eg identified from a list of patients under continuing care), or incident (eg new cases presenting for care). Prevalent cases have the relative disadvantage that associations could reflect risk factors for persistence or recovery, rather than disease occurrence, and in practice most case-control studies seek to recruit cases as they present.

Strengths and weaknesses (vs. cohort studies)

A case-control study has certain pros and cons relative to the cohort design. As the starting point is cases, without any waiting time for disease occurrence, the design is an efficient way to assemble adequate study material when a disease is rare or of long latency. Neither circumstance applies to low back pain. However, cases in a case-control study also tend to be characterised in more detail clinically in terms of clinical tests than is possible within cohort studies (thus, for example, cases from WP5.2 were characterised in terms of MRI images of the lumbar spine, and this material was assembled as a part of routine clinical care without additional research costs).

One disadvantage is that, as disease has already occurred, exposure assessment has to be retrospective - with the potential for reporting or recall bias, or simple errors of memory; exposure characterisation may be less detailed than when measured prospectively in a planned way. Another challenge is in choosing 'representative' controls - the need being to identify a comparison group that is representative in terms of the specific exposures of interest. In practice, the method of selection needs to be independent of the exposure of interest (eg it

would not be appropriate, in studying whole-body vibration, to select controls from a haulage company with a preponderance of vocational drivers). Cases typically come from hospitals, so controls are usually chosen either from the communities that the hospitals serve or other patients attending those hospitals with diseases not considered related to the exposure of interest. (If in doubt, subjects with a mixture of control diagnoses are chosen.)

While case-control studies have some potential limitations, so do cohort studies - including generally higher costs, a longer waiting time, and the potential for bias in certain circumstances - for example, when exposure-outcome associations differ in those lost to follow-up, or where the assessment of outcome is systematically influenced (biased) by knowledge of exposure status. Achieving full follow-up and ensuring blinded assessment of outcome represent challenges for the cohort design.

It may thus be seen that potential biases tend to differ between case-control and cohort studies. The capacity to draw causal inferences can be strengthened, therefore, if similar associations can be demonstrated under the different study designs.

Questionnaires and other measures

Necessarily there have to be differences in the choice and design of questionnaires and measuring instruments between case-control and cohort studies. Thus, one section of the control questionnaire may involve corroborating that a control is eligible and not in fact a case; while the case questionnaire will confirm and characterise relevant symptoms. The time window of enquiries about exposure is also likely to differ from that of a cohort study. But cases and controls complete a common set of questions in relation to exposure and potential confounders. (In WP5 some of the differences between case-control and cohort questionnaires reflect the different requirements.)

Analysis

In general a case-control study provides no direct estimate of incidence, as the starting point is a group of cases rather than a group of disease free individuals at risk of becoming cases. The key measure is relative risk, estimated as the exposure odds ratio (which has the same value as the disease odds ratio). Typically, the log odds of the outcome (logit), as the dependent variable, is modelled, assuming a linear relation with one or several independent or explanatory variables. Further details on the planning, conduct, analysis and interpretation of case-control studies can be found in: Schlesselman JJ, Case-control Studies: Design, Conduct, Analysis. Oxford University Press, New York, 1982.

APPENDIX 2

Measures of doses for whole-body vibration

From VIBRISKS Working Document WP4-N19 prepared by:
Michael Grifin, Massimo Bovenzi

Introduction

This document specifies the method of calculating alternative measures of dose for exposures to whole-body vibration to be used in the epidemiological studies of whole-body vibration within VIBRISKS.

The methods are defined here for the studies being conducted within VIBRISKS but it is recognised that further development is appropriate in some areas. The guidance may be further developed in the light of experience gained in using the methods defined.

Sources of data

The information from which dose measures are calculated are of two types:

(i) Measures, or estimates, of vibration magnitude, and

(ii) Measures, or estimates, of exposure duration.

Vibration magnitude

Measurement of vibration magnitude

The vibration magnitude should be measured in three orthogonal axes on the supporting seat surface beneath the ischial tuberosities of the driver in accord with ISO 2631.

Frequency weighting

The vibration should be evaluated using the frequency weightings defined in ISO 2631 (1997):

(i) With frequency weighting W_d, for the *x*-axis, and W_d, for the *y*-axis so as to produce $a_{x,w}$, $a_{y,w}$.

(ii) With frequency weighting W_k, for the *z*-axis so as to produce $a_{z,w}$.

Averaging methods: r.m.s. and VDV

The r.m.s. value should be calculated using true integration:

$$a_{r.m.s.} = \left[\frac{1}{T} \int_{t=0}^{t=T} a^2(t)\,dt \right]^{1/2}$$

The r.m.q. value should also be calculated using true integration:

$$a_{r.m.q.} = \left[\frac{1}{T} \int_{t=0}^{t=T} a^4(t)\,dt \right]^{1/4}$$

In order to simplify Table 3 below, the lifetime dose formulae are the same for both second power (i.e. r.m.s.) and fourth power averaging (r.m.q. and VDV) methods. Hence the calculations are based on r.m.s. and r.m.q. (rather than r.m.s. and VDV measures). The r.m.q. value can be calculated from a measured VDV by dividing the VDV by the fourth root of the exposure duration (in seconds).

Summation over axes

For the calculation of the dose using r.m.s. measures, the root-sums-of-squares (sometimes referred to as the 'vector sum' or 'total value') of the r.m.s. values should be used to obtain for each machine or vehicle, *n*, the weighted acceleration, $a_{w(n)}$:

$$a_{ws(n)} = (1.4a^2_{x,w} + 1.4a^2_{y,w} + a^2_{z,w})^{½}$$

For the calculation of the dose using r.m.q. measures, the root-sums-of-quads of the r.m.q. values should be used to obtain for each machine or vehicle, *n*, the weighted acceleration, $a_{w(n)}$:

$$a_{wq(n)} = (1.4a^4_{x,w} + 1.4a^4_{y,w} + a^4_{z,w})^{¼}$$

It is recommended to also calculate a measure of the variability in the value of $a_{w(n)}$ and consider the influence of variability on the measures of dose calculated below.

Notes:

1. The use of root-sums-of-squares differs from the EU Physical Agents Directive where the axis with the greatest weighted acceleration is used. This is problematic for epidemiological research since different (and unknown) axes will contribute to the values used in the statistical analysis. Nevertheless, it is recommended to also perform the analysis using the 'worst axis' within individual studies where this is practical.
2. When deciding on the 'worst axis' it is suggested that the axis multiplying factors of 1.4 should be used. Optionally, the calculations could be repeated without the axis multiplying factors – since many consider them inappropriate.
3. In all the above cases, we suggest specifically stating that the axis multiplying factors have been used (or not) so as to avoid ambiguity and confusion.

Estimation of vibration magnitude

It may be necessary to estimate some vibration magnitudes without making measurements in the specific machine or vehicle. The source of the data should be specified when such estimates are used.

Exposure duration

It may not be easy to obtain an accurate estimate of the duration of vibration exposure. There

can be differences between actual and estimated durations of exposure, and this has not been recognised in the evolution of dose-response relationships in current guidance.

Measurement of exposure duration

It is desirable to obtain objective measures of the duration of vibration exposure. For whole-body vibration, exposure durations can be measured with a stop watch.

It is recommended to compare measured exposure durations with self-reported exposure durations using the relevant question in the self-completed questionnaire.

Estimation of exposure duration

The exposure duration may be estimated from self-reported exposures using the VIBRISKS questionnaires.

The basic questionnaire asks for the start of the current job (question 7) and the hours and minutes for each vehicle that has been driven (question 17). The current questionnaire may not directly provide all the detail required (e.g. it does not record the date the questionnaire is completed, it does not allow for different starting dates for different machines in the same job, it does not identify the number of weeks of exposure in the year). Some local modifications of the basic questionnaire overcome these deficiencies.

Unless otherwise known, it should be assumed:

(iii) that all specified machines were used from the start to the end of the job,

(iv) there are 40 working weeks in the year.

Sources of error

1. Workers may be confused between:
    - (i) duration of exposure to whole-body vibration,
    - (ii) duration of sitting in the machine
    - (iii) duration of work that primarily involves using the machine
2. Workers may find it difficult to give an average duration and may report:
    - (i) the greatest exposure duration
    - (ii) the greatest common exposure duration
    - (iii) their estimate of an average exposure duration
3. The cumulative durations calculated from the questionnaire may not be reasonable. For example, the durations may correspond to more than 8 hours per day when this is known to be not correct.
4. Exposure to whole-body vibration from the use of machines or vehicles may not occur on every day.

Calculation of dose

The means of calculating alternative doses is given below with examples. The values are shown with excessive accuracy to assist the checking of calculations.

Current job

Table 1 summarises the information on the duration of exposure to whole-body vibration that should be obtained for each individual.

Table 1. Exposure duration for each vehicle or machine *i.*

Machine, n	n	Start year D1	End Year D2	Hours per week (Q17)	Hours per day	Weeks per year	Number of years	Total hours per machine
				$t_{h(n)}$	$t_{d(n)}$	$t_{w(n)}$	$t_{y(n)}$	$t_{T(n)}$
Lift truck A	1	1975	2000	15	3	40	25	15000
Mobile crane B	2	1980	2005	7.5	1.5	40	25	7500

Table 2 summarises the information on the magnitude of whole-body vibration that should be obtained for each vehicle or machine used by each individual.

Table 2. Vibration magnitudes

Machine	r.m.s.			r.m.q.			Overall (with 1.4 factor)	
	$a_{x,w}$	$a_{y,w}$	$a_{z,w}$	$a_{x,w}$	$a_{y,w}$	$a_{z,w}$	r.s.s. (a_{wsi})	r.s.q. (a_{wqi})
Lift truck A	0.3	0.28	0.95	0.58	0.57	1.89	1.110208989	1.920374554
Mobile crane B	0.06	0.07	0.29	0.17	0.19	0.87	0.317427157	0.873102167

Table 3 summarises the dose measures that should be calculated for each individual using the information on individual exposure duration (in Table 1) and vehicle or machine vibration (Table 2).

Table 3. Dose measures to be calculated (using information from Tables 1 and 2 as an example).

Dose	Formula	Value	Description	Units
Dose 1	$T = \sum t_{Ti}$	22500	Total hours exposure	h
Dose 2	$\sum a_{wsi}.t_i$	19033.83852	r.m.s. at total dose	$ms^{-2}.h$
Dose 3	$\sum a_{wsi}^2 t_i$	19244.16	r.m.s. a^2t total dose	$m^2s^{-4}.h$
Dose 4	$\sum a_{wsi}^4 t_i$	22864.35454	r.m.s. a^4t total dose	$m^4s^{-8}.h$
Dose 5	$\sum a_{wqi}.t_i$	35353.88456	r.m.q. at total dose	$ms^{-2}.h$
Dose 6	$\sum a_{wqi}^2 t_i$	61034.88185	r.m.q. a^2t total dose	$m^2s^{-4}.h$
Dose 7	$\sum a_{wqi}^4 t_i$	208360.6281	r.m.q. a^4t total dose	$m^4s^{-8}.h$
Dose 8	$\lvert[(\sum a_{wsi}^2 t_i)/(\sum t_i)]^{½}\rvert_{max}$	1.110208989	Max r.m.s. any machine	ms^{-2}
Dose 9	$\lvert[(\sum a_{wqi}^4 t_i)/(\sum t_i)]^{¼}\rvert_{max}$	1.920374554	Max r.m.q. any machine	ms^{-2}
Dose 10	$Y = \lvert D_2 - D_1\rvert_{max}$	30	Total years exposure	y
Dose 11	$\lvert t_{d(n)}\rvert_{max}$	3	Max daily exposure each machine	hours
Dose 12	$A(8) = \lvert(\sum a_{wsi}^2 .t_{di}/T_{(8)})^{½}\rvert_{max}$	0.679861383	Max r.m.s. *A*(8) each machine	ms^{-2}
Dose 13	$VDV = \lvert a_{wqi}.(t_{di}.60.60)^{¼}\rvert_{max}$	19.576808	Maximum daily VDV any machine	$ms^{-1.75}$
Dose 14	$A(8) = (\sum a_{wsi}^2 .t_{di}/T_{(8)})^{½}$	0.137449991	Current r.m.s. *A*(8)	ms^{-2}
Dose 15	$VDV = \lvert a_{wqi}.(t_{di}.60.60)^{¼}\rvert_{current}$	7.484512298	Current daily VDV	$ms^{-1.75}$
Past exposure	Hours of exposure to whole-body vibration in previous jobs (see Section 3.2).	See questionnaire	Hours exposure to WBV in previous jobs (Section 3.2).	h
Leisure exposure	Hours of exposure to whole-body vibration in leisure (see Section 3.3).	See questionnaire	Hours exposure to WBV in leisure (Section 3.3).	h

Past jobs

Question 24 in the standard VIBRISKS self-completed questionnaire provides information on years of using specified machines, such as Car or van, Bus or lorry, Motorcycle, Fork-lift truck, Tractor, Loader, Dump or Excavator, Other large vehicle (describe).

The total hours of exposure for the above should be estimated and summed and provided as a single value (see Table 3).

The standard VIBRISKS questionnaire does not provide sufficient information to calculate the total hours of exposure in previous jobs. It provides information on the type of vehicle driven and the years of employment. There is no information about duration of driving per day, or per week, or the number of weeks in the year. The additional information might be added to future questionnaires.

Leisure exposure

The standard VIBRISKS questionnaire provides minimal information on sport resulting in exposure to vibration and leisure driving (in miles per year).

It is suggested that the total hours of exposure to vibration during leisure should be estimated and summed and provided as a single value (see Table 3).

The standard VIBRISKS questionnaire does not provide sufficient information to calculate with any accuracy the total hours of exposure to vibration in leisure jobs. There is no information about duration of leisure driving per day, or per week, or the number of weeks in the year. The additional information might be added to future questionnaires.

Conclusions

The information in Table 3 is suggested as the information that should be calculated and exchanged between partners.

