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REPORT

Measurement of psychosocial working conditions in Norway: A review of current practice

**Hans Torvatn, with Per Øystein Saksvik
and Tove Helland Hammer**

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**Measurement of psychosocial working conditions in Norway:
A review of current practice**

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Norwegian Labour Inspection Authority

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ABSTRACT

This report provides an analysis of the limitations of the current Norwegian practice of measuring work conditions, and offers suggestions for improving practice. We discuss the needs for updated and representative measurement of working conditions in Norway, and argue that despite Norway's strong tradition of work life research, studies of work life and working conditions have almost always been focused on particular topics or narrow problems, with little thought given to obtaining a comprehensive, or general, examination and analysis of work life.

We identify the measures, or instruments, that have been used to examine working conditions on a national level up to the present time. Focus is on measurements employed to measure psychosocial work conditions, but during this process we also touch upon measurement of other work conditions. Unfortunately, current measurement practices have several limitations. The six most important deficiencies are:

- 1) The use of "one shot" surveys designed to collect information about specific, often narrow, work life topics (with exception of Statistics Norway)
- 2) The surveys have had weak theoretical underpinnings
- 3) An absence of a clear method or logic for selecting topics to be included or excluded
- 4) The surveys have been designed and used for cross sectional research, not for cohort or longitudinal studies
- 5) The surveys have focused almost exclusively on the individual level of analysis
- 6) There has been a division of labor between the agency collecting data and agencies analyzing data, which has resulted in limited use of the data collected

Based on this analysis, we then propose a new design for measuring the work environment in Norway.

| KEYWORDS | ENGLISH | NORWEGIAN |
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| GROUP 1 | Work environment | Arbeidsmiljø |
| GROUP 2 | Mesurement | Måling |
| SELECTED BY AUTHOR | Psychosocial | Psykososialt |
| | Review | Gjennomgang |
| | | |

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Summary

This report provides an analysis of the limitations of the current Norwegian practice of measuring work conditions, and offers suggestions for improving practice. We discuss the needs for updated and representative measurement of working conditions in Norway, and argue that despite Norway's strong tradition of work life research, studies of work life and working conditions have almost always been focused on particular topics or narrow problems, with little thought given to obtaining a comprehensive, or general, examination and analysis of work life.

We identify the measures, or instruments, that have been used to examine working conditions on a national level up to the present time. Focus is on measurements employed to measure psychosocial work conditions, but during this process we also touch upon measurement of other work conditions. Unfortunately, current measurement practices have several limitations. The six most important deficiencies are:

1. The use of "one shot" surveys designed to collect information about specific, often narrow, work life topics (with exception of Statistics Norway)
2. The surveys have had weak theoretical underpinnings
3. An absence of a clear method or logic for selecting topics to be included or excluded
4. The surveys have been designed and used for cross sectional research, not for cohort or longitudinal studies
5. The surveys have focused almost exclusively on the individual level of analysis
6. There has been a division of labor between the agency collecting data and agencies analyzing data, which has resulted in limited use of the data collected

Based on this analysis, we then propose a new design for measuring the work environment in Norway, built on the following principles:

- Surveys should be based on well established theories of work life and work experiences, and contain questions from validated instruments based on international research, in order to provide an overall view of, if not all, then at least the most salient features of work environment in Norway
- Research samples should be representative of the Norwegian work life, both on the individual and enterprise level. That is, the research design should include parallel panels of employees and enterprises
- To measure changes in the work environment over time, surveys should be conducted at regular intervals, say every two or three years
- A longitudinal design should be used to allow for repeated sampling of information from the same unit of analysis
- The survey design should allow analyses on both the individual and enterprise level
- The institution carrying out the surveys should also be responsible for reporting and using the data collected

We propose that the Norwegian Labour Inspection Authority should be the responsible governmental agency for ensuring that regular surveys of the Norwegian work environment be carried out. We also propose topics to be included in the surveys, with a focus on the psychosocial work environment.

1 Background and overview of report

1.1 The focus of this report

This report provides an analysis of the measurement of work environment in Norway, with particular emphasis on the measurement of the psychosocial work environment. The main topic of this report is the *measurement* of working conditions, not the current status of working conditions. The report summarizes the need for a measurement system, contains an analysis of the limitations of the current practice of measuring work conditions, provides an analysis of the measurement practice, and offers suggestions for improving this practice.

A separate research note provides an overview of measurement practice of work environment in Norway (Torvatn, 2005). The content of this research note is a review of the work carried out by Statistics Norway (Statistisk Sentralbyrå - SSB), and through this review, an overview of the actual development of working conditions as measured by Statistics Norway. These are the only Norwegian national representative and repeated measures of working conditions, and they therefore define measurement practice to some degree. The separate research note includes an overview of what is measured by Statistics Norway, what is not measured, and how the data are analyzed and used, to substantiate our claims in this report. Some conclusions from the research note are included in this report.

1.2 The need for updated and representative measurement of the work environment

There is a strong need for research based on systematic, updated and representative surveys of the Norwegian work environment. Data from such surveys would provide politicians, bureaucrats, trade unions, business confederations, the Labour Inspectorate, work life scientists and the society in general with research based knowledge about relationships in, and the development of, the work environment, employee health and well being, and the quality of work life. In addition to enhancing the general knowledge about the work environment, such measurement could be used to provide:

- Better information for decision makers, in order to develop laws and regulations in this area

- A foundation for prioritizing Occupational Health Work, both in general, and specifically to aid the work of the Labour Inspectorate
- Benchmarking exercises for individual enterprises, so that the work environment in a given enterprise could be compared with the overall situation
- Baseline information for studies focusing on specific work life topics, groups of employees, industries, etc

Few individuals or agencies concerned with occupational health dispute the need for longitudinal work environment surveys. Current practice however, is far from ideal. Some nationwide surveys have been carried out by different research groups and institutions, but as we will show in this report the surveys suffer from several limitations and do not provide enough information.

