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P.O. Box 541
7300 AM Apeldoorn
Laan van Westenenk 501
7334 DT Apeldoorn, The Netherlands

Fax +31 55 42 14 58
Telex 36395 tnoap nl
Phone +31 55 49 35 00

Participation in the management of occupational
health and safety improvement
-Workers' investigation as active risk analysis-

Nederlands Instituut voor
Arbeidsomstandigheden NIA
bibliotheek-documentatie-informatie
De Boelelaan 32, Amsterdam-Buitenveldert

stamb.nr. 477
plaats 43 579
datum 26 - april 1990

Dr. W.L. Buitelaar
TNO-Centre for Technology and Policy Studies,
Apeldoorn, The Netherlands, August 1989.

Paper for the seminar Risk Assessment and Control,
Delft University of Technology, 31st August 1989.

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This paper was written in the context of the National Research Program Technology, Work and Organization. Cluster Industry, theme Technology and Industrial Relations.

Relatively little is known about workers' initiatives to investigate their own situation, with the aim of analyzing and improving the quality of work. In this paper workers' knowledge will be interpreted as a relevant expertise (Von Otter, 1985) from the point of view of occupational health and safety. It may function as a potential innovation factor for the shaping of work and technology.

The Dutch Working Conditions Act (Arbo-law) situates as a matter of fact workers in an executive role, in the following however their initiating involvement will be underlined. Workers' investigation on health and safety at the workplace, on the quality of working life, may be viewed as an additional form of risk management. That's why we call workers' investigation an instrument of active risk analysis (ARA).

1. Occupational health and safety as social accountability

'When people is paced up, they get in a hurry and then most of the accidents are happening. What really matters is the change of human behaviour at the workplace' (OR-Informatie, 29 september 1989, p.12). This citation of an employee of the Mars Confectionery at Veghel illustrates the dual problem of risk analysis at the workplace. Two elements are involved:

- the organizational environment ('the pacing up')
- human behaviour and reactions ('get hurried')

The pacing-element is the work organization, the machinery, but the organizational culture as well. The human coping-element is the expression of expectations, motivations and interactions with the working environment. Let's face a classical problem: not to wear a safety helmet and/or mask may be induced by the hindering effects of it to get work done in the proper time ('