APPENDIX 3

Example summary table

Population	**FORESTRY VEHICLE DRIVERS**				
Number exposed	250				
Vehicles	Harwarder	Forwarder	Mounder	Snowmobile	4 wheeler
From WBV dose calculation (m/s^2 r.m.s):					
Average $a_{x,w}$	0.25	0.5	0.7	0.7	0.7
Average $a_{y,w}$	0.4	0.8	1.1	0.7	0.7
Average $a_{z,w}$	0.3	0.6	0.6	0.8	0.8
Number indicated driving	208	170	12	16	6
Average daily duration (minutes)	480	300	60	15	20
SD daily duration	146	176	15	47	20
Max daily duration	720	780	57	180	60
Min daily duration	12	12	15	12	6
Average years of exposure for all vehicles					19.2
SD years of exposure for all vehicles					12.4
Max years of exposure for all vehicles					49.3
Min years of exposure for all vehicles					0.2
Percent with more than 1 year of occupational exposure to WBV prior to current job					22 %
From questionnaire (symptoms):					
% with low back pain in last 7 days					32.2 %
% with low back pain in last 12 months					57.9 %
VAS score for lower back					3.3/10
Roland disability scale score (response rate 41%)					3.8/24
% with neck pain in last 7 days					38.6 %
% with neck pain in last 12 months					54.3 %
VAS score for neck pain					3.8/10
% with shoulder pain in last 7 days					26 %
% with shoulder pain in last 12 months					39.5 %
VAS score for shoulder pain					3.9/10

APPENDIX 4A.

Self-administered questionnaire for longitudinal studies – Initial Questionnaire

From VIBRISKS Working Document WP4-N5 prepared by:
Carel Hulshof, Keith Palmer, Ivo Tiemessen, Mats Hagberg, Tohr Nilsson,
Ronnie Lundström, Massimo Bovenzi, Jos Verbeek

SECTION 1: Personal and general information

Serial number |__|__|__|__|

Name: ____________________________ Surname: ___________________________________

Address: ____

____

Post Code: |__|__|__|__|__|__|__|

day / month / year
Date of birth _________________ Sex: M _____ F _____ Country of birth and raised __________________

Height: _____ ft/m _____ in/cm Weight: _____ lbs./kg

Marital Status: Single ☐ Married ☐ Divorced/Separated ☐ Widowed ☐

How many school years have you completed? Less than 6 yr ☐ 7-12 yr ☐ more than 12 yr ☐

---

1. How often each week do you engage in any exercise program or sports?

   Never ☐ Less than 1 time ☐ 1 to 2 times ☐ 3 times or more ☐ Everyday ☐

2. Do you smoke or have you ever smoked? No ☐ Yes ☐

3a. If yes, when did you start smoking regularly? 19____

3b. Do you still smoke? No ☐ Yes ☐

3c. If no, when did you give up to smoke? 19_____

3d. If yes, how much did/do you smoke?
   Cigarettes per day: ☐
   Cigars per day: ☐
   Pipe/rolling tobacco g per day: ☐

4. Do you drink alcoholic beverages? (wine, beer, etc.) No ☐ Yes ☐

4a. How much do you drink daily? ☐ 0-1 unit ☐ 2-3 units ☐ more than 3 units

4b. How much do you drink weekly? ☐ 1-3 units ☐ 4-6 units ☐ more than 6 units

(1 unit = ½ pint of beer, a glass of wine, or single spirit)

SECTION 2: Occupational history

CURRENT JOB

5. What is your current occupation?

 ____

6. In what industry (e.g. farming, shipyard, insurance) do you carry out this occupation?

 ____

7. When did you start this job? |__|__| *month* |__|__|__|__| *year*

ACTIVITIES IN YOUR JOB

Posture

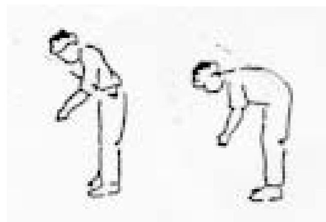
8. Does an average working day involve walking and standing?

If No, please go to question 9 No ☐ Yes ☐

8a). If Yes, If you add together all the time in an average working day that you spend walking and standing, how many hours does that make?

Less than an hour ☐ 1-3 hours ☐ More than 3 hours ☐

9. Does an average working day involve bending as shown below?



No ☐ Yes ☐

If No, please go to question 10

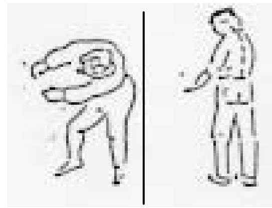
9a) .If Yes, how long during an average working day do you work in a position with your trunk bended between 20 and 40° ?

Less than 1 hour ☐ 1-2 hours ☐ More than 2 hours ☐

9b).If Yes, how long during an average working day do you work in a position with your trunk bended more than 40° ?

Less than ½ hour ☐ ½-2 hours ☐ More than 2 hours ☐

10. Does an average day in the job involve twisting as shown below?



No ☐ Yes ☐

If No, please go to question 11

10a). If Yes, how long during an average working day do you twist in a position with your trunk bended between 20 and 40° ?

Less than 1 hour ☐ 1-2 hours ☐ More than 2 hours ☐

10b). If Yes, how long during an average working day do you work in a position with your trunk bended more than 40° ?

Less than ½ hour ☐ ½-2 hours ☐ More than 2 hours ☐

11. Does an average day in the job involve working with your arms raised and your hand held above shoulder height?

No ☐ Yes ☐

If no, please go to question 12

11a). If you add together all the time in an average working day that you spend working with your arms raised and your hand held above shoulder height, how many hours does that make?

Less than an hour ☐ 1-3 hours ☐ More than 3 hours ☐

Digging

12. Does an average working day involve digging or shoveling? No ☐ Yes ☐

If No, please go to question 13

12a). If you add together all the time in an average working day that you spend digging and shoveling, how many hours does that make?

Less than an hour ☐ 1-3 hours ☐ More than 3 hours ☐

Sitting

13. Does an average working day involve sitting **(other than when driving)** for longer than three hours at a time?

No ☐ Yes but I **can** get up and move around when I want to ☐ Yes, and I **cannot** get up and move around even if I want to ☐

Lifting

14. Do you regularly have to load or unload the vehicle(s) you drive by moving heavy materials or equipment by hand?

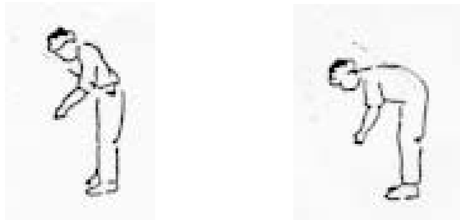
No ☐ Yes ☐

15. How many times in an average working day do you lift loads greater than 15 kg (30 lbs) (comparable with 24 bottles of beer in a crate, an average child of three or an small suitcase with belongings)?

Not at all ☐ 0-15 minutes ☐ 15 - 45 minutes ☐ More than 45 minutes ☐

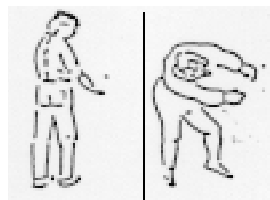
If No at all, please go to question 16

15a). How many times in an average working day **do you lift such a load** whilst your back is in a bent position as shown?



Not at all ☐ 1-10 times ☐ More than 10 times ☐

15b). How many times in an average working day **do you lift such a load** whilst your back is in a twisted or bent and twisted position as shown?



bent and twisted twisted

Not at all ☐ 1-10 times ☐ More than 10 times ☐

Driving

16. Did or do you drive any kind of vehicle in your current job? (i.e. car, bus, truck, train, earth moving machine, other)

No ☐ Yes ☐

if No, go to question 20

17. Which of the following vehicles do you normally drive in the job, and for how many hours per week on average?

	Vehicle	*Tick if driven in the job (✓)*	*Roughly how many hours per week do you drive this vehicle on average?*
a)	Car or van (do **not** include journeys to and from work)	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
b)	Lorry, bus or coach (as a driver, **not** a passenger)	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
c)	Motorcycle (do **not** include journeys to and from work)	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
d)	Fork lift truck	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
e)	Tractor	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
f)	Loader	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
g)	Dumper or excavator	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
h)	Other large off road vehicle (eg harvester, armoured tank)	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
i)	Other large on road vehicle (eg ambulance, fire engine)	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*

18. Do you ever have to drive with your back bent forward or twisted in the job?

Never ☐ Seldom ☐ Often ☐

19. Do you experience discomfort by mechanical vibration or shock in your work?

vertical vibration	No ☐	Yes ☐
fore/aft vibration	No ☐	Yes ☐
side-to-side vibration	No ☐	Yes ☐

YOUR VIEWS ABOUT YOUR JOB

20. In your job, do you have a choice in deciding:

		Never/almost never	*Seldom*	*Sometimes*	*Often*
a)	**How** you do your work?	☐	☐	☐	☐
b)	**What** you do at work?	☐	☐	☐	☐
c)	Your work timetable and breaks?	☐	☐	☐	☐

21. When you have difficulties in your work, how often do you get help and support from your colleagues or immediate line manager?

Not applicable ☐ Never ☐ Seldom ☐ Sometimes ☐ Often ☐

22 How satisfied have you been with your job as a whole, taking everything into consideration?

Very dissatisfied ☐ Dissatisfied ☐ Satisfied ☐ Very satisfied ☐

OTHER JOBS YOU MAY HAVE HELD

*Complete this section **only** if you have held other jobs in the past. **Otherwise go to Section 3, page 9.***

23. Did your previous job(s) involve: prolonged sitting? No ☐ Yes ☐

heavy physical demands? No ☐ Yes ☐

24. We are interested in your previous work – including, the kind of job, when it was done, and whether or not it involved professional driving. Please fill in the table below to show **all of the jobs you've held for a year or more**.

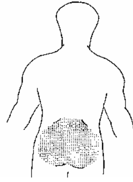
Ignore the job you may have told us about in Question 17. But include all the other jobs held for a year or more, beginning with the first job after leaving school or higher education.

Age started	Age stopped	Occupation	Which vehicle(s) did you drive professionally in the job? (✓) *(Do not include journeys to and from work)*								
			None	Car or van	Bus or lorry	Motor-cycle	Fork-lift truck	Tractor	Loader	Dump or excavator	Other large vehicle (describe)
☐☐ *age in years*	☐☐ *age in years*	____	☐	☐	☐	☐	☐	☐	☐	☐	☐ ____
☐☐ *age in years*	☐☐ *age in years*	____	☐	☐	☐	☐	☐	☐	☐	☐	☐ ____
☐☐ *age in years*	☐☐ *age in years*	____	☐	☐	☐	☐	☐	☐	☐	☐	☐ ____
☐☐ *age in years*	☐☐ *age in years*	____	☐	☐	☐	☐	☐	☐	☐	☐	☐ ____
☐☐ *age in years*	☐☐ *age in years*	____	☐	☐	☐	☐	☐	☐	☐	☐	☐ ____

SECTION 3: Personal medical history

This section concerns pain or discomfort you may have had in different parts of the body and at different times.

3.1: LOW BACK (including radiating pain in the leg)



	During the last 7 days		During last 12 months	
25 a) Have you had pain or discomfort in the area shown in the diagram?	☐ No ☐ Yes		☐ No ☐ Yes	

(If No, ignore this part of the section and proceed to question 33, page 12).

	During the last 7 days		During last 12 months	
25 b) What type of pain or discomfort did you have? (Tick all applicable alternatives)	☐ back pain only ☐ leg pain or symptoms only ☐ back and leg pain or symptoms		☐ back pain only ☐ leg pain or symptoms only ☐ back and leg pain or symptoms	
c) How many episodes have you had?	☐ 1 ☐ 2 – 3	☐ more than 3	☐ 1 ☐ 2 – 5	☐ 6-10 ☐ more than 10
d) How long did they typically last?	☐ hours ☐ 1-2 days	☐ 3-6 days ☐ always	☐ hours ☐ 1-2 days ☐ 3-6 days	☐ 7-30 days ☐ 1-3 months ☐ 3-6 months ☐ always
e) How much time did you have to take off work due to the back pain?	☐ None ☐ 1-2 days	☐ 3-6 days ☐ whole 7 days	☐ None ☐ 1-6 days ☐ 7-14 days ☐ 15-30 days	☐ 1-3 months ☐ 3-6 months ☐ more than 6 months
f) Did you consult a doctor ?	☐ No	☐ Yes	☐ No	☐ Yes
g) What treatment did your doctor prescribe? (painkillers, physical therapy, surgery, other?)	☐ None Namely: ________	☐ Yes	☐ None Namely: ________	☐ Yes
h) Do you get back pain during or shortly after driving a vehicle?	☐ No	☐ Yes	☐ No	☐ Yes
1) If yes, for how long did this typically last?	☐ hours ☐ 1-2 days	☐ 3-6 days ☐ whole 7 days	☐ hours ☐ 1-6 days ☐ 7-14 days ☐ 15-30 days	☐ 1-3 months ☐ 3-6 months ☐ more than 6 months

Have you ever had a trauma to your low back that required a medical visit? No ☐ Yes ☐

If No, please go to question 27

26a). What kind of trauma?

____

26b). When did it happen? |__|__| *month* |__|__|__|__| *year*

During the last 7 days

(If you have not suffered from back pain or discomfort during the past 7 days go to page 11, question 32)

27. When your low back pain **first started**, how did it come on?

gradually ☐ suddenly outside work ☐ suddenly at work ☐

28. If suddenly, what were you doing at the time?

____

29. Has the pain spread down your leg to below your knee during the past 7 days?

No ☐ Yes ☐

30. Have you had to cut down, avoid, or give up any of your normal duties in the past 7 days because of pain in your low back

No ☐ Yes ☐

If No, please go to question 31

30a). If yes, please try to estimate ho many hours or minutes it would take someone to make up the time lost from your work in this way?

☐☐ *hrs* ☐☐ *mins*

31. How would you rate your back pain on a 0-10 scale during a typical day in the last 7 days (where 0 is “no pain” and 10 is “pain as bad as it could be”)?

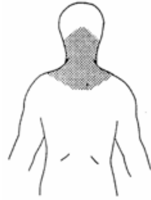
(please circle one number)

	No pain										*Pain as bad as it could be*
Back	0	1	2	3	4	5	6	7	8	9	10

These questions are about the way your pain is affecting your daily life. We would like to know if you are, or have been <u>in your last episode of back pain</u> in any of the situations listed below (please tick all the items that apply).