1.3 Current practice in measuring the work environment in Norway

Norway has a well established and strong tradition of work life research, including work environment studies. It is a rather heterogeneous tradition with respect to both methods and research topics. The focus is, however, on particular topics, not on the general, or overall, work environment. Although high quality work environment research has been, and is, conducted in Norway, this is almost always done on some specific problem. There are studies on everything from cancer risks in industry, musculoskeletal disorders, safety practices in offshore, absenteeism, labor-management relations, front-line workers in service, work environment in call centers, for teachers, for construction workers, and so on. Most studies are conducted to meet some specific needs; provide insight into some specific problem(s) of interest to some specific group. Very few studies are concerned with providing an overview of the whole Norwegian work environment.

This is not something to be condemned. Very often general overviews cannot provide the detail needed to solve specific or local problems. Since much research is carried out by contract research agencies on behalf of various institutions trying to solve problems for their members/ clients, it is not surprising that few take responsibility for providing overall descriptions of the working environment. After all, such an overview should be provided by the national authorities, not by private organizations, trade unions, or small research groups. The problem is thus not an attention to the particular, but *a lack of attention to the general*. Nobody has an overview of the situation. There are some national and representative studies aimed at providing an overview. But, as we

will demonstrate in this report, these studies suffer from serious limitations and do not provide the information needed on this level.

Three different agencies have conducted such general surveys of the work environment or working conditions: Statistics Norway, The European Foundation for Improving the Quality of Working Life and Living Conditions (The Foundation), and SINTEF Industrial Management.

Statistics Norway has undertaken a series of studies, with an interval of three to four years (in 1989, 1993, 1996, 2000 and 2003). It is currently not known when a new survey is planned. Statistics Norway publishes figures and tables with descriptive data (mostly frequencies) of individual survey items, but does not itself carry out more complex statistical analyses of relationships between survey variables. Neither does Statistics Norway summarize their findings in any reports. However, researchers at other institutions have carried out such analyses, for example, Pape (1993), Grimsmo (1996), Grimsmo (2001), and Byrkjeland (1998). Their analyses are based on the 1989, 1993 and 1996 data. Reports on the 2000 and 2003 data are not known to us, but data have been published on the Statistic Norway's web-pages, on what is called the Statistikkbank.

A second agency, the European Foundation, has conducted national work environment studies in countries belonging to the European Union, including a pilot study in 1990, and full scale studies in 1996 and 2000. Norway participated in the 2000 study. These studies are cross sectional. The Norwegian part of the sample comprised 1500 respondents.

Various EU-wide and national reports exist, but to our knowledge no analysis focusing specifically on the Norwegian work environment has been published. However, Byrkjeland (1998) used data from the second survey as a basis for comparison of Norway with other European nations in his analysis of Statistics Norway data. The European Foundation data are available for analysis, but they suffer from the same problem as the Statistics Norway data, in that no one has any responsibility and funding for conducting such an analysis.

The third agency having carried out such studies is SINTEF. On behalf of the Trade Union of Norway (LO) SINTEF carried out a representative national survey in 2001. It was a cross sectional study, similar to the Statistics Norway and Foundation studies, but employed a different questionnaire. The key findings were reported in Torvatn and Molden (2001). The study has not been repeated.

We are not aware of other representative national level surveys of the Norwegian work environment. Several studies focusing on specific topics, specific groups of workers, industries or specific regions have been conducted. There are too many of them to warrant detailed descriptions. Suffice it to say that although they contribute to our understanding of the work environment, they cannot, and are not intended to, fill the role of baseline data of the work population in Norway.

In addition to the instruments used in topic specific studies, there is one theory based, tested and validated instrument for measuring psychological and social factors in work, the QPŞ-Nordic. This survey was developed and tested by researchers in four Nordic countries (Skogstad et al., 2001). It contains 129 items measuring 14 psychosocial variables: *Job demands, role expectations, control at work, predictability at work, mastery of work, social interactions, leadership, organizational culture, interaction between work and private life, work centrality, commitment to the organization, group work, work motives*. According to the user manual the survey is designed to provide information about conditions at the level of the job tasks, the individual, the group and the organization. The survey has been extensively tested with different research samples in the Nordic countries, but no representative national study of Norwegian psychosocial work has been published so far to our knowledge.

2 Analysis of the current practice

2.1 The main problems with current practice

We want to emphasize that the studies mentioned above have produced valuable and interesting knowledge about the Norwegian work environment. Unfortunately, current practice has had several limitations and weaknesses. The six most important deficiencies are:

1. These are one shot surveys, except for Statistics Norway
2. The surveys have had weak theoretical underpinnings
3. There has been no clear method or logic for selecting topics to be included or excluded
4. All the surveys have been cross sectional, not cohort or longitudinal studies
5. The surveys have focused almost exclusively on the individual level of measurement

6. There has been a division of labor between the agency collecting data and agencies analyzing data which has resulted in limited use of the data collected

We will discuss each of these problems in detail below. Before doing so, however, we offer some comments on the role which criticism is intended to play in a report that assesses the state of work life research. First, it should be kept in mind that it is easy to criticize something that has been done, but difficult to criticize something that has not been done. Thus, although we comment on the less than adequate questions used in Statistic Norway's surveys, we also recognize that we would have very little information about the Norwegian work environment and work life without the efforts of surveys carried out by Statistics Norway. Statistics Norway has at least done something that can be both used and criticized.

Secondly, when one is criticizing existing practice, one may come across as faultless. This is not our situation. The main authors of this report have played an active part in creating some of the problems we identify here, by conducting one of the flawed surveys, serving on expert teams that developed questions for Statistics Norway, and by not using these data for further analysis. In other words, the deficiencies in measurement, research design, and data analyses we describe in this report are not new to us. We have seen in our own research the problems that often result from inadequacies in theoretical models and measures. We have worked to overcome them, but several of the problems we identify in this report have only become clear to us by running into them in our own research.

We view the current practice of measurement of work environment in Norway to be in a rather sorry state. The responsibility for this situation rests on a number of actors and agencies. Researchers, governmental agencies, the social partners, in short, all parties interested in this kind of information have in various ways contributed to the situation. No one has tried hard to change the current practice. The question of interest, however, is not whose fault it is. The important question is: "What is the problem, and what can be done to solve it"? We will try to answer that question in the next two chapters.

2.1.1 One shot surveys

Neither the European Foundation survey¹ nor the SINTEF LO study has been repeated. Thus they represent one shot descriptions of the work environment at the time of their execution. Nothing can be said regarding development of working conditions over time, what is changing and what is stable. This is not satisfying for a national system of measurement. It is, of course, possible to repeat the surveys, and the European Foundation is likely to repeat its study². Both surveys could, however, still be used to provide input for a new and improved measurement system.

Statistics Norway has repeated its survey a total of five times, and therefore some time series data exist. These are presented on their web-pages and are available from Statistikkbanken³. When we examine the time series data, however, we find that the number of items repeated across all surveys is not very high. In 1989, the survey contained 37 items. The 2003 survey consists of 90 items on the work environment, in addition to demographic data. A total of 35 items have been repeated all five times, and several items have been measured once, twice or thrice. Measures of the physical work environment have been rather stable; of the 20 items used in 2003, 15 were measured already in 1989 and have been measured consistently since. However, when it comes to the focus of this report, the psychosocial work conditions, the picture is quite different. Of the 34 items presented under the heading “organizational work conditions⁴” 8 have been repeated since 1989. Of these 8 items 3 deals with harassment, 3 with various conflicts and 2 with repetitiveness of tasks. If we compare this to the 14 topics covered by QPS-Nordic or the 13 topics covered by SINTEF/NTNU, it is reasonable to say that the coverage of psychosocial work conditions is relatively weak. We do have some time series, but they are few in this area and there is a strong need to develop the measurement.

2.1.2 Weak or little theoretical underpinning of questions

In none of the surveys are the questions based on a coherent theoretical model of the work environment. Neither Statistics Norway (see separate note, Torvatn, 2005) nor The Foundation provides us with any theory or model that links the work environment to employee health, nor do they specify hypotheses about relationships between the variables. They do not explain why some

¹ The European Foundation study has been repeated in several European nations, but not in Norway.

² It will be repeated in 2005.

³ An analysis of the 2003 survey shows that Statistics Norway has collected more data than what have been published on Statistikkbanken. This is likely to be the case for the other surveys as well. It is therefore possible that time series with a higher number of items could be published. Since Statistics Norway has chosen not to publish these data we cannot possibly know at the moment, and therefore we rely on the published data.

⁴ Statistics Norway does not itself use the term psychosocial.

questions have been included while others have been excluded. There were expert groups involved in the design of both surveys, so to some degree conceptual analysis must have been done in order for the questionnaires to be developed, but since the models are implicit rather than explicit, it is difficult for others to follow them. Neither do the two agencies explicitly state to what degree the questions employed are built on already established and validated instruments.

Especially in the case of Statistics Norway, this lack of theoretical underpinning has resulted in:

1. Poorly formulated, non validated questions that are not necessarily measuring what they were intended to measure
2. Important topics are not included in the survey
3. Limited possibilities for statistical analysis beyond descriptive summaries
4. No predefined theory or hypotheses that can be tested with the empirical material
5. A growth in the number of items used in the surveys because there are no guidelines that prescribe what the surveys should and should not include
6. Limited possibilities for publications because the theories behind the items are unknown. This also limits the possibilities for international benchmarking

The first two problems in this list are the most troublesome. They imply that because a theory is lacking important aspects of the work environment are not measured, either because the questions are not good enough or because the topics are not addressed. The third and fourth problems mean that the data can only be used for explorative, not model testing, research⁵.

The fifth issue, item growth, is not yet a serious problem. A total of 90 items is not very much, compared with the work environment surveys SINTEF carried out, with between 220 and 250 items (including demographics). However, the actual survey conducted by Statistics Norway in 2003 was considerably larger than 90 items, but a lot of that material was not published. The real problem of item growth is that there is no method for prioritizing topics and items, and thus surveys are likely to grow and grow without any checks. When a question has been included, it tends to stay. The sixth problem, lack of possibilities for international publications, might seem to apply only to researchers. However, without possibilities for comparative studies we cannot learn what is particularly good or bad in the Norwegian work environment.

⁵ Such analysis and model construction have been conducted, see for instance Asbjørn Grimsmo.

To some degree, the SINTEF survey avoids these problems. The reports from the study do not explicitly state what models or theoretical underpinning the survey was built on. However, we know that the questionnaire was built on a model and a questionnaire developed for an earlier study of the food and beverage industry, published in a previous SINTEF report (Torvatn, Saksvik, & Hammer, 2001). That report contains the theoretical model that guided the study, and a description of the sources of the questions. In addition, a separate report validating the questionnaire was published after the study (Saksvik, Hammer, & Nytrø, 2001). Thus SINTEF has employed international and validated questions in its study, but has not described them properly.

2.1.3 No clear methods or logic for selecting topics to be included or excluded

The lack of theoretical underpinning of the surveys also leads to a situation where there is no method or logic applied to decisions about what topics should be included and or excluded from the survey. No survey can cover everything. The decisions about what to include and what to exclude are of key importance in any survey design, and should not be made arbitrarily.

The use of theory is a way of avoiding arbitrariness. A theory would give some guidelines on why something is important or not important, and what kinds of relationships we can expect to find between various variables. Looking at the topics presented by Statistics Norway, it is easy to see that several important topics are lacking. Some of these might be (see chapter 3.2 for an argument about why):

- The role of technology at the workplace
- Organizational development and structural changes
- Interaction with consumers or clients
- Work family-conflicts/timebind
- Workplace norms
- Stress and burnout
- Medical outcomes/health issues
- Positive effects of work, other than job satisfaction

In fairness to Statistics Norway, we note that the 2003 survey includes some of these variables. However, if the design of the survey was based on a theoretical model of the work environment, we would have expected that the full set of variables or topics be listed on their web-pages.