32. a) I stay at home most of the time because of my back.	☐ No	☐ Yes
b) I change position frequently to try and get my back comfortable.	☐ No	☐ Yes
c) I walk more slowly than usual because of my back.	☐ No	☐ Yes
d) Because of my back I am not doing any of the jobs that I usually do around the house.	☐ No	☐ Yes
e) Because of my back, I use a handrail to get upstairs.	☐ No	☐ Yes
f) Because of my back, I lie down to rest more often.	☐ No	☐ Yes
g) Because of my back, I have to hold on to something to get out of an easy chair.	☐ No	☐ Yes
h) Because of my back, I try to get other people to do things for me.	☐ No	☐ Yes
i) I get dressed more slowly than usual because of my back.	☐ No	☐ Yes
j) I only stand up for short periods of time because of my back.	☐ No	☐ Yes
k) Because of my back, I try not to bend or kneel down.	☐ No	☐ Yes
l) I find it difficult to turn over in bed because of my back.	☐ No	☐ Yes
m) My back is painful almost all the time.	☐ No	☐ Yes
n) I find it difficult to get out of a chair because of my back.	☐ No	☐ Yes
o) My appetite is not very good because of my back pain.	☐ No	☐ Yes
p) I have trouble putting on my socks (or stockings) because of the pain in my back.	☐ No	☐ Yes
q) I only walk short distances because of my back pain.	☐ No	☐ Yes
r) I sleep less well because of my back pain.	☐ No	☐ Yes
s) Because of my back pain, I get dressed with help from someone else.	☐ No	☐ Yes
t) I sit down for most of the day because of my back.	☐ No	☐ Yes
u) I avoid heavy jobs around the house because of my back.	☐ No	☐ Yes
v) Because of my back pain, I am more irritable and bad tempered with people than usual.	☐ No	☐ Yes
x) Because of my back pain, I go upstairs more slowly than usual.	☐ No	☐ Yes
y) I stay in bed most of the time because of my back.	☐ No	☐ Yes

3.2: Neck (including pain radiating in the arm)



	During the last 7 days	During last 12 months
33. a) Have you had pain or discomfort in the area shown in the diagram?	☐ No ☐ Yes	☐ No ☐ Yes

(If you never have had any neck or arm pain, ignore this part of the section and proceed to page 14).

	During the last 7 days	During last 12 months
b) What type of pain or discomfort did you have? (Tick all applicable alternatives)	☐ neck pain only ☐ arm pain/symptoms only ☐ neck and arm pain/symptoms	☐ neck pain only ☐ arm pain/symptoms only ☐ neck and arm pain/symptoms
c) How many episodes have you had?	0 ☐ more than 3 ☐ 1-3 ☐	1 ☐ 6 - 10 ☐ 2-5 ☐ more than 10 ☐
d) How long did they typically last?	☐ not applicable ☐ 3-6 days ☐ hours ☐ always ☐ 1-2 days	☐ not applicable ☐ 7-30 days ☐ hours ☐ 1-3 months ☐ 1-2 days ☐ 3-6 months ☐ 3-6 days ☐ always
e) How much time did you have to take off work due to the neck/arm pain?	☐ None ☐ 3-6 days ☐ 1-2 days ☐ whole 7 days	☐ None ☐ 1-3 months ☐ 1-6 days ☐ 3-6 months ☐ 7-14 days ☐ more than 6 months ☐ 15-30 days
f) Did you consult a doctor ?	☐ No ☐ Yes	☐ No ☐ Yes
g) What treatment did your doctor prescribe? (painkillers, physical therapy, surgery, other?)	☐ None ☐ Yes Namely: __________	☐ None ☐ Yes Namely: ______________
h) Do you get neck pain during or shortly after driving a vehicle ?	☐ No ☐ Yes	☐ No ☐ Yes
i) If yes, for how long did this typically last?	☐ hours ☐ 3-6 days ☐ 1-2 days ☐ whole 7 days	☐ hours ☐ 1-3 months ☐ 1-6 days ☐ 3-6 months ☐ 7-14 days ☐ more than 6 months ☐ 15-30 days

During the last 7 days

(If you have not suffered specifically from neck pain or discomfort during the past 7 days go to page 14.

37. When your neck pain **first started**, how did it come on?

gradually ☐ suddenly outside work ☐ suddenly at work ☐

38. If suddenly, what were you doing at the time?

____

39. Have you <u>ever</u> had a trauma to your neck that required a medical visit?

No ☐ Yes ☐

If No, please go to question 40

39a). What kind of trauma?

____

39b). When did it happen? |__|__| *month* |__|__|__|__| *year*

40.Have you had to cut down, avoid, or give up any of your normal duties in the past 7 days because of pain in your neck.

No ☐ Yes ☐

If No, please go to question 41

40a).If yes, please try to estimate ho many hours or minutes it would take someone to make up the time lost from your work in this way?

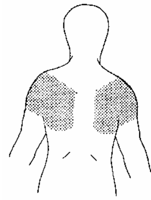
☐☐ *hrs* ☐☐ *minutes*

41. How would you rate your neck pain on a 0-10 scale during a typical day in the <u>last 7 days</u> (where 0 is "no pain" and 10 is "pain as bad as it could be")?

(please circle one number)

	No pain								***Pain as bad as it could be***		
Neck	0	1	2	3	4	5	6	7	8	9	10

3.3: Shoulders



	During the last 7 days	During last 12 months
42a) Have you had pain or discomfort in the area shown in the diagram?	☐ No ☐ Yes	☐ No ☐ Yes

(If you never have had any neck or arm pain, ignore this part of the section and proceed to page 14).

	During the last 7 days	During last 12 months
b) What type of pain or discomfort did you have? (Tick all applicable alternatives)	☐ shoulder pain only ☐ arm/hand symptoms only ☐ shoulder and arm/hand symptoms	☐ shoulder pain only ☐ arm/hand symptoms only ☐ shoulder and arm/hand symptoms
c) How many episodes have you had?	0 ☐ more than 3 ☐ 1-3 ☐	1 ☐ 6 - 10 ☐ 2-5 ☐ more than 10 ☐
d) How long did they typically last?	☐ not applicable ☐ 3-6 days ☐ hours ☐ always ☐ 1-2 days	☐ not applicable ☐ 7-30 days ☐ hours ☐ 1-3 months ☐ 1-2 days ☐ 3-6 months ☐ 3-6 days ☐ always
e) How much time did you have to take off work due to the shoulder pain?	☐ None ☐ 3-6 days ☐ 1-2 days ☐ whole 7 days	☐ None ☐ 1-3 months ☐ 1-6 days ☐ 3-6 months ☐ 7-14 days ☐ more than 6 months ☐ 15-30 days
f) Did you consult a doctor ?	☐ No ☐ Yes	☐ No ☐ Yes
g) What treatment did your doctor prescribe? (painkillers, physical therapy, surgery, other?)	☐ None ☐ Yes Namely: __________	☐ None ☐ Yes Namely: ______________
h) Do you get shoulder pain during or shortly after driving a vehicle?	☐ No ☐ Yes	☐ No ☐ Yes
i) If yes, for how long did this typically last?	☐ hours ☐ 3-6 days ☐ 1-2 days ☐ whole 7 days	☐ hours ☐ 1-3 months ☐ 1-6 days ☐ 3-6 months ☐ 7-14 days ☐ more than 6 months ☐ 15-30 days

During the last 7 days

(If you have not suffered from shoulder pain or discomfort during the past 7 days go to section 4, question 48)

43. When your shoulder pain **first started**, how did it come on?

gradually ☐ suddenly outside work ☐ suddenly at work ☐

44. If suddenly, what were you doing at the time?

____

45. Have you ever had a trauma to your shoulder(s) that required a medical visit?

No ☐ Yes ☐

If No, please go to question 46

45. a). What kind of trauma?

____

45. b).When did it happen? |__|__| *month* |__|__|__|__| *year*

46. Have you had to cut down, avoid, or give up any of your normal duties in the past 7 days because of pain in your shoulder(s).

No ☐ Yes ☐

If No, please go to question 47

46a).If yes, please try to estimate ho many hours or minutes it would take someone to make up the time lost from your work in this way?

☐☐ ***hrs*** ☐☐ ***mins***

47. How would you rate your shoulder(s) pain on a 0-10 scale during a typical day in the last 7 days (where 0 is “no pain” and 10 is “pain as bad as it could be”)?

(please circle one number)

	No pain										***Pain as bad as it could be***
Shoulder	0	1	2	3	4	5	6	7	8	9	10

SECTION 4: Other parts of your body

48. Have you at any time during the last 12 months had trouble (such as ache, pain, discomfort, numbness) in:

Elbows

☐ No ☐ Yes
- ☐ in the right elbow
- ☐ in the left elbow
- ☐ in both elbows

Wrists/hands

☐ No ☐ Yes
- ☐ in the right wrist/hand
- ☐ in the left wrist/hand
- ☐ in both wrists/hands

Upper back

☐ No ☐ Yes

Hips/thighs/buttocks

☐ No ☐ Yes
- ☐ in the right hip
- ☐ in the left hip
- ☐ in both hips

Knees

☐ No ☐ Yes
- ☐ in the right knee
- ☐ in the left knee
- ☐ in both knees

Ankles/feet

☐ No ☐ Yes
- ☐ in the right ankle/foot
- ☐ in the left ankle/foot
- ☐ in both ankles/feet

Other disorders

49. Did you suffer from the following disorders?

	Ever had?		Ever been treated?	
Inguinal (groin) rupture (hernia)	☐ No	☐ Yes	☐ No	☐ Yes
Digestive disorders (aspecific stomach complaints, gastritis, stomach ulcer, intestinal complaints)	☐ No	☐ Yes	☐ No	☐ Yes
Circulatory problems (varicose veins, hemorrhoids, hypertension, heart complaints)	☐ No	☐ Yes	☐ No	☐ Yes
Raynaud's phenomenon, i.e. vibration white finger syndrome (white and/or cold fingers)	☐ No	☐ Yes	☐ No	☐ Yes
Urinary disorders (prostatitis, renal disorder)	☐ No	☐ Yes	☐ No	☐ Yes
Vestibular disturbances (dizziness)	☐ No	☐ Yes	☐ No	☐ Yes

Other symptoms and feelings

50. Firstly, some questions about how you feel and how things have been with you **during the past 4 weeks**.
Please tick the one box for each question which most closely reflects how you feel.

How much of the time **during the past 4 weeks** …….	*None of the time*	*A little of the time*	*Some of the time*	*A good bit of the time*	*Most of the time*	*All of the time*
a) …did you feel full of life?	☐	☐	☐	☐	☐	☐
b) …have you been a very nervous person?	☐	☐	☐	☐	☐	☐
c) …have you felt so down in the dumps that nothing could cheer you up?	☐	☐	☐	☐	☐	☐
d) …have you felt calm and peaceful?	☐	☐	☐	☐	☐	☐
e) …did you have a lot of energy?	☐	☐	☐	☐	☐	☐
f) …have you felt downhearted and low?	☐	☐	☐	☐	☐	☐
g) …did you feel worn out?	☐	☐	☐	☐	☐	☐
h) …have you been a happy person?	☐	☐	☐	☐	☐	☐
i) …did you feel tired?	☐	☐	☐	☐	☐	☐

51. Below is a list of problems people sometimes have. Please read each one carefully and circle the number that best describes how much that problem has distressed or bothered **you** during the **past 7 days including today**.

	Not at all	*A little bit*	*Moderately*	*Quite a bit*	*Extremely*
a) Faintness or dizziness.	0	1	2	3	4
b) Pains in the heart or chest.	0	1	2	3	4
c) Your feelings being easily hurt.	0	1	2	3	4
d) Feeling that people are unfriendly or dislike you.	0	1	2	3	4
e) Feeling inferior to others.	0	1	2	3	4
f) Nausea or upset stomach.	0	1	2	3	4
g) Trouble getting your breath.	0	1	2	3	4
h) Numbness or tingling in parts of your body.	0	1	2	3	4
i) Feeling weak in parts of your body.	0	1	2	3	4
j) Feeling very self-conscious with others.	0	1	2	3	4

Activity, work and back pain

52. Whether you have back pain or not, based on your views and what the doctor or others may have told you about pain in the back, how strongly do you agree with the following statements?

Please circle one number for each statement which most closely reflects how you feel, ranging from 1 ‘Completely disagree’ to 5 ‘Completely agree’.

	Disagree				**Agree**
a) Physical activity worsens back pain.	1	2	3	4	5
b) Physical activities should be avoided if they might make the pain worse	1	2	3	4	5
c) An increase in pain is an indication to stop what one is doing	1	2	3	4	5
d) Rest is needed to get better	1	2	3	4	5
e) Normal work should be avoided until the pain is treated	1	2	3	4	5
f) It is important to see a doctor straight away at the first sign of trouble	1	2	3	4	5
g) Neglecting problems of this kind can cause permanent health problems	1	2	3	4	5
h) back pain normally gets better by itself	1	2	3	4	5

APPENDIX 4B

Self-administered questionnaire for longitudinal studies – Follow-Up Questionnaire

From VIBRISKS Working Document WP4-N5 prepared by:
Carel Hulshof, Keith Palmer, Ivo Tiemessen, Mats Hagberg, Tohr Nilsson,
Ronnie Lundström, Massimo Bovenzi, Jos Verbeek

SECTION 1: Personal and general information

Serial number |__|__|__|__|

Has there been any change in address? No ☐ Yes ☐

If yes, specify: ____

____

Date of birth __________________ (day / month / year) Sex: M _____ F _____

Height: _____ ft/m _____ in/cm Weight: _____ lbs./kg

Marital Status: Single ☐ Married ☐ Divorced/Separated ☐ Widowed ☐

---

1. How often each week do you engage in any exercise program or sports?

   Never ☐ Less than 1 time ☐ 1 to 2 times ☐ 3 times or more ☐ Everyday ☐

2. Do you smoke or have you ever smoked? No ☐ Yes ☐

3a. If yes, when did you start smoking regularly? 19____

3b. Do you still smoke? No ☐ Yes ☐

3c. If no, when did you give up to smoke? 19_____

3d. If yes, how much did/do you smoke?
   - Cigarettes per day: ☐
   - Cigars per day: ☐
   - Pipe/rolling tobacco g per day: ☐

4. Do you drink alcoholic beverages? (wine, beer, etc.) No ☐ Yes ☐

4a. How much do you drink daily? ☐ 0-1 unit ☐ 2-3 units ☐ more than 3 units

4b. How much do you drink weekly? ☐ 1-3 units ☐ 4-6 units ☐ more than 6 units

(1 unit = ½ pint of beer, a glass of wine, or single spirit)

SECTION 2: Occupational history

CURRENT JOB

5. Has there been any change in job activities since you completed the last questionnaire? No ☐ Yes ☐

   If yes, new job title ____

   Describe new work activities ____

   ____

6. In what industry (e.g. farming, shipyard, insurance) do you carry out this occupation?

   ____

7. When did you start this job? |__|__| *month* |__|__|__|__| *year*

ACTIVITIES IN YOUR JOB

Posture

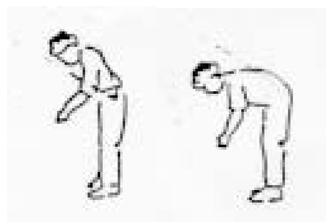
8. Does an average working day involve walking and standing?

   If No, please go to question 9 No ☐ Yes ☐

8a). If Yes, If you add together all the time in an average working day that you spend walking and standing, how many hours does that make?

Less than an hour ☐ 1-3 hours ☐ More than 3 hours ☐

9. Does an average working day involve bending as shown below?



No ☐ Yes ☐

If No, please go to question 10

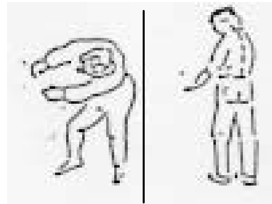
9a) .If Yes, how long during an average working day do you work in a position with your trunk bended between 20 and 40° ?

Less than 1 hour ☐ 1-2 hours ☐ More than 2 hours ☐

9b).If Yes, how long during an average working day do you work in a position with your trunk bended more than 40° ?

Less than ½ hour ☐ ½-2 hours ☐ More than 2 hours ☐

10. Does an average day in the job involve twisting as shown below?



No ☐ Yes ☐

If No, please go to question 11

10a). If Yes, how long during an average working day do you twist in a position with your trunk bended between 20 and 40° ?

Less than 1 hour ☐ 1-2 hours ☐ More than 2 hours ☐

10b). If Yes, how long during an average working day do you work in a position with your trunk bended more than 40° ?

Less than ½ hour ☐ ½-2 hours ☐ More than 2 hours ☐

11. Does an average day in the job involve working with your arms raised and your hand held above shoulder height?

No ☐ Yes ☐

If no, please go to question 12

11a). If you add together all the time in an average working day that you spend working with your arms raised and your hand held above shoulder height, how many hours does that make?

Less than an hour ☐ 1-3 hours ☐ More than 3 hours ☐

Digging

12. Does an average working day involve digging or shoveling? No ☐ Yes ☐

If No, please go to question 13

12a). If you add together all the time in an average working day that you spend digging and shoveling, how many hours does that make?

Less than an hour ☐ 1-3 hours ☐ More than 3 hours ☐

Sitting

13. Does an average working day involve sitting **(other than when driving)** for longer than three hours at a time?

No ☐ Yes but I **can** get up and move around when I want to ☐ Yes, and I **cannot** get up and move around even if I want to ☐

Lifting

14. Do you regularly have to load or unload the vehicle(s) you drive by moving heavy materials or equipment by hand?

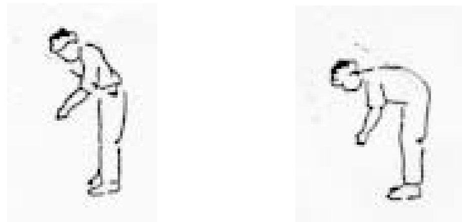
No ☐ Yes ☐

15. How many times in an average working day do you lift loads greater than 15 kg (30 lbs) (comparable with 24 bottles of beer in a crate, an average child of three or an small suitcase with belongings)?

Not at all ☐ 0-15 minutes ☐ 15 - 45 minutes ☐ More than 45 minutes ☐

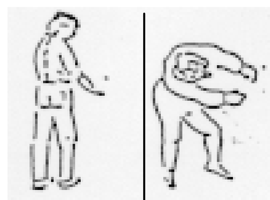
If No at all, please go to question 16

15a). How many times in an average working day **do you lift such a load** whilst your back is in a bent position as shown?



Not at all ☐ 1-10 times ☐ More than 10 times ☐

15b). How many times in an average working day **do you lift such a load** whilst your back is in a twisted or bent and twisted position as shown?



bent and twisted twisted

Not at all ☐ 1-10 times ☐ More than 10 times ☐

Driving

16. Did or do you drive any kind of vehicle in your current job?
(i.e. car, bus, truck, train, earth moving machine, other) No ☐ Yes ☐

If No, go to question 20

17. Which of the following vehicles do you normally drive in the job, and for how many hours per week on average?

	Vehicle	*Tick if driven in the job (✓)*	*Roughly how many hours per week do you drive this vehicle on average?*
a)	Car or van (do **not** include journeys to and from work)	☐	☐☐ ☐☐ *(per week)* *hrs mins*
b)	Lorry, bus or coach (as a driver, **not** a passenger)	☐	☐☐ ☐☐ *(per week)* *hrs mins*
c)	Motorcycle (do **not** include journeys to and from work)	☐	☐☐ ☐☐ *(per week)* *hrs mins*
d)	Fork lift truck	☐	☐☐ ☐☐ *(per week)* *hrs mins*
e)	Tractor	☐	☐☐ ☐☐ *(per week)* *hrs mins*
f)	Loader	☐	☐☐ ☐☐ *(per week)* *hrs mins*
g)	Excavator	☐	☐☐ ☐☐ *(per week)* *hrs mins*
h)	Dumper	☐	☐☐ ☐☐ *(per week)* *hrs mins*
h)	Other large off road vehicle (eg harvester, armoured tank)	☐	☐☐ ☐☐ *(per week)* *hrs mins*
i)	Other large on road vehicle (eg ambulance, fire engine)	☐	☐☐ ☐☐ *(per week)* *hrs mins*

18. Do you ever have to drive with your back bent forward or twisted in the job?

Never ☐ Seldom ☐ Often ☐

19. Do you experience discomfort by mechanical vibration or shock in your work?

vertical vibration	No ☐	Yes ☐
fore/aft vibration	No ☐	Yes ☐
side-to-side vibration	No ☐	Yes ☐

YOUR VIEWS ABOUT YOUR JOB

20. In your job, do you have a choice in deciding:

	Never/almost never	*Seldom*	*Sometimes*	*Often*
a) **How** you do your work?	☐	☐	☐	☐
b) **What** you do at work?	☐	☐	☐	☐
c) Your work timetable and breaks?	☐	☐	☐	☐

21. When you have difficulties in your work, how often do you get help and support from your colleagues or immediate line manager?

Not applicable ☐ Never ☐ Seldom ☐ Sometimes ☐ Often ☐

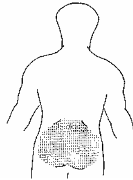
22. How satisfied have you been with your job as a whole, taking everything into consideration?

Very dissatisfied ☐ Dissatisfied ☐ Satisfied ☐ Very satisfied ☐

SECTION 3: Personal medical history

This section concerns pain or discomfort you may have had in different parts of the body and at different times.

3.1: LOW BACK (including radiating pain in the leg)



	During the last 7 days	During last 12 months
23 a) Have you had pain or discomfort in the area shown in the diagram?	☐ No ☐ Yes	☐ No ☐ Yes

(If No, ignore this part of the section and proceed to question 32, page 11).

	During the last 7 days		During last 12 months	
b) What type of pain or discomfort did you have? (Tick all applicable alternatives)	☐ back pain only ☐ leg pain or symptoms only ☐ back and leg pain or symptoms		☐ back pain only ☐ leg pain or symptoms only ☐ back and leg pain or symptoms	
c) How many episodes have you had?	☐ 1 ☐ 2 – 3	☐ more than 3	☐ 1 ☐ 2 – 5	☐ 6-10 ☐ more than 10
d) How long did they typically last?	☐ hours ☐ 1-2 days	☐ 3-6 days ☐ always	☐ hours ☐ 1-2 days ☐ 3-6 days	☐ 7-30 days ☐ 1-3 months ☐ 3-6 months ☐ always
e) How much time did you have to take off work due to the back pain?	☐ None ☐ 1-2 days	☐ 3-6 days ☐ whole 7 days	☐ None ☐ 1-6 days ☐ 7-14 days ☐ 15-30 days	☐ 1-3 months ☐ 3-6 months ☐ more than 6 months
f) Did you consult a doctor ?	☐ No	☐ Yes	☐ No	☐ Yes
g) What treatment did your doctor prescribe? (painkillers, physical therapy, surgery, other?)	☐ None Namely: __________	☐ Yes	☐ None Namely: ______________	☐ Yes
h) Do you get back pain during or shortly after driving a vehicle ?	☐ No	☐ Yes	☐ No	☐ Yes
1) If yes, for how long did this typically last?	☐ hours ☐ 1-2 days	☐ 3-6 days ☐ whole 7 days	☐ hours ☐ 1-6 days ☐ 7-14 days ☐ 15-30 days	☐ 1-3 months ☐ 3-6 months ☐ more than 6 months

24. Have you <u>ever</u> had a trauma to your low back that required a medical visit? No ☐ Yes ☐
If No, please go to question 25

24a). What kind of trauma?

____

24b). When did it happen? |__|__| *month* |__|__|__|__| *year*

During the last 7 days

(If you have not suffered from back pain or discomfort during the past 7 days go to page 10, question 31)

25. When your low back pain **first started**, how did it come on?

gradually ☐ suddenly outside work ☐ suddenly at work ☐

26. If suddenly, what were you doing at the time?

____

27. Has the pain spread down your leg to below your knee during the past 7 days?

No ☐ Yes ☐

28. Have you had to cut down, avoid, or give up any of your normal duties in the past 7 days because of pain in your low back

No ☐ Yes ☐

If No, please go to question 31

29. If yes, please try to estimate ho many hours or minutes it would take someone to make up the time lost from your work in this way?

☐☐ *hrs* ☐☐ *mins*

30. How would you rate your back pain on a 0-10 scale during a typical day in the <u>last 7 days</u> (where 0 is “no pain” and 10 is “pain as bad as it could be”)?

(please circle one number)

	No pain										*Pain as bad as it could be*
Back	0	1	2	3	4	5	6	7	8	9	10

These questions are about the way your pain is affecting your daily life. We would like to know if you are, or have been <u>in your last episode of back pain</u> in any of the situations listed below (please tick all the items that apply).

31. a) I stay at home most of the time because of my back. ☐ No ☐ Yes

b) I change position frequently to try and get my back comfortable. ☐ No ☐ Yes

c) I walk more slowly than usual because of my back. ☐ No ☐ Yes

d) Because of my back I am not doing any of the jobs that I usually do around the house. ☐ No ☐ Yes

e) Because of my back, I use a handrail to get upstairs. ☐ No ☐ Yes

f) Because of my back, I lie down to rest more often. ☐ No ☐ Yes

g) Because of my back, I have to hold on to something to get out of an easy chair. ☐ No ☐ Yes

h) Because of my back, I try to get other people to do things for me. ☐ No ☐ Yes

i) I get dressed more slowly than usual because of my back. ☐ No ☐ Yes

j) I only stand up for short periods of time because of my back. ☐ No ☐ Yes

k) Because of my back, I try not to bend or kneel down. ☐ No ☐ Yes

l) I find it difficult to turn over in bed because of my back. ☐ No ☐ Yes

m) My back is painful almost all the time. ☐ No ☐ Yes

n) I find it difficult to get out of a chair because of my back. ☐ No ☐ Yes

o) My appetite is not very good because of my back pain. ☐ No ☐ Yes

p) I have trouble putting on my socks (or stockings) because of the pain in my back. ☐ No ☐ Yes

q) I only walk short distances because of my back pain. ☐ No ☐ Yes

r) I sleep less well because of my back pain. ☐ No ☐ Yes

s) Because of my back pain, I get dressed with help from someone else. ☐ No ☐ Yes

t) I sit down for most of the day because of my back. ☐ No ☐ Yes

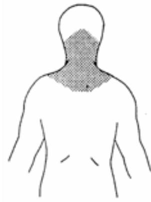
u) I avoid heavy jobs around the house because of my back. ☐ No ☐ Yes

v) Because of my back pain, I am more irritable and bad tempered with people than usual. ☐ No ☐ Yes

x) Because of my back pain, I go upstairs more slowly than usual. ☐ No ☐ Yes

y) I stay in bed most of the time because of my back. ☐ No ☐ Yes

3.2: **Neck** (including pain radiating in the arm)



	During the last 7 days	During last 12 months
32. a) Have you had pain or discomfort in the area shown in the diagram?	☐ No ☐ Yes	☐ No ☐ Yes

(*If you never have had any neck or arm pain, ignore this part of the section and proceed to page 13*).

	During the last 7 days	During last 12 months
b) What type of pain or discomfort did you have? (Tick all applicable alternatives)	☐ neck pain only ☐ arm pain/symptoms only ☐ neck and arm pain/symptoms	☐ neck pain only ☐ arm pain/symptoms only ☐ neck and arm pain/symptoms
c) How many episodes have you had?	0 ☐ more than 3 ☐ 1-3 ☐	1 ☐ 6 - 10 ☐ 2-5 ☐ more than 10 ☐
d) How long did they typically last?	☐ not applicable ☐ 3-6 days ☐ hours ☐ always ☐ 1-2 days	☐ not applicable ☐ 7-30 days ☐ hours ☐ 1-3 months ☐ 1-2 days ☐ 3-6 months ☐ 3-6 days ☐ always
e) How much time did you have to take off work due to the neck/arm pain?	☐ None ☐ 3-6 days ☐ 1-2 days ☐ whole 7 days	☐ None ☐ 1-3 months ☐ 1-6 days ☐ 3-6 months ☐ 7-14 days ☐ more than 6 months ☐ 15-30 days
f) Did you consult a doctor ?	☐ No ☐ Yes	☐ No ☐ Yes
g) What treatment did your doctor prescribe? (painkillers, physical therapy, surgery, other?)	☐ None ☐ Yes Namely: __________	☐ None ☐ Yes Namely: __________
35. Do you get neck pain during or shortly after driving a vehicle ?	☐ No ☐ Yes	☐ No ☐ Yes
i) If yes, for how long did this typically last?	☐ hours ☐ 3-6 days ☐ 1-2 days ☐ whole 7 days	☐ hours ☐ 1-3 months ☐ 1-6 days ☐ 3-6 months ☐ 7-14 days ☐ more than 6 months ☐ 15-30 days

During the last 7 days

If you have not suffered specifically from neck pain or discomfort during the past 7 days go to page 13.