Unpublished and un-analyzed data are of little use in formulating work environment policy and measures.

2.1.4 No cohort or longitudinal studies

A fourth weakness is the cross sectional sampling strategy. All studies described above are reported and discussed as cross sectional studies. They draw a random sample from the population, gather data, analyze them and report the findings. When a new study is conducted, another sample is drawn, which means that it is impossible to follow changes in the work environment over time on the individual level. For example, we do not know anything about possible long time effects of exposure to poor working conditions because we have not measured long time exposure. Every time we measure working conditions, we measure the work environment for a new population. In order to identify the risk associated with exposure, we need to see long time effects of exposure, not only a snapshot taken at one point in time. *“Preventive health promotion work, based on risk assessment, requires knowledge on the relationship between exposure and health.”* (Bye, Bakke, & Grov, 1998, page 7). Thus we need to be able to follow respondents over time with a longitudinal research design where we ask the same respondents the same questions after predefined intervals.

Such a design is not a new idea. Indeed, the earliest surveys done by Statistics Norway were designed as a cohort/panel study in which 2957 workers were interviewed both in 1989 and 1993. However, among these respondents only 1076 had remained in their jobs. It was therefore decided to treat the 1989 and 1993 surveys as two cross sectional studies instead of a panel (Grimsmo, 1996, p 10-11). When the survey of the work environment became incorporated in the survey on living conditions, the panel design was abandoned.

Denmark provides a useful example of panel studies of the work environment. The National Institute for Occupational Health in Denmark has systematically mapped the working conditions, health and lifestyles of a cohort of Danish workers from 1990 to 2000 (DWECS 2000)⁶. In their 2003 summary to the Foundation the report states that (p 2) *“One of the main findings of this thrice repeated study is that the work environment and the working conditions have generally improved from 1990-2000. However, these developments are largely explained by a changing labor force rather than interventions in the work environment and in the occupational health*

⁶ For details, see the website <http://www.ami.dk/national%20data.aspx>

system.” While a set of repeated surveys could identify the first part of this analysis (the improvement of working conditions) it is necessary to use a longitudinal study for the second part. Even though it is a challenge methodologically to carry out panel studies, we think there is so much to gain in the way of useful information that this should be done.

2.1.5 Ignoring the working environment at the organizational level

A fifth weakness is a bias towards the study of the individual employee and a lack of attention to the role of organizational level variables in the work environment. There is a curious gap between the focus of work environment researchers and the rest of the parties interested in following the developments in the work environment. Apart from the researchers, everyone else seems to consider the enterprise level to be the key factor in efforts to improve work life conditions in Norway.

The government and its regulatory system focus strongly on the enterprise. By law it demands systematic occupational health work in every *enterprise*. It places the responsibility for a healthy work environment on the manager of the enterprise and demands company health services for specific types of *enterprises*. Through its inspections the Labour Inspectorate also focuses on the *enterprises*' compliance with the rules and regulations. The company health services as well as private consultants do the same, partly because of the focus from the regulatory agencies and partly because the *enterprises* are their costumers. The trade union (LO) and the employers' confederation (NHO) also focus on the *enterprises*, as they are already organized at this level. Everyone agrees that the *enterprise* is the “unit of development”, not the individual worker. Researchers, on the other hand, have focused their work life studies at the individual level. Although the focus of the discussion about the work environment is the organization (the enterprise), large scale surveys of the work environment have had a distinct bias towards the individual employee. Theoretical models have included some organizational factors, such as leadership, organizational structure, or technology, but the measures have, overwhelmingly, captured individual level variables, such as exposure to job hazards, job demands, social support, or opportunities for participation. The implicit assumption in work environment surveys is that whatever happens, or exists, on the organizational level must be experienced by the individual employee to have an effect on job attitudes, work behaviors, and health outcomes, and there is therefore nothing to be learnt about the work environment by focusing on, or including, organizational level properties. In other words, it is assumed that all the variance in traditional outcome variables, such as physical and psychological health indicators, job satisfaction,

absenteeism, early retirement or turnover, can be explained by the individual employee's perceptions of, and experiences in, the workplace. We believe this assumption is faulty on theoretical grounds, and we have demonstrated empirically that it is incorrect. In a large scale study of the work environment in the Norwegian food and beverage industry, we found that organizational level norms about work performance and social relations had significant effects on employee health and job stress beyond what the individual employee experienced in his or her job (Hammer, Saksvik, Nytrø, Torvatn, & Bayazit, 2004).

There are some exceptions. It should be noted here that the first work environment survey of SSB in 1989 actually tried to combine enterprise and individual level variables. Data were collected on both levels, but according to Pape (1993) the design was not good enough, and no multilevel analysis were carried out. The report from the study consequently focused on the individual level in its description of work environment. Unfortunately, the later studies have not attempted to improve on the design, but have instead focused on the individual level. In contrast, several of the studies on internal control focused on enterprise level analysis (see for instance, Hovden (1998); Saksvik & Nytrø (1996); Nytrø, Saksvik, & Torvatn (1998); Saksvik, Torvatn, & Nytrø (2003)). However, in these studies data were collected only on the enterprise level. What is needed are studies measuring variables on both levels at the same time.

2.1.6 A structural problem of underutilization

As mentioned earlier we do not know of any analysis of the 2000 and 2003 data collected by Statistics Norway⁷. Neither do we know of any analyses focusing on the Norwegian sample in the data from the European Foundation. The data in both cases are available for interested researchers. Regarding the Statistics Norway data, the Bureau makes them available to researchers through Norsk Samfunnsvitenskapelig Datatjeneste. In addition to this a large set of data has been presented and published on the web, on Statistics Norway's "Statistikkbanken". The data thus are accessible and available for all kinds of analyses.