33. When your neck pain **first started**, how did it come on?

gradually ☐ suddenly outside work ☐ suddenly at work ☐

34. If suddenly, what were you doing at the time?

____

35. Have you ever had a trauma to your neck that required a medical visit?

No ☐ Yes ☐

If No, please go to question 36

35a). What kind of trauma?

____

35b). When did it happen? |__|__| *month* |__|__|__|__| *year*

36. Have you had to cut down, avoid, or give up any of your normal duties in the past 7 days because of pain in your neck.

No ☐ Yes ☐

If No, please go to question 37

36a).If yes, please try to estimate ho many hours or minutes it would take someone to make up the time lost from your work in this way?

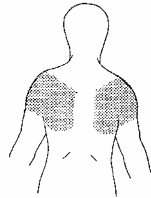
☐☐ *hrs* ☐☐ *minutes*

37. How would you rate your neck pain on a 0-10 scale during a typical day in the last 7 days (where 0 is "no pain" and 10 is "pain as bad as it could be")?

(please circle one number)

	No pain										*Pain as bad as it could be*
Neck	0	1	2	3	4	5	6	7	8	9	10

3.3: Shoulders



	During the last 7 days	During last 12 months
38. Have you had pain or discomfort in the area shown in the diagram?	☐ No ☐ Yes	☐ No ☐ Yes

(If you never have had any shoulder pain, ignore this part of the section and proceed to page 15).

	During the last 7 days	During last 12 months
b) What type of pain or discomfort did you have? (Tick all applicable alternatives)	☐ shoulder pain only ☐ arm/hand symptoms only ☐ shoulder and arm/hand symptoms	☐ shoulder pain only ☐ arm/hand symptoms only ☐ shoulder and arm/hand symptoms
c) How many episodes have you had?	0 ☐ more than 3 ☐ 1-3 ☐	1 ☐ 6 - 10 ☐ 2-5 ☐ more than 10 ☐
d) How long did they typically last?	☐ not applicable ☐ 3-6 days ☐ hours ☐ always ☐ 1-2 days	☐ not applicable ☐ 7-30 days ☐ hours ☐ 1-3 months ☐ 1-2 days ☐ 3-6 months ☐ 3-6 days ☐ always
e) How much time did you have to take off work due to the shoulder pain?	☐ None ☐ 3-6 days ☐ 1-2 days ☐ whole 7 days	☐ None ☐ 1-3 months ☐ 1-6 days ☐ 3-6 months ☐ 7-14 days ☐ more than 6 months ☐ 15-30 days
f) Did you consult a doctor ?	☐ No ☐ Yes	☐ No ☐ Yes
g) What treatment did your doctor prescribe? (painkillers, physical therapy, surgery, other?)	☐ None ☐ Yes Namely: ________	☐ None ☐ Yes Namely: ________
36. Do you get shoulder pain during or shortly after driving a vehicle?	☐ No ☐ Yes	☐ No ☐ Yes
i) If yes, for how long did this typically last?	☐ hours ☐ 3-6 days ☐ 1-2 days ☐ whole 7 days	☐ hours ☐ 1-3 months ☐ 1-6 days ☐ 3-6 months ☐ 7-14 days ☐ more than 6 months ☐ 15-30 days

During the last 7 days

(If you have not suffered from shoulder pain or discomfort during the past 7 days, please go to section 4)

39. When your shoulder pain **first started**, how did it come on?

gradually ☐ suddenly outside work ☐ suddenly at work ☐

40. If suddenly, what were you doing at the time?

____

41. Have you ever had a trauma to your shoulder(s) that required a medical visit?

No ☐ Yes ☐

If No, please go to question 42

41a). What kind of trauma?

____

41b).When did it happen? |__|__| *month* |__|__|__|__| *year*

42. Have you had to cut down, avoid, or give up any of your normal duties in the past 7 days because of pain in your shoulder(s).

No ☐ Yes ☐

If No, please go to question 43

42a).If yes, please try to estimate ho many hours or minutes it would take someone to make up the time lost from your work in this way?

☐☐ ***hrs*** ☐☐ ***mins***

43. How would you rate your shoulder(s) pain on a 0-10 scale during a typical day in the last 7 days (where 0 is "no pain" and 10 is "pain as bad as it could be")?

(please circle one number)

	No pain										***Pain as bad as it could be***
Shoulder	0	1	2	3	4	5	6	7	8	9	10

SECTION 4: Other parts of your body

44. Have you at any time during the last 12 months had trouble (such as ache, pain, discomfort, numbness) in:

Elbows

☐ No ☐ Yes

☐ in the right elbow
☐ in the left elbow
☐ in both elbows

Wrists/hands

☐ No ☐ Yes

☐ in the right wrist/hand
☐ in the left wrist/hand
☐ in both wrists/hands

Upper back

☐ No ☐ Yes

Hips/thighs/buttocks

☐ No ☐ Yes

☐ in the right hip
☐ in the left hip
☐ in both hips

Knees

☐ No ☐ Yes

☐ in the right knee
☐ in the left knee
☐ in both knees

Ankles/feet

☐ No ☐ Yes

☐ in the right ankle/foot
☐ in the left ankle/foot
☐ in both ankles/feet

Other disorders

45. Did you suffer from the following disorders?

	Ever had?		**Ever been treated?**	
Inguinal (groin) rupture (hernia)	☐ No	☐ Yes	☐ No	☐ Yes
b) Digestive disorders (aspecific stomach complaints, gastritis, stomach ulcer, intestinal complaints)	☐ No	☐ Yes	☐ No	☐ Yes
c) Circulatory problems (varicose veins, hemorrhoids, hypertension, heart complaints)	☐ No	☐ Yes	☐ No	☐ Yes
d) Raynaud's phenomenon, i.e. vibration white finger syndrome (white and/or cold fingers)	☐ No	☐ Yes	☐ No	☐ Yes
e) Urinary disorders (prostatitis, renal disorder)	☐ No	☐ Yes	☐ No	☐ Yes
f) Vestibular disturbances (dizziness)	☐ No	☐ Yes	☐ No	☐ Yes

Other symptoms and feelings

50. Firstly, some questions about how you feel and how things have been with you **during the past 4 weeks**.
Please tick the one box for each question which most closely reflects how you feel.

How much of the time **during the past 4 weeks** …….	*None of the time*	*A little of the time*	*Some of the time*	*A good bit of the time*	*Most of the time*	*All of the time*
a) …did you feel full of life?	☐	☐	☐	☐	☐	☐
b) …have you been a very nervous person?	☐	☐	☐	☐	☐	☐
c) …have you felt so down in the dumps that nothing could cheer you up?	☐	☐	☐	☐	☐	☐
d) …have you felt calm and peaceful?	☐	☐	☐	☐	☐	☐
e) …did you have a lot of energy?	☐	☐	☐	☐	☐	☐
f) …have you felt downhearted and low?	☐	☐	☐	☐	☐	☐
g) …did you feel worn out?	☐	☐	☐	☐	☐	☐
h) …have you been a happy person?	☐	☐	☐	☐	☐	☐
i) …did you feel tired?	☐	☐	☐	☐	☐	☐

51. Below is a list of problems people sometimes have. Please read each one carefully and circle the number that best describes how much that problem has distressed or bothered **you** during the **past 7 days including today**.

	Not at all	*A little bit*	*Moderately*	*Quite a bit*	*Extremely*
a) Faintness or dizziness.	0	1	2	3	4
b) Pains in the heart or chest.	0	1	2	3	4
c) Your feelings being easily hurt.	0	1	2	3	4
d) Feeling that people are unfriendly or dislike you.	0	1	2	3	4
e) Feeling inferior to others.	0	1	2	3	4
f) Nausea or upset stomach.	0	1	2	3	4
g) Trouble getting your breath.	0	1	2	3	4
h) Numbness or tingling in parts of your body.	0	1	2	3	4
i) Feeling weak in parts of your body.	0	1	2	3	4
j) Feeling very self-conscious with others.	0	1	2	3	4

Activity, work and back pain

52. Whether you have back pain or not, based on your views and what the doctor or others may have told you about pain in the back, how strongly do you agree with the following statements?

Please circle one number for each statement which most closely reflects how you feel, ranging from 1 ‘Completely disagree’ to 5 ‘Completely agree’.

	Disagree				**Agree**
a) Physical activity worsens back pain.	1	2	3	4	5
b) Physical activities should be avoided if they might make the pain worse	1	2	3	4	5
c) An increase in pain is an indication to stop what one is doing	1	2	3	4	5
d) Rest is needed to get better	1	2	3	4	5
e) Normal work should be avoided until the pain is treated	1	2	3	4	5
f) It is important to see a doctor straight away at the first sign of trouble	1	2	3	4	5
g) Neglecting problems of this kind can cause permanent health problems	1	2	3	4	5
h) Back pain normally gets better by itself	1	2	3	4	5

APPENDIX 5A

Self-administered questionnaire for case-control studies – Cases

From VIBRISKS Working Document WP4-N7 prepared by:
Keith Palmer, Clare Harris

SECTION ONE: ABOUT YOURSELF

1. Please fill in your date of birth ☐☐ ☐☐ ☐☐☐☐
   day *month* *year*

2. *and* your sex — Male ☐ Female ☐

3. Please give your height *and* your weight — Height ☐ ft ☐☐ in or ☐☐☐ cm

   Weight ☐☐ st ☐☐ lbs or ☐☐☐ kg

4. Please indicate your ethnic origin by ticking the appropriate box

White	☐	Indian	☐
Black-Caribbean	☐	Pakistani	☐
Black-African	☐	Bangladeshi	☐
Black-Other	☐	Chinese	☐
Other	☐ (please specify ______________________________)		

5. Have you ever **smoked** regularly (ie at least once a day for a month or longer)? — No ☐ Yes ☐

5a. If ***YES,*** how old were you when you **first** smoked regularly? — ☐☐ years

5b. Do you **still** smoke regularly? — No ☐ Yes ☐

5c. If ***NO***, how old were you when you **last** smoked regularly? — ☐☐ years

6. Have you ever had a job since leaving school or higher education? — No ☐ Yes ☐

   *If **NO**, please go to Section 4, page 59.*

   *If **YES,** please continue.*

SECTION TWO: YOUR CURRENT OR MOST RECENT JOB

*We would like to know about your **current** or **most recent** job. If you have more than one job (or had more than one job at the time you last worked), please focus on the **main** one.*

7. What is your **CURRENT OR MOST RECENT OCCUPATION?** ______________________

8. In what **INDUSTRY** do (did) you carry this job out (eg farming, shipyard, hospital, bank)? ______________________

9. When did you start this job? ☐☐ ☐☐☐☐
month *year*

10. Is this still your job? No ☐ Yes ☐

10a. If ***NO***, when did you leave this job? ☐☐ ☐☐☐☐
month *year*

11. How many hours per week do (did) you normally work in this job? ☐☐☐ hours

12. And are (were) you employed or self-employed?

Employed ☐ Self-employed ☐

ACTIVITIES IN YOUR JOB

Considering your current or your most recently held job that you have just been telling us about, we are interested in the physical activities carried out in ***an average working day****. If you no longer do this job, please tell us about what the job used to be like before you gave it up. If you have changed what you do in the job because of a current health problem, please tell us what it used to be like before you had to make the changes.*

(Tick the most appropriate box(es)).

Lifting

13. How many **times** in an average working day do you lift loads greater than 10 kg (20 lbs), eg a large bag of potatoes or a full bucket of water?

Not at all ☐ 1 - 10 times ☐ More than 10 times ☐

13a. And how many **times** in an average working day do you lift such a load **whilst your back is in a bent or twisted position**, as shown?

Not at all ☐ 1 - 10 times ☐ More than 10 times ☐

Digging

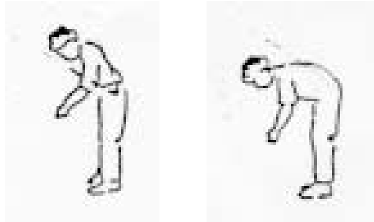
14. Does an average working day involve digging or shovelling? No ☐ Yes ☐

Posture

15. During an average day in the job, how many hours in total are spent standing or walking?

None ☐ Less than an hour ☐ 1 - 3 hours ☐ More than 3 hours ☐

16. Does an average working day involve bending as shown below?



No ☐ Yes ☐

*If **NO**, please go to question 17.*

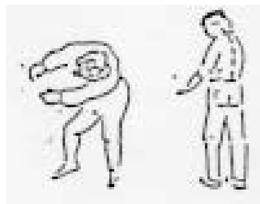
16a. If ***YES***, how many times in an average working day do you bend over in such a position?

Less than 5 times ☐ 5 - 20 times ☐ more than 20 times ☐

16b. And, if you add together all the time in an average working day that you spend in such a position, how many hours does that make?

Less than an hour ☐ 1 - 3 hours ☐ More than 3 hours ☐

17. Does an average day in the job involve twisting as shown below?



No ☐ Yes ☐

*If **NO**, please go to question 18.*

17a. If ***YES,*** how many times in an average working day do you twist like this?

Less than 5 times ☐ 5 - 20 times ☐ more than 20 times ☐

17b. And, if you add together all the time in an average working day that you spend in such a twisted position, how many hours does that make?

Less than an hour ☐ 1 - 3 hours ☐ More than 3 hours ☐

18. If you add together all the time in an average working day that you spend working with your arms raised and your hand held above shoulder height, how long does that make?

Not done at all ☐ Less than an hour ☐ 1 - 3 hours ☐ More than 3 hours ☐

19. During an average working day, how long in total do you spend sitting (other than while driving)?

Not done at all ☐ Less than 1 hour ☐ 1 - 3 hours ☐

More than 3 and up to 6 hours ☐ More than 6 hours ☐

20. Does an average working day involve sitting (other than when driving) for longer than three hours at a time?

No ☐ Yes, but I **<u>can</u>** get up and move around when I want to ☐ Yes, and I **<u>cannot</u>** get up and move around even if I want to ☐

Professional Driving

21. Does your job normally involve **professional driving** (ie driving in the job for more than <u>an hour</u> on a typical working day - other than going to and from your normal place of work)? No ☐ Yes ☐

*If **NO**, go to question 25.*

22. Does an average working day involve driving for more than three hours at a time? No ☐ Yes ☐

23. Which of the following vehicles do you normally drive in the job, and for how many hours per week on average?

	Vehicle	*Tick if driven in the job (✓)*	*Roughly how many hours do you drive this vehicle on average?*
a)	Car or van (do **not** include journeys to and from work)	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
b)	Bus or coach (as a driver, **not** a passenger)	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
c)	Lorry or heavy goods vehicle	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
d)	Motorcycle (do **not** include journeys to and from work)	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
e)	Forklift truck	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
f)	Tractor	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
g)	Loader	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*

	Vehicle	*Tick if driven in the job (✓)*	*Roughly how many hours do you drive this vehicle on average?*
h)	Dumper or excavator	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
i)	Other large off road vehicle (eg harvester, armoured tank)	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
j)	Other large on road vehicle (eg ambulance, fire engine)	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*

24. Do you regularly have to load or unload the vehicle(s) you drive by moving heavy materials or equipment by hand? No ☐ Yes ☐

Your views about your job

25. Do you believe that your job makes a person more likely to get back pain? No ☐ Yes ☐

26. Do you think your job is likely to make back pain worse, if someone already has it? No ☐ Yes ☐

27. Would back pain be more of a problem in this job than most other jobs? No ☐ Yes ☐

28. In your job, do you have a choice in deciding:

		Often	*Sometimes*	*Seldom*	*Never/almost never*
a)	**How** you do your work?	☐	☐	☐	☐
b)	**What** you do at work?	☐	☐	☐	☐
c)	Your work timetable and breaks?	☐	☐	☐	☐

29. When you have difficulties in your work, how often do you get help and support from your colleagues or immediate line manager?

Often ☐ Sometimes ☐ Seldom ☐ Never ☐ Not applicable ☐

30. How satisfied have you been with your job as a whole, taking everything into consideration?

Very satisfied ☐ Satisfied ☐ Dissatisfied ☐ Very dissatisfied ☐

SECTION THREE: OTHER JOBS YOU MAY HAVE HELD

*Complete this section **only** if you have held other jobs in the past. **Otherwise go to Section 4, page 59.***

31. The previous section asked about your current or most recent job. Please fill in the table below for all **other jobs that you have held for a year or more** to show age started and age stopped, kind of job, and normal work activities. Begin with the **first** job after leaving school or higher education and stop before your present or last job.

If you have held no jobs other than your current or most recent job please go to Section 4, page 59.

	Age started (years)	Age stopped (years)	Occupation	Self employed in the job? (✓)	Did your job involve any of the following activities in a typical working day? (✓)							
					Digging or shovelling	Working with your back bent or twisted for **more than one hour per day**	Sitting (other than while driving) for **more than 3 hours per day**	Lifting loads heavier than 10 kg (20 lbs) **more than 10 times per day**	Driving a car or van for **more than 1 hour per day**	Driving a lorry, bus or coach for **more than 1 hour per day**	Driving a fork lift truck or off road vehicle for **more than 1 hour per day**	Driving another large vehicle for **more than 1 hour per day**
1.	☐☐	☐☐	______	☐	☐	☐	☐	☐	☐	☐	☐	☐
2.	☐☐	☐☐	______	☐	☐	☐	☐	☐	☐	☐	☐	☐
3.	☐☐	☐☐	______	☐	☐	☐	☐	☐	☐	☐	☐	☐
4.	☐☐	☐☐	______	☐	☐	☐	☐	☐	☐	☐	☐	☐
5.	☐☐	☐☐	______	☐	☐	☐	☐	☐	☐	☐	☐	☐
6.	☐☐	☐☐	______	☐	☐	☐	☐	☐	☐	☐	☐	☐
7.	☐☐	☐☐	______	☐	☐	☐	☐	☐	☐	☐	☐	☐

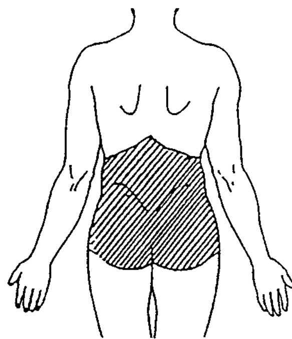
*Please check that the table includes all jobs held for a year or more, **excluding the current or last one**. If you need more space attach an extra sheet here.*

SECTION FOUR: YOUR HEALTH: ACHES AND PAINS

*This section concerns **aches and pains** you may have had in different parts of the body and at different times.*

The first few questions focus on pain in the LOW BACK

32. Please can we confirm that you have had **back pain** lasting more than a day in the **past 12 months** in the area shown in the diagram? *(Don't include pain occurring only during pregnancy, menstrual periods or the course of a feverish illness such as 'flu).*



No ☐ Yes ☐

*If **NO**, go straight to question 48.*

If ***YES***:

33. At what age did you have back pain in this area for the **first time** in your life? ☐☐ years old

34. When were you **last free** from back pain in this area for as long as a **month or more?** ☐☐ *month* ☐☐☐☐ *year*

35. Thinking now of when the most recent episode of back pain began after that time, did it develop:

Gradually ☐ Suddenly outside work ☐ Suddenly at work ☐

36. And **if suddenly**, what were you doing at the time? ______________________________

____

37. Were you in your **current or most recent job** (the one you told us about in Section 2) when this most recent spell of back pain came on? No ☐ Yes ☐

*If **YES**, go to question 40.*

38. If ***NO***, were you in another job?

No ☐ → *Go to Question 40*

Yes ☐

39. If ***YES***, what was this job? ______________________________

What was the industry? ______________________________

39a. And did it involve any of the following activities on a typical working day?

(Please tick all the items that apply.)

	Activity	*No*	*Yes*
a)	Digging or shovelling	☐	☐
b)	Working with your back bent or twisted for more than an hour	☐	☐
c)	Sitting (other than while driving) for more than three hours	☐	☐
d)	Lifting loads heavier than 10 kg (20 lbs) more than ten times	☐	☐
e)	Driving a car or van for more than an hour (do not include journeys to and from work)	☐	☐
f)	Driving a bus or coach for more than an hour	☐	☐
g)	Driving a lorry or heavy goods vehicle for more than an hour	☐	☐
h)	Driving a motorcycle for more than an hour	☐	☐
i)	Driving a forklift truck for more than an hour	☐	☐
j)	Driving a tractor for more than an hour	☐	☐
k)	Driving a loader for more than an hour	☐	☐
l)	Driving a dumper or excavator for more than an hour	☐	☐
m)	Driving another large off-road vehicle (eg harvester, armoured tank) for more than an hour	☐	☐
n)	Driving another large on-road vehicle (eg ambulance, fire engine) for more than an hour	☐	☐

40. If you added up all the days you have taken time off work for back pain in the **past 12 months**, approximately how many days in total would that make altogether? *(Tick one.)*

☐☐☐ days ***or*** not had a job in past 12 months ☐

41. During the **past 12 months** has the pain ever spread down your leg to below your knee? No ☐ Yes ☐

42. During the **past 12 months** have you had weakness or numbness in your lower legs or feet? No ☐ Yes ☐

43. Have you ever given up or changed a job because of your back problem? No ☐ Yes ☐

43a. If ***YES***, when did this last happen? ☐☐ *month* ☐☐☐☐ *year*

44. Have you ever had surgery on your back because of a back problem? No ☐ Yes ☐

44a. If ***YES***, when did you first have surgery on your back? ☐☐ *month* ☐☐☐☐ *year*

Your back in the PAST 4 WEEKS

*The next few questions focus on your back in the **past 4 weeks**.*

45. During the **past 4 weeks** have you had **low back pain** (as shown in the diagram) which lasted more than a day? *(Don't include pain occurring only during pregnancy, menstrual periods or the course of a feverish illness such as 'flu).*

No ☐ Yes ☐

*If **NO**, go straight to question 48.*

46. These questions are about the way your back pain is affecting your daily life. We would like to know if you are, or have been in the **past 4 weeks**, in any of the situations listed below.

(Please tick all the items that apply.)

		No	*Yes*
a)	I stay at home most of the time because of my back.	☐	☐
b)	I change position frequently to try and get my back comfortable.	☐	☐
c)	I walk more slowly than usual because of my back.	☐	☐
d)	Because of my back I am not doing any of the jobs that I usually do around the house.	☐	☐
e)	Because of my back, I use a handrail to get upstairs.	☐	☐
f)	Because of my back, I lie down to rest more often.	☐	☐
g)	Because of my back, I have to hold onto something to get out of an easy chair.	☐	☐
h)	Because of my back, I try to get other people to do things for me.	☐	☐
i)	I get dressed more slowly than usual because of my back.	☐	☐
j)	I only stand up for short periods of time because of my back.	☐	☐
k)	Because of my back, I try not to bend or kneel down.	☐	☐
l)	I find it difficult to turn over in bed because of my back.	☐	☐
m)	My back is painful almost all the time.	☐	☐
n)	I find it difficult to get out of a chair because of my back.	☐	☐
o)	My appetite is not very good because of my back pain.	☐	☐
p)	I have trouble putting on my socks (stockings or tights) because of the pain in my back.	☐	☐
q)	I only walk short distances because of my back pain.	☐	☐
r)	I sleep less well because of my back pain.	☐	☐
s)	Because of my back pain, I get dressed with help from someone else.	☐	☐
t)	I sit down for most of the day because of my back.	☐	☐
u)	I avoid heavy jobs around the house because of my back.	☐	☐
v)	Because of my back pain, I am more irritable and bad tempered with people than usual.	☐	☐
w)	Because of my back pain, I go upstairs more slowly than usual.	☐	☐
x)	I stay in bed most of the time because of my back.	☐	☐

And now your back in the PAST 7 DAYS

47. How would you rate your low back pain on a 0 - 10 scale during a typical day in the **past 7 days** (where **0 = no pain** and **10 = pain as bad as it could be**)?

(Please circle one number.)

No pain — *Pain as bad as it could be*

0 1 2 3 4 5 6 7 8 9 10

Pain at other sites *(tick one box for each question)*

48. During the **past 4 weeks** have you had a pain lasting a day or more in your knee(s)?

No ☐ Yes, but **not** bad enough to prevent normal activities ☐ Yes, and bad enough to prevent normal activities ☐

49. During the **past 4 weeks** have you had a pain lasting a day or more in your hip(s)?

No ☐ Yes, but **not** bad enough to prevent normal activities ☐ Yes, and bad enough to prevent normal activities ☐

50. During the **past 4 weeks** have you had a pain lasting a day or more in your shoulder(s)?

No ☐ Yes, but **not** bad enough to prevent normal activities ☐ Yes, and bad enough to prevent normal activities ☐

51. During the **past 4 weeks** have you had a pain lasting a day or more in your neck?

No ☐ Yes, but **not** bad enough to prevent normal activities ☐ Yes, and bad enough to prevent normal activities ☐

52. During the **past 4 weeks** have you had a pain lasting a day or more in your wrist(s)/hands?

No ☐ Yes, but **not** bad enough to prevent normal activities ☐ Yes, and bad enough to prevent normal activities ☐

53. During the **past 4 weeks** have you had a pain lasting a day or more in your elbow(s)?

No ☐ Yes, but **not** bad enough to prevent normal activities ☐ Yes, and bad enough to prevent normal activities ☐

SECTION FIVE: OTHER SYMPTOMS AND FEELINGS

This section concerns ***other symptoms*** *and your* ***feelings*** *about health problems.*

54. Firstly, some questions about how you feel and how things have been with you **during the past 4 weeks**. *Please tick the one box for each question which most closely reflects how you feel.*

How much of the time **during the past 4 weeks** …….	*None of the time*	*A little of the time*	*Some of the time*	*A good bit of the time*	*Most of the time*	*All of the time*
a) …did you feel full of life?	☐	☐	☐	☐	☐	☐
b) …have you been a very nervous person?	☐	☐	☐	☐	☐	☐
c) …have you felt so down in the dumps that nothing could cheer you up?	☐	☐	☐	☐	☐	☐
d) …have you felt calm and peaceful?	☐	☐	☐	☐	☐	☐
e) …did you have a lot of energy?	☐	☐	☐	☐	☐	☐
f) …have you felt downhearted and low?	☐	☐	☐	☐	☐	☐
g) …did you feel worn out?	☐	☐	☐	☐	☐	☐
h) …have you been a happy person?	☐	☐	☐	☐	☐	☐
i) …did you feel tired?	☐	☐	☐	☐	☐	☐

OTHER SYMPTOMS

55. Below is a list of problems people sometimes have. Please read each one carefully and circle the number that best describes how much that problem has distressed or bothered **you** during the **past 7 days including today**.

	Not at all	*A little bit*	*Moderately*	*Quite a bit*	*Extremely*
a) Faintness or dizziness.	0	1	2	3	4
b) Pains in the heart or chest.	0	1	2	3	4
c) Your feelings being easily hurt.	0	1	2	3	4
d) Feeling that people are unfriendly or dislike you.	0	1	2	3	4
e) Feeling inferior to others.	0	1	2	3	4
f) Nausea or upset stomach.	0	1	2	3	4
g) Trouble getting your breath.	0	1	2	3	4
h) Numbness or tingling in parts of your body.	0	1	2	3	4
i) Feeling weak in parts of your body.	0	1	2	3	4
j) Feeling very self-conscious with others.	0	1	2	3	4

56. Whether you have back pain or not, based on your own views and what the doctor or others may have told you about pain in the back, how strongly do you agree with the following statements?