A big question, however, is who should carry out these analyses? There is no governmental agency that has special responsibility to see to that the data are analyzed, and contract research

⁷ SINTEF has not conducted any such analyses. We have searched on the Norwegian library database BIBSYS, and found 163 publications on "arbeidsmiljø" (work environment) since 1999. Based on their title and keywords none of these seems to be using these data. The same goes for 103 reports on "Helse, Miljø and Sikkerhet" (Occupational Health and Safety). Also checking out the web-pages and the report lists of STAMI, FAFO, AFI, and RF, and neither of these institutions seems to have published anything.

agencies are not paid to do such analyses. There are several institutions who would gladly analyze and report on the data collected by Statistics Norway, but without funding they can hardly be expected to do so. There seems to be an implicit assumption that there will be a division of labor and responsibility where Statistics Norway collects and publishes descriptive data (frequency on item or question level), but leaves the rest of the analyses and the elaboration of more comprehensive reports to others. This results in no, or very delayed, analyses except for the frequency tables provided by Statistics Norway. This situation is an unfortunate underutilization of potentially valuable data. Raw data in itself do not provide insight. Analysis is necessary, and the data from Statistics Norway should indeed be analyzed more in detail.

2.2 What is required for a better system for measuring the work environment?

In summary, there is a need for research on the work environment that:

- Is based on international research, validated instruments, and well established theories in order to provide an overall view of, if not all, then at least the most salient features of the work environment in Norway
- Is representative of the Norwegian work life, both on the individual and enterprise level. That is, two samples, one of employees and one of enterprises, should be established in parallel
- Can be replicated after a period of time, in order to measure changes in the work environment during this time
- Has a longitudinal design that includes repeated collection of information from the same unit of analysis
- Allows analyses on both individual and enterprise level
- Ensures that the institution or research group carrying out the surveys should also be responsible for reporting and using the data collected

The theories and topics we suggest to investigate are presented elsewhere (see chapter 3). Here we propose a research design in which two different samples are established: An enterprise sample and an employee sample. Both samples should be representative of the populations from which they are derived; the enterprise population and the workforce. Both samples should be considered cohorts to be followed up and surveyed again.

For the employee sample we will follow the logic used in previous representative studies. We develop a questionnaire, administer it to the respondents and collect their responses. The only difference from previous research is that we plan to return to these respondents after a predefined period of time, thus establishing a longitudinal design. Of course, we need to be able to identify the respondents, inform them about our plans, and obtain their consent. Given that such a research design is already used to study other topics (like aging), it is certainly possible to use the design in studies of the work environment. The employee sample will, after a time and a set of repeated administrations, allow us to investigate the long term effects of the work environment.

For the enterprise sample we will collect data on both individual and enterprise levels. The workers currently hired by the enterprise will answer the same questionnaire about the work environment as do the respondents in the employee sample, and we will register from which enterprise the answers come. An additional questionnaire will be given to the general manager of the enterprise. From him/her we will collect information about the enterprise, such as total size, financial data, health and safety work (like Systematic Occupational Health Work), absenteeism and turnover rates, membership in business confederations, etc. Using the same time interval as in the employee sample, we will return to the enterprises and deliver the questionnaires to the workers and the managers again. We can then carry out multilevel and individual level analyses, and we can follow the enterprises over time.

Finally, it is necessary to discuss who should do the job. While we do not want to criticize Statistics Norway for either their data collection or the ways in which the data are made available to interested parties, the fact remains that their data are underutilized and what data exist are not always easily accessible. It often takes a long time before the reports and analyses become available for public consumption. It is not within Statistics Norway's mandate to do elaborate statistical analyses of work environment variables and trends. Therefore, we suggest that they are not necessarily the institution that is best suited to the collection of data about the work environment. At the very least, they should not be doing it alone.

Of course there are several of research agencies in Norway capable of collecting as well as analyzing such data. We believe we have the necessary expertise and staffing levels to do so at NTNU and SINTEF. Others could probably make the same claim. However, there should be a government agency responsible for such an analysis. Among government agencies, the Labour Inspectorate should have a special interest in the collection and analysis of longitudinal data on the work environment because the work of the Inspectorate requires such information to help in

setting monitoring priorities. In the future we therefore suggest that the Labour Inspectorate take the responsibility for collecting, analyzing, publishing and presenting data on the work environment. The agency needs the data in its daily work. The Labour Inspectorate has administrative, supervisory and information responsibilities in connection with the Work Environment Act. The Inspectorate already collects and publishes statistical information on work related injuries and deaths, and industrial diseases. Information on the work environment from survey data will fill out this picture and help the Inspectorate prioritize and focus its work.

3 What to measure and why use multilevel measurement?

3.1 Physical work environment

Descriptions of the physical work environment, where the aim is the assessment of physical and chemical risk factors in the workplace, are common and any survey of the work environment should include some measures of the physical work environment. According to a report issued by STAMI and the Labour Inspectorate (Bye et al., 1998, 214) five areas are of particular interest in the physical work environment: Chemical factors, Biological factors, Physical factors (light, sound, vibrations, etc), Ergonomic factors and Accidents. There are validated instruments available that measure individual workers' perceived exposure to the first four. Accidents can be, and will be, measured on the enterprise level. In addition, we propose to measure Occupational Health Work on the organizational level.

3.2 The state of the art in psychosocial work environment surveys

In an analysis carried out by STAMI and the Labour Inspectorate (Bye et al., 1998) occupational health experts in Norway were asked what they considered to be the main source of the problems in today's work life. Regardless of their training and background the majority of the experts answered that the source of the problems was the organizational and psychosocial work environment (p14-15). The same view has been found in Sweden (Marklund & Wikman, 2002). In light of the changes that have taken place in the psychosocial work environment since the early 1990s, and the importance of the psychosocial work environment as a source of work life

problems, it is necessary to discuss measurement of the psychosocial work environment in more detail.

There are two theoretically grounded and empirically validated surveys of the organizational and psychosocial work environment in Norway: QPS-Nordic and SINTEF/NTNU survey of the work environment in the food processing and beverage industry. Both are large samples, national level surveys. Studies using QPS-Nordic are documented in several publications, among them Lindström et al. (1995), Lindström et al. (1997), Dallner et al. (2000), Skogstad et al. (2001). The SINTEF/NTNU survey is described in Hammer, Nytrø, and Saksvik (2000), Torvatn et al., (2001), Torvatn and Molden, (2001), Saksvik et al. (2001), and Hammer et al. (2004). The topics, or variables, covered in these surveys should provide a guide to what are the most important aspects of psychosocial work environment.