Please circle one number for each statement which most closely reflects how you feel.
1 means you completely disagree, 5 means you completely agree.

a) Physical activity makes back pain worse.	1	2	3	4	5
b) Physical activities should be avoided if they might make the pain worse.	1	2	3	4	5
c) Rest is needed for back pain to get better.	1	2	3	4	5
d) Normal work should be avoided until the pain is treated.	1	2	3	4	5
e) It is important to see a doctor straight away at the first sign of trouble.	1	2	3	4	5
f) Neglecting problems of this kind can cause permanent health problems.	1	2	3	4	5

SECTION SIX: CONTACT DETAILS

We may wish to contact you again in the future to ask similar questions about your health. Please can you tick one of the boxes below to indicate whether or not you would mind us contacting you again?

YES, I am happy to be contacted again ☐

NO, I would prefer not to be contacted again ☐

If ***YES***, please check we have your correct address. If not, please write it in the space below.

Address: …………………………………………………………………..

……………………………………………………………………………….

……………………………………………………………………………….

……………………………………………………………………………….

****

You have finished. Please take a moment to look through your answers. Return the questionnaire to us in the pre-paid envelope supplied. Once again thank you for your time and help.

APPENDIX 5B

Self-administered questionnaire for case-control studies – Controls

From VIBRISKS Working Document WP4-N8 prepared by:
Keith Palmer, Clare Harris

SECTION ONE: ABOUT YOURSELF

1. Please fill in your date of birth ☐☐ ☐☐ ☐☐☐☐
   day *month* *year*

2. *and* your sex — Male ☐ Female ☐

3. Please give your height *and* your weight — Height ☐ ft ☐☐ in or ☐☐☐ cm
   Weight ☐☐ st ☐☐ lbs or ☐☐☐ kg

4. Please indicate your ethnic origin by ticking the appropriate box

White	☐	Indian	☐
Black-Caribbean	☐	Pakistani	☐
Black-African	☐	Bangladeshi	☐
Black-Other	☐	Chinese	☐
Other	☐ (please specify ______________________________)		

5. Have you ever **smoked** regularly (ie at least once a day for a month or longer)? — No ☐ Yes ☐

5a. If ***YES,*** how old were you when you **first** smoked regularly? ☐☐ years

5b. Do you **still** smoke regularly? — No ☐ Yes ☐

5c. If ***NO***, how old were you when you **last** smoked regularly? ☐☐ years

6. Have you ever had a job since leaving school or higher education? — No ☐ Yes ☐

*If **NO**, please go to Section 4, page 75.*

*If **YES,** please continue.*

SECTION TWO: YOUR CURRENT OR MOST RECENT JOB

*We would like to know about your **current** or **most recent** job. If you have more than one job (or had more than one job at the time you last worked), please focus on the **main** one.*

7. What is your **CURRENT OR MOST RECENT OCCUPATION?** ______________________

8. In what **INDUSTRY** do (did) you carry this job out (eg farming, shipyard, hospital, bank)? ______________________

9. When did you start this job? ☐☐ ☐☐☐☐
month *year*

10. When did you last do this job?

Still doing it ☐ *or* ☐☐ ☐☐☐☐
month *year*

11. How many hours per week do (did) you normally work in this job? ☐☐☐ hours

12. And are (were) you employed or self-employed?

Employed ☐ Self-employed ☐

ACTIVITIES IN YOUR JOB

*Considering your current or your most recently held job that you have just been telling us about, we are interested in the physical activities carried out in **an average working day**. If you no longer do this job, please tell us about what the job used to be like before you gave it up. If you have changed what you do in the job because of a current health problem, please tell us what it used to be like before you had to make the changes.*

(Tick the most appropriate box(es)).

Lifting

13. How many **times** in an average working day do you lift loads greater than 10 kg (20 lbs), eg a large bag of potatoes or a full bucket of water?

Not at all ☐ 1 - 10 times ☐ More than 10 times ☐

13a. And how many **times** in an average working day do you lift such a load **whilst your back is in a bent or twisted position**, as shown?

Not at all ☐ 1 - 10 times ☐ More than 10 times ☐

Digging

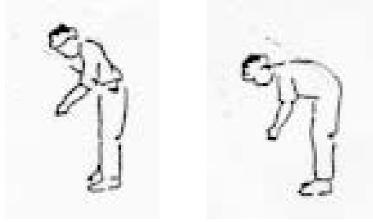
14. Does an average working day involve digging or shovelling? No ☐ Yes ☐

Posture

15. During an average day in the job, how many hours in total are spent standing or walking?

None ☐ Less than an hour ☐ 1 - 3 hours ☐ More than 3 hours ☐

16. Does an average working day involve bending as shown below?



No ☐ Yes ☐

*If **NO**, please go to question 17.*

16a. If ***YES***, how many times in an average working day do you bend over in such a position?

Less than 5 times ☐ 5 - 20 times ☐ more than 20 times ☐

16b. And, if you add together all the time in an average working day that you spend in such a position, how many hours does that make?

Less than an hour ☐ 1 - 3 hours ☐ More than 3 hours ☐

17. Does an average day in the job involve twisting as shown below?

No ☐ Yes ☐

*If **NO**, please go to question 18.*

17a. If ***YES,*** how many times in an average working day do you twist like this?

Less than 5 times ☐ 5 - 20 times ☐ more than 20 times ☐

17b. And, if you add together all the time in an average working day that you spend in such a twisted position, how many hours does that make?

Less than an hour ☐ 1 - 3 hours ☐ More than 3 hours ☐

18. If you add together all the time in an average working day that you spend working with your arms raised and your hand held above shoulder height, how long does that make?

Not done at all ☐ Less than an hour ☐ 1 - 3 hours ☐ More than 3 hours ☐

19. During an average working day, how long in total do you spend sitting (other than while driving)?

Not done at all ☐ Less than 1 hour ☐ 1 - 3 hours ☐

More than 3 and up to 6 hours ☐ More than 6 hours ☐

20. Does an average working day involve sitting (other than when driving) for longer than three hours at a time?

No ☐ Yes, but I **can** get up and move around when I want to ☐ Yes, and I **cannot** get up and move around even if I want to ☐

Professional Driving

21. Does your job normally involve **professional driving** (ie driving in the job for more than an hour on a typical working day - other than going to and from your normal place of work)? No ☐ Yes ☐

*If **NO**, go to question 25.*

22. Does an average working day involve driving for more than three hours at a time? No ☐ Yes ☐

23. Which of the following vehicles do you normally drive in the job, and for how many hours per week on average?

	Vehicle	*Tick if driven in the job (✓)*	*Roughly how many hours do you drive this vehicle on average?*
a)	Car or van (do **not** include journeys to and from work)	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
b)	Bus or coach (as a driver, **not** a passenger)	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
c)	Lorry or heavy goods vehicle	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
d)	Motorcycle (do **not** include journeys to and from work)	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
e)	Forklift truck	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
f)	Tractor	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*
g)	Loader	☐	☐☐ *hrs* ☐☐ *mins* *(per week)*

	Vehicle	Tick if driven in the job (✓)	Roughly how many hours do you drive this vehicle on average?
h)	Dumper or excavator	☐	☐☐ hrs ☐☐ mins (per week)
i)	Other large off road vehicle (eg harvester, armoured tank)	☐	☐☐ hrs ☐☐ mins (per week)
j)	Other large on road vehicle (eg ambulance, fire engine)	☐	☐☐ hrs ☐☐ mins (per week)

24. Do you regularly have to load or unload the vehicle(s) you drive by moving heavy materials or equipment by hand? No ☐ Yes ☐

Your views about your job

25. Do you believe that your job makes a person more likely to get back pain? No ☐ Yes ☐

26. Do you think your job is likely to make back pain worse, if someone already has it? No ☐ Yes ☐

27. Would back pain be more of a problem in this job than most other jobs? No ☐ Yes ☐

28. In your job, do you have a choice in deciding:

		Often	*Sometimes*	*Seldom*	*Never/almost never*
a)	**How** you do your work?	☐	☐	☐	☐
b)	**What** you do at work?	☐	☐	☐	☐
c)	Your work timetable and breaks?	☐	☐	☐	☐

29. When you have difficulties in your work, how often do you get help and support from your colleagues or immediate line manager?

Often ☐ Sometimes ☐ Seldom ☐ Never ☐ Not applicable ☐

30. How satisfied have you been with your job as a whole, taking everything into consideration?

Very satisfied ☐ Satisfied ☐ Dissatisfied ☐ Very dissatisfied ☐

SECTION THREE: OTHER JOBS YOU MAY HAVE HELD

*Complete this section **only** if you have held other jobs in the past. **Otherwise go to Section 4, page 75.***

31. The previous section asked about your current or most recent job. Please fill in the table below for all **other jobs that you have held for a year or more** to show age started and age stopped, kind of job, and normal work activities. Begin with the **first** job after leaving school or higher education and stop before your present or last job.

If you have held no jobs other than your current or most recent job please go to Section 4, page 75.

	Age started (years)	*Age stopped (years)*	*Occupation*	*Self employed in the job? (✓)*	*Did your job involve any of the following activities in a typical working day? (✓)*							
					Digging or shovelling	*Working with your back bent or twisted for **more than one hour per day***	*Sitting (other than while driving) for **more than 3 hours per day***	*Lifting loads heavier than 10 kg (20 lbs) **more than 10 times per day***	*Driving a car or van for **more than 1 hour per day***	*Driving a lorry, bus or coach for **more than 1 hour per day***	*Driving a fork lift truck or off road vehicle for **more than 1 hour per day***	*Driving another large vehicle for **more than 1 hour per day***
1.	☐☐	☐☐	______	☐	☐	☐	☐	☐	☐	☐	☐	☐
2.	☐☐	☐☐	______	☐	☐	☐	☐	☐	☐	☐	☐	☐
3.	☐☐	☐☐	______	☐	☐	☐	☐	☐	☐	☐	☐	☐
4.	☐☐	☐☐	______	☐	☐	☐	☐	☐	☐	☐	☐	☐
5.	☐☐	☐☐	______	☐	☐	☐	☐	☐	☐	☐	☐	☐
6.	☐☐	☐☐	______	☐	☐	☐	☐	☐	☐	☐	☐	☐
7.	☐☐	☐☐	______	☐	☐	☐	☐	☐	☐	☐	☐	☐

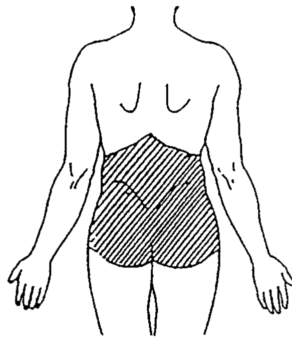
*Please check that the table includes all jobs held for a year or more, **excluding the current or last one**. If you need more space attach an extra sheet here.*

SECTION FOUR: YOUR HEALTH: ACHES AND PAINS

*This section concerns **aches and pains** you may have had in different parts of the body and at different times.*

The first few questions focus on pain in the LOW BACK

32. Have you ever had **back pain** in the area shown in the diagram which has lasted for more than a day? *(Don't include pain occurring only during pregnancy, menstrual periods or the course of a feverish illness such as 'flu).*



No ☐ Yes ☐

*If **NO**, go straight to question 37.*

If ***YES***:

32a. When did you **last** have back pain in this area lasting a day or longer?

Within the last month ☐ More than a month but less than a year ago ☐ More than a year ago ☐

33. Has the pain ever spread down your leg to below the knee? No ☐ Yes ☐

*If **NO**, go to question 34.*

33a. If ***YES***, when did you last have pain spreading down your leg to below your knee?

Within the last month ☐ More than a month but less than a year ago ☐ More than a year ago ☐

34. If you added up all the time that you have ever had back pain in the area shown, how long would this be in total?

Up to 1 month ☐ 1 - 6 months ☐ More than 6, up to 12 months ☐ More than 1 year ☐

35. Have you ever taken time off work because of low back pain? No ☐ Yes ☐

35a. If ***YES***, when did you last take time off work for low back pain? ☐☐ ☐☐☐☐
month *year*

36. Have you ever: *(please tick all the items that apply)*

		No	*Yes*
a)	Seen a doctor or health care professional for your back pain?	☐	☐
b)	Visited a hospital because of your back pain?	☐	☐
c)	Had an X-ray of your back because of back pain?	☐	☐
d)	Had a scan of your back because of back pain?	☐	☐
e)	Had surgery on your back because of back pain?	☐	☐

Pain at other sites

37. During the **past 4 weeks** have you had a pain lasting a day or more in your knee(s)?

No ☐ Yes, but **not** bad enough to prevent normal activities ☐ Yes, and bad enough to prevent normal activities ☐

38. During the **past 4 weeks** have you had a pain lasting a day or more in your hip(s)?

No ☐ Yes, but **not** bad enough to prevent normal activities ☐ Yes, and bad enough to prevent normal activities ☐

39. During the **past 4 weeks** have you had a pain lasting a day or more in your shoulder(s)?

No ☐ Yes, but **not** bad enough to prevent normal activities ☐ Yes, and bad enough to prevent normal activities ☐

40. During the **past 4 weeks** have you had a pain lasting a day or more in your neck?

No ☐ Yes, but **not** bad enough to prevent normal activities ☐ Yes, and bad enough to prevent normal activities ☐

41. During the **past 4 weeks** have you had a pain lasting a day or more in your wrist(s)/hands?

No ☐ Yes, but **not** bad enough to prevent normal activities ☐ Yes, and bad enough to prevent normal activities ☐

42. During the **past 4 weeks** have you had a pain lasting a day or more in your elbow(s)?

No ☐ Yes, but **not** bad enough to prevent normal activities ☐ Yes, and bad enough to prevent normal activities ☐

SECTION FIVE: OTHER SYMPTOMS AND FEELINGS

*This section concerns **other symptoms** and your **feelings** about health problems.*

43. Firstly, some questions about how you feel and how things have been with you **during the past 4 weeks**. *Please tick the one box for each question which most closely reflects how you feel.*

How much of the time **during the past 4 weeks** …….	*None of the time*	*A little of the time*	*Some of the time*	*A good bit of the time*	*Most of the time*	*All of the time*
a) …did you feel full of life?	☐	☐	☐	☐	☐	☐
b) …have you been a very nervous person?	☐	☐	☐	☐	☐	☐
c) …have you felt so down in the dumps that nothing could cheer you up?	☐	☐	☐	☐	☐	☐
d) …have you felt calm and peaceful?	☐	☐	☐	☐	☐	☐
e) …did you have a lot of energy?	☐	☐	☐	☐	☐	☐
f) …have you felt downhearted and low?	☐	☐	☐	☐	☐	☐
g) …did you feel worn out?	☐	☐	☐	☐	☐	☐
h) …have you been a happy person?	☐	☐	☐	☐	☐	☐
i) …did you feel tired?	☐	☐	☐	☐	☐	☐

OTHER SYMPTOMS

44. Below is a list of problems people sometimes have. Please read each one carefully and circle the number that best describes how much that problem has distressed or bothered **you** during the **past 7 days including today**.