Table 1 contains a list of the topics included in these two surveys as well as some additional recommendations:

Table 1 Topics included in QPS-Nordic and SINTEF/NTNU surveys

| Topic | QPS-Nordic | SINTEF/NTNU |
|--|-------------------|---|
| Job demands | X | X |
| Role expectations | X | |
| Control at work | X | X |
| Predictability at work | X | |
| Mastery of work | X | |
| Social interaction/ social relations, (including harassment) | X | X |
| Leadership | X | X |
| Communication/ feedback | X | X |
| Organizational climate and culture | X | |
| Interaction between work and private life/ work family conflict | X | X |
| Work centrality | X | |
| Commitment to the organization | X | X |
| Group work | X | |
| Work motives | X | |
| Organizational norms | | X |
| Customer interaction | | X (Only in the national study, not validated) |
| Effort (new addition) | | (X) |
| Rewards (new addition) | | (X) |
| Organizational change (new addition) | | (X) |
| Experiences and propagation of technological changes (new addition) | | (X) |

It is clear from the table that there is considerable overlap between QPS-Nordic and the SINTEF/NTNU surveys with respect to the topics covered. The questions included and the relative weight given to each topic differ, but in both we see that “Job demands”, “Control at work”, “Social interaction/ social relations”, “Communication”, “Leadership”, “Work family-interaction” and “Commitment” are important topics. This does not mean that the theories behind them are the same, and therefore the items under these headings are seldom identical.

There are also some differences between the two instruments in terms of the topics they measure, and they differ in the emphasis placed on various topics. This is not surprising, and we will not discuss the relative merit of the two instruments here. Both are grounded in theory, and the topics covered in either one could be included in a national survey. Which of these topics should be included is something the agency carrying out the survey must decide at a later point.

Table 1 also includes a set of topics, or variables, that were not included in the two surveys, but which we consider important, and for which we can find theoretical support. We will here briefly explain why these topics are important.

As the service sector grows *interaction with customers or clients* has become part of everyday work life (Forseth, Molden, & Rasmussen, 2002). This interaction is an important part of the work environment, having both positive and negative aspects. In their study of work environment in Norway in 2001, Torvatn and Molden (2001) used a self constructed measure of this variable and found that customer interaction was one of the three most important factors affecting health and job satisfaction. We believe that the nature and extent of interaction with customers or clients is an important variable that ought to be included in a general survey of the work environment. Unfortunately, we do not as yet have a validated measure of it which means that one would have to be developed if no other valid scale can be found.

Siegrist and colleagues have developed an “*effort-reward imbalance*” (ERI) model, often used in research on the psychosocial work environment. The ERI model identifies an imbalance between effort and reward at work as a psychosocial risk factor (Siegrist, 1996). According to this model, people experience threats to continuous learning, promotion prospects, and job security as distressing (Siegrist, Peter, Junge, Cremer, & Seidel, 1990; Siegrist, 1996). Siegrist and Peter (1996) have argued that a major threat to health and well being at work is “low status control,” as seen, for example, in forced job changes.

Organisational changes of all kinds have taken place almost everywhere in Norway the last 15 years. The changes range from privatisation to new pay systems. For example, in 1989 Televerket had a monopoly on telecommunications and was owned by the state. In 2005 we have several such companies, and Telenor (successor to Televerket) is on the stock exchange. Televerket is not the only organisation where such changes have taken place. It is well documented that organisational changes can have an impact on the work environment and employees' health (for Norwegian references, see Grimsmo and Hilsen (2000), Moland (1997), Torvatn and Molden (2001); for international studies, see Westerlund et al. (2004)). We believe it will be useful for policy makers, agencies overseeing working conditions, and researchers to have survey data about the extent of organisational change as well as how the changes are experienced in the workforce.

Technology has changed the workplace dramatically the last 15 years. As an example, in 1989 there was no e-mail outside the academic world, and not much of it on the inside either. Few had ever heard the word Internet. Today at least 53 percent of Norwegian workers use e-mail or the Internet on a regular basis to do their job (Torvatn & Molden, 2001). Electronic communication and other technological advances have altered the working environment, but how? We need to know both propagation (extent) of technological change, and how workers experience this change. The 2003 survey of Statistics Norway included questions on this topic, but these data have so far not been published⁸.

3.3 Norms: The need to expand our understanding of the psychosocial work environment

Earlier (see chapter 3.2) we have argued that measurement of the psychosocial work environment is of key importance in a work environment survey. Further we have argued that it is necessary to go beyond a focus on the individual which characterizes most surveys and measure work environment at the organizational level as well (see chapter 2.1) To expand our understanding of the psychosocial work environment we believe information about organizational norms can give us valuable data. We have in our own research demonstrated how norms that operate at the enterprise level contribute to job stress over and above employees' immediate job situation (Hammer et al., 2004), and we find it very important to include these norms in a measurement of work environment.

⁸ According to correspondence with Statistics Norway.

Norms are taken-for-granted beliefs about how people should think and behave (Homans, 1992). Organizational norms are unwritten rules that prescribe the ways in which all members of an organization should approach their work and interact with one another. They are collectively agreed upon behaviours, attitudes, and beliefs that give employees a shared meaning or understanding of the workplace and their roles in it (e.g., Cooke & Rousseau, 1988; Dyer, 1986; Schein, 1992). Such norms are powerful and can influence work environment more heavily than management (Barker, 1993). They should be of sufficient importance to be covered in a national study of psychosocial work environment.

Employees may not know how and why a given set of norms originated, but they understand the obligations implicit in the norms and the expectations placed on their behaviour. The strength of any one set of norms will put pressure on, or constrain, people's behaviour. Norms control behaviour through people's beliefs that others will apply sanctions if they violate expectations, and when expectations conflict, either with personal preferences or with one another, psychological tension and stress ensue. In our survey of the Norwegian food and beverage industry, we found, for example, that there were large differences across firms in norms governing work performance and job attendance which explained significant amounts of variance in job stress over and above the effects of employees' immediate job demands (Hammer et al., 2004).

The domain of behaviours covered by norms will differ across organizations, but implicit rules about work performance, attendance, commitment, social relations, interaction patterns, bullying and harassment will exist in most workplaces. They are part and parcel of the work environment and should therefore be included in national level assessments. Based on our review of work environment research and relevant issues in Norwegian work life, we propose that a work environment survey include the assessment of at least the following norms governing: Work performance (performance pressure), attendance (absenteeism), social and communal relations, bullying and harassment, and the distribution of rewards (equity vs. equality).

3.4 Organizational work environment

We have several times before argued that the work environment is inherently an organizational level variable - a unique and distinguishing property of the firm or institution - and we therefore argue that surveys of the psychosocial work environment in Norway (and elsewhere) must include those organizational level factors that all employees of the firm or institution are exposed to by

virtue of their employment. This is because organizational level characteristics influence the individual employee's actions and reactions, as well as aggregate organizational outcomes, and because their measurement will provide a more accurate picture of differences between workplaces and changes in the work environment over time.

With "organizational properties" we mean those features of the firm or institution that determine the physical and psychosocial work environment. These include technology and production processes, the physical plant, organizational structure, ownership (including economy sector), union density, HMS programs, management, wage system, and shift-work. Tangible organizational characteristics are relative easy to measure and are often included in work environment surveys in the form of data provided by organizational level leaders.

Usually, the assessment of psychosocial factors has had a narrow focus on employees' experiences of work at the point of production (e.g., job demands, control over work, social relations in work groups), a practice that has been heavily criticized by work environment researchers (e.g., de Rijk, le Blanc, Schaufeli, & de Jonge, 1998; Kasl, 1998; Kristensen, 1995; Landsbergis et al., 2000; Söderfelt et al., 1997; Van der Doef & Maes, 1999; Van Yperen & Snijders, 2000).

3.5 Outcomes on individual and enterprise level: Health and quality of working life

On the individual level surveys should measure several aspects of the employees' health and quality of working life. Some commonly measured aspects of individual health are: Self reported health and health problems, Stress, Burnout, Self reported absenteeism, Job satisfaction, Commitment to work and Work ethics. Other topics might be added, the challenge is to get a balanced report of both positive and negative outcomes of the work environment.

The work environment can influence enterprise level outcomes as well. Sickness absenteeism, turnover, accidents and early retirements are the most important. Average tenure in an enterprise might also be considered a measure of the quality of work life in the particular enterprise. Again other topics might be added in order to get a better understanding of the outcomes at the enterprise level. These factors will be measured in the sample based on enterprises, primarily through a questionnaire to the manager.

3.6 Limitations: What is not covered in this method

The proposed survey is a large and comprehensive study of the work environment in Norway. It is, however, not complete. No study can cover all aspects of the work environment. Some elements have been excluded:

- Individual life style
- Individual coping strategies
- Personalities
- Physical measurements of working conditions
- Physical measurements of health conditions

While all of these can influence the work environment, we have chosen to emphasize the psychosocial factors and the organizational level of analysis.

References

- Barker, J. R. (1993). Tightening the Iron Cage: Concertive Control in Self-Managing Teams. *Administrative Science Quarterly*, 38(3), 408-437.
- Bye, E., Bakke, J. V., & Grov, T. R. (1998). *Kjemisk-fysiske forhold i arbeid av betydning for helse- kunskapsmangler og forskningsbehov* (No. HD 1095/98 FOU). Oslo: STAMI.
- Byrkjeland, M. (1998). *Det gode arbeid- om endringer i arbeidsliv og arbeidsmiljø i Noreg* (No. FAFO rapport 261). Oslo: FAFO.
- Cooke, R. A., & Rousseau, D. M. (1988). Behavioral norms and expectations: A quantitative approach to the assessment of organizational culture. *Group & Organization Studies*, 13, 245-273.
- Dallner, M., Elo, A.-L., Gamberale, F., Hottinnen, V., Knardahl, S., Lindström, K., et al. (2000). *Validation of the General Nordic Questionnaire (QPS-Nordic) for psychological and social factors at work*. (No. Nord 2000:12). Copenhagen: Nordic Council of Ministers.
- de Rijk, A. E., le Blanc, P. M., Schaufeli, W. B., & de Jonge, J. (1998). Active coping and need for control as moderators of the job demand-control model: Effects on burnout. *Journal of Occupational and Organizational Psychology*, 71, 1-18.
- Dyer, W. G (1986). *Cultural change in small firms*. San Francisco, CA: Jossey-Bass.
- Falkum, E. (2000). Hva er utbrenthet. *Tidsskrift for Den norske Lægeforening*, 120, 1122-1128.
- Forseth, U., Molden, T. H., & Rasmussen, B. (2002). Det nye arbeidslivet- et kundeliv. In U. Forseth & B. Rasmussen (Eds.), *Arbeid for livet* (pp. 75-92). Oslo: Gyldendal Akademiske.
- Grimsmo, A. (1996). *Norsk arbeidsmiljø i en endringstid. En rapport fra Statistisk sentralbyrås arbeidslivsundersøkelser 1989 og 1993* (No. 4/96). Oslo: AFI.
- Grimsmo, A. (2001). *Lærernes arbeidsmiljø 2000* (No. AFI-Notat 7: 2001). Oslo: AFI.
- Grimsmo, A., & Hilsen, A. I. (2000). *Arbeidsmiljø og omstilling* (No. Arbeidsforskningsinstituttets skriftserie 7). Oslo: Arbeidsforskningsinstituttet.
- Hallsten, L., Bellaagh, K., & Gustavson, K. (2002). *Utbränning i Sverige- en populationsstudie* (No. 2002:06). Stockholm: Arbetslivsinstituttet.
- Hammer, T. H., Nytrø, K., & Saksvik, P. Ø. (2000). *Defining and measuring the Work Environment in Norway* (Nord serien). København: Nordisk ministerråd.
- Hammer, T. H., Saksvik, P. Ø., Nytrø, K., Torvatn, H., & Bayazit, M. (2004). Expanding the domain of the psychosocial work environment: Workplace norms and work-family