	Not at all	*A little bit*	*Moderately*	*Quite a bit*	*Extremely*
a) Faintness or dizziness.	0	1	2	3	4
b) Pains in the heart or chest.	0	1	2	3	4
c) Your feelings being easily hurt.	0	1	2	3	4
d) Feeling that people are unfriendly or dislike you.	0	1	2	3	4
e) Feeling inferior to others.	0	1	2	3	4
f) Nausea or upset stomach.	0	1	2	3	4
g) Trouble getting your breath.	0	1	2	3	4
h) Numbness or tingling in parts of your body.	0	1	2	3	4
i) Feeling weak in parts of your body.	0	1	2	3	4
j) Feeling very self-conscious with others.	0	1	2	3	4

45. Whether you have back pain or not, based on your own views and what the doctor or others may have told you about pain in the back, how strongly do you agree with the following statements?

Please circle one number for each statement which most closely reflects how you feel.
1 means you completely disagree, 5 means you completely agree.

a) Physical activity makes back pain worse.	1	2	3	4	5
b) Physical activities should be avoided if they might make the pain worse.	1	2	3	4	5
c) Rest is needed for back pain to get better.	1	2	3	4	5
d) Normal work should be avoided until the pain is treated.	1	2	3	4	5
e) It is important to see a doctor straight away at the first sign of trouble.	1	2	3	4	5
f) Neglecting problems of this kind can cause permanent health problems.	1	2	3	4	5

SECTION SIX: CONTACT DETAILS

We may wish to contact you again in the future to ask similar questions about your health. Please can you tick one of the boxes below to indicate whether or not you would mind us contacting you again?

YES, I am happy to be contacted again ☐

NO, I would prefer not to be contacted again ☐

If ***YES***, please check we have your correct address. If not, please write it in the space below.

Address: …………………………………………………………………..

……………………………………………………………………….

……………………………………………………………………….

……………………………………………………………………….

****

You have finished. Please take a moment to look through your answers. Return the questionnaire to us in the pre-paid envelope supplied. Once again thank you for your time and help.

APPENDIX 6

Protocol for WBV measurements to be used in WBV experimental studies as input for the FE-model in order to predict spinal stress

From VIBRISKS Working Document WP6-N1 prepared by:
Barbara Hinz, Helmut Seidel

1 Vibration exposure

1.1. Transducer location scheme (see Figure 1)

1.1.1. Seat surface: translational accelerations x, y, z (optional rotations r_x, r_y)

1.1.2. Seat base = floor of the cabin, near the seat: translational accelerations x, y, z

1.1.3. Back rest (between the backrest and the subject): translational accelerations x, y, z

1.1.4. If the vibration at the supports for hands and/or feet differ from those at the floor, translational accelerations x, y, z at the contact surfaces can be measured and provided.

1.1.5. Very important!!! The signs of all signals should be clearly defined, e. g., plus and minus should be assigned to upwards or downwards acceleration, the signs of the horizontal accelerations should be defined, too. Without this assignment, data cannot be used as input for the model.

1.1.6. Minimum requirement: Seat base z, seat surface z, back rest x. Please note that incomplete vibration input will affect the result of calculations, because missing data shall be replaced by estimated accelerations.

1.2. Signal acquisition

1.2.1. Time series synchronised measurements in ASCII files.

1.2.2. It is important that all time series are recorded simultaneously, i.e. without any time shift between different channels.

1.2.3. If longer time series are provided, the section or sections considered as typical should be indicated.

1.3. Signal processing

1.3.1. Sampling frequency: 1000 Hz, minimum 400 Hz

1.3.2. Acceleration: Low pass filter (identical for all time series): fc=100 Hz (-3dB) ; Butterworth type –36dB/octave

1.4. Photo and Video acquisition

1.4.1. Photographs of the machine

1.4.2. Two photographs of the seat (front view, side view) without the driver, the floor (= horizontal reference for the description of posture) should be seen, the profile of the seat should be seen.

1.4.3. Photo of the seat with the driver

1.4.4. Photo of the seat with the accelerometers

1.4.5. Video of the tests showing the seat and driver and the interaction with the controls.

1.4.6. *.avi file synchronised with data acquisitions.

1.5. **Information on the seat**

1.5.1. Seat type

1.5.2. Kind and location of suspension

1.5.3. If applicable - Adjustment of the seat suspension to body mass, adjustment of the seat to other individual parameters (e.g., seat height, lumbar support, slope of the seat surface)

1.5.4. Year of production

1.5.5. Time since the last maintenance service of the seat

Note: The following information is required for the estimation of some details of the posture that can possibly not be obtained directly. Details are given in Section 3 and the angles should be documented with that section.

- Angle between the seat surface and the floor of the cabin (the latter supposed to be horizontal). *See Section 3.2, Angle AS.*
- Three angles between the seat surface the and (1) lower, (2) central and (3) upper parts of the backrest. *See Section 3.2, Angles AB1, AB2, AB3*

1.6. **Information on the task and driving conditions**

1.6.1. Working task

1.6.2. Kind of activity

1.6.3. Quality of the ground

2 Information on the driver (Anthropometric data) (see Figure 2)

1.7. *Body weight, body mass:* Weighing of lightly clad body.

1.8. *Body height:* Linear distance of the vertex (highest point of the top of the head in the median plane with the head orientated in the plane of the ear and eyes) from the reference surface, standing subject. Measurement by an anthropometer.

1.9. *Seated height:* Linear distance of the vertex from the seat reference surface for an upright seated posture and orientation of the head in the plane of the eyes and ears. Measurement by an anthropometer.

1.10. *Chest depth:* Greatest sagittal diameter of the torso at the height of the middle of the sternum where the fourth pair of ribs articulate the sternum when breathing softly.

1.11. *Chest breadth:* Greatest transverse diameter of the torso at the height of the middle of the sternum, where the fourth pair of ribs articulate the sternum when breathing softly.

1.12. *Pelvic breadth (cristal breadth, bi-cristal diameter):* Linear distance between the two iliocristalia (iliac crest point, correspond to the most lateral point of the iliaccrest. Measurement by large calipers.

1.13. *Circumference of waist:* Horizontal circumference of the torso in the middle between the chest (i. e. in the middle between the most distal part of the costal arch and the most cranial part of the crista iliaca sup. when breathing softly. Measurement by a tape measure.

1.14. *Length of the upper part of the body* l_1: Linear distance between the hip (most prominent part of the trochanter major femoris) and the vertex. Measurement either by an anthropometer using separate height measurements (hip and vertex above the floor) with the standing person or by a tape measure (a minor error is possible – the result is

somewhat bigger than the anthropometrically defined length that is the projection of this distance to the vertical).

1.15. *Length of the thigh l_2:* Linear distance between the knee (apex capitis fibulae) and hip (most prominent part of the trochanter major). Measurement either by an anthropometer using separate height measurements (knee and hip above the floor) with the standing person or by a tape measure (a minor error is possible – the result is somewhat bigger than the anthropometrically defined length that is the projection of this distance to the vertical).

1.16. *Length of the shank and foot l_3:* Linear distance between the sole of the foot and the knee (apex capitis fibulae). Measurement either by an anthropometer using one height measurement (knee) above the floor or by a tape measure (a minor error is possible – the result is somewhat bigger than the anthropometrically defined length that is the projection of this distance to the vertical).

1.17. *Elbow breadth* (bi-epicondylar breadth, bicondylar diameter at elbow): Linear separation between the two humeri; between the lateral humerus (point on side of the upper arm; corresponds to the most lateral point of the upper arm in the region of the elbow joint) and the medial humerus (point on the inside of the upper arm, corresponds to the most medial point of the upper arm bone in the area of the elbow joint. Measurement by sliding calipers.

1.18. *Length of the upper arm*: Linear distance between the acromion process (corresponds to the most lateral point of the shoulder blade at the top of the shoulder) and the most proximal part of the head of the radius (measuring position: standing person, stretched arm – fingers showing downwards, palm to the thigh). Measurement either by an anthropometer using different height measurements or by a tape measure (a minor error is possible – the result is somewhat bigger than the anthropometrically defined length of the upper arm that is the projection of the upper arm to the vertical).

Note: The measures 2.11 and 2.12 will not be used as input for the model, but they are of interest for the prediction of the areas of lumbar discs.

3 Information on posture

3.1. Seating conditions

3.1.1. Use of safety belt

3.1.2. Contact with the backrest

3.2. Angles describing the posture

Set of angles for the description of posture. Measurement by a goniometer. (Some angles might be estimated from suitable photos.)

Angle	Definitions of the angles
A1	Angle between the straight lines which connects the foot joint (malleolus lateralis) and the knee joint (lower leg, Apex capitis fibulae), and the horizontal *(might conditionally be replaced by AX2, but see Note!)*
A2	Angle between the straight lines which connects the knee joint (Apex capitis fibulae) and at the hip joint (thigh, Trochanter major femoris), and the horizontal *(can conditionally be replaced by AX2, but see Note!)*
A3	Angle between the straight line which connects the hip joint (thigh, Trochanter major femoris) and the spinous process S1, and the horizontal. Note: Considering the high significance of this angle, some effort should be undertaken to obtain it. (If not accessible, this angle would be estimated.)
A4	Angle between the straight line which connects the spinous processes of T11 and T5, and the horizontal. (If not accessible, this angle would be estimated.)
A5	Angle between the straight line which connects the spinous process of C7 and the tragus. (If not accessible, this angle would be estimated.)
A6	Angle between the straight line which connects the acromion and the elbow joint (upper arm, Epicondylus lateralis humeri), and the horizontal *(might conditionally be replaced by AX3, but see Note!)*
A7	Angle between the straight line, which connect the markers at the elbow joint (Epicondylus lateralis humeri) and wrist (Processus styloideus ulnae), and the horizontal *(might conditionally be replaced by AX3, but see Note!)*
AX1 + Deviat.	Angle between the straight lines which connect the head (tragus in front of the ear, above the temporomandibular joint) and the acromion, and the acromion and the hip (trochanter major femoris). *See Note!*
AX2 (A1&2) + Deviat.	*To be measured, if A1 or A2 is not measured. Angle between the straight lines which connect the foot joint (malleolus lateralis) and the knee joint (lower leg, Apex capitis fibulae), and the knee joint (Apex capitis fibulae) and at the hip joint (thigh, Trochanter major femoris). Might replace A1 and A2.* See Note!
AX3 (A6&7) + Deviat.	*To be measured, if A6 or A7 is not measured. Angle (not shown in Figure 3) between the straight lines which connect the acromion and the elbow joint (upper arm, Epicondylus lateralis humeri), and the elbow joint (Epicondylus lateralis humeri) and wrist (Processus styloideus ulnae). Might replace A6 and A7.* See Note!
AS	*Angle between the seat surface and the horizontal.*
AB1	*Angle between the lower part of the backrest and the seat surface.*
AB2	*Angle between the central part of the backrest and the seat surface.*
AB3	*Angle between the upper part of the backrest and the seat surface.*

Note: The deviation (Deviat.) of the lower (distal) side of this angle from the horizontal shall be given.

4. REPORT

A report on each measurement is recommended with the following elements:

4.1. Identification

Front page:

- Title,
- reference number,
- name and signature of the writer and approver,
- date of measurement,
- person responsible for the measurement,
- acquisition equipment,
- transducers location,
- orientation and polarity,
- sampling rate,
- filter type and anti-alias filter frequencies.

4.2. Text

Description/Identification of the measurements, exposure conditions, anthropometric characteristics, and posture – cf. Sections 1, 2 and 3.

4.3. Appendices

4.3.1. Track description,
4.3.2. Drawings and/or photographs of transducers positions (indication of polarity),
4.3.3. Transducers' technical characteristics,
4.3.4. Data acquisition files description: names with tests conditions.

CD-ROM

Data acquisition files: ASCII format.

Video acquisition files: AVI format.

Photographs: JPEG format

Text of sections 1 - 4.

Figure 1. Exposure input data for the model

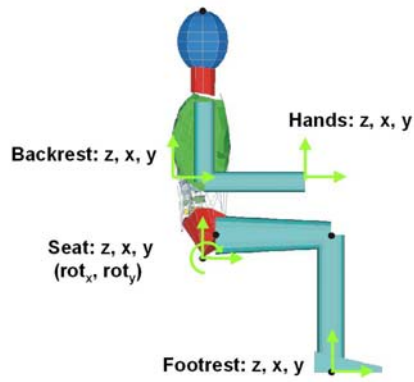


Figure 2. Anthropometric data for the model

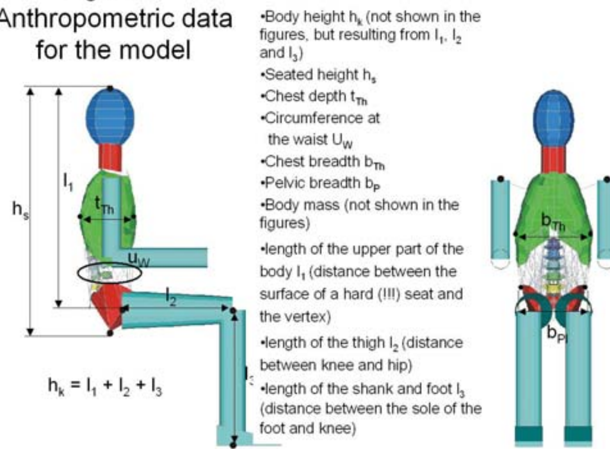


Figure 3. Postural data for the model