- conflict as predictors of stress and subjective health symptoms. *Journal of Occupational Health Psychology*, 9, 83-97.
- Homans, G. C. (1992). *The human group*. New Brunswick, NJ: Transaction Publishers.
- Hougen, H. C. (2003). *Samordnet levekårsundersøkelse 2003- tverrsnittundersøkelsen. Dokumentasjonsrapport* (No. 2003: 49). Oslo: Statistisk Sentralbyrå.
- Hovden, J. (1998). The ambiguity of contents and results in the Norwegian internal control of safety, health and environment reform. *Reliability Engineering and System Safety*, 60, 133-141.
- Kasl, S. V. (1998). Measuring job stressors and studying the health impact of the work environment: An epidemiological commentary. *Journal of Occupational Health Psychology*, 3, 390-401.
- Kristensen, T. S. (1995). The demand-control-support model: Methodological challenges for future research. *Stress Medicine*, 11, 17-26.
- Landsbergis, P.A., Mikkelsen, A., Saksvik, P.Ø., Jonge, J., de, Houtman, I., Cedillo, L., Nielsen, M., & Kristensen, T. (2000). *Reliability and validity of the Job Content Questionnaire (JCQ) decision latitude scale*. Paper presented at the International Congress of Behavioral Medicine, November 16, Brisbane, Australia.
- Lindström, K., Dallner, M., Elo, A.-L., Gamberale, F., Knardahl, S., Skogstad, A., et al. (1995). *Measurements of psychological and social factors at work. Description of selected questionnaire methods employed in four Nordic countries* (No. Nord 1995:39). Copenhagen: Nordic Council of Ministers.
- Lindström, K., Dallner, M., Elo, A.-L., Gamberale, F., Knardahl, S., Skogstad, A., et al. (1997). *Review of psychological and social factors at work and suggestions for the general Nordic questionnaire (QPS Nordic)* (No. Nord 1997:15). Copenhagen: Nordic Council of Ministers.
- Marklund, S., & Wikman, A. (2002). Innledning. In S. Marklund (Ed.), *Arbetsliv og helse 2000* (pp. 9-25). Stockholm: Arbetslivsinstitutet.
- Moland, L. E. (1997). *Ingen grenser? Arbeidsmiljø og tjenesteorganisering i kommunene*. (No. FAFO rapport 221). Oslo: FAFO.
- Munkeby, I., Torvatn, H., & Øyum, L. (2003). *Hverdagsbilder av arbeidsmiljø* (No. STF38 A03023). Trondheim: SINTEF Teknologiledelse.
- Nytrø, K., Saksvik, P. Ø., & Torvatn, H. (1998). Organizational prerequisites for implementation of Systematic Health, Environment and Safety Work in Enterprises. *Safety Science*, 30, 297-307.
- Pape, T. C. (1993). *Arbeidsmiljø i Norge* (No. FAFO rapport 149). Oslo: FAFO.

- Saksvik, P. Ø., Hammer, T. H., & Nytrø, K. (2001). *Spørreskjemaet fra undersøkelsen i Nærings- og nytelsesmiddelindustrien- en kvalitetsvurdering* (No. STF38 A01029). Trondheim: SINTEF Teknologiledelse.
- Saksvik, P. Ø., & Nytrø, K. (1996). Implementation of Internal Control (IC) of Health, Environment and Safety (HES) in Norwegian Enterprises. *Safety science*, 1, 53-61.
- Saksvik, P. Ø., Tovatn, H., & Nytrø, K. (2003). Systematic occupational health and safety work in Norway: a decade of implementation. *Safety Science*, 41, 721-728.
- Schein, E. H. (1992). *Organizational culture and leadership*. San Francisco, CA: Jossey-Bass.
- Skogstad, A., Knardahl, S., Lindström, K., Elo, A.-L., Dallner, M., Gamberale, F., et al. (2001). *Brukerveiledning QPS Nordic- generelt spørreskjema om psykologiske og sosiale faktorer i arbeidet* (No. STAMI report 01-2001). Oslo: Statens Arbeidsmiljøinstitutt.
- Söderfeldt, B., Söderfeldt, M., Jones, K., Ocampo, P., Mountaner, C., Ohlson, C. G., & Warg, L. E. (1997). Does organization matter? A multilevel analysis of the demand-control model applied to human services. *Social Science & Medicine*, 44, 527-534.
- Torvatn, H. (2001). *Arbeidsmiljø og arbeidstilsyn gjennom 90-årene* (No. STF38 A01020). Trondheim: SINTEF Teknologiledelse.
- Torvatn, H., & Molden, T. H. (2001). *HMS-tilstanden i Norge i år 2001* (No. STF38 A01027). Trondheim: SINTEF Teknologiledelse.
- Torvatn, H., Saksvik, P. Ø., & Hammer, T. H. (2001). *Arbeidsmiljø i næringsmiddelindustrien i år 2000* (No. STF38 A01028). Trondheim: SINTEF Teknologiledelse.
- Van der Doef, M., & Maes, S. (1999). The job demand-control(-support) model and psychological well-being: a review of 20 years of empirical research. *Work & Stress*, 13, 87-114.
- Van Yperen, N. W., & Snijders, T. A. B. (2000). A multilevel analysis of the demands-control model: Is stress at work determined by factors at the group level or the individual level? *Journal of Occupational Health Psychology*, 5, 182-190.
- Westerlund, H., Ferrie, J., Hagberg, J., Jeding, K., Oxenstierna, G., & Theorell, T. (2004). Workplace expansion, long-term sickness absence, and hospital admission. *The Lancet*, 363, 1193-1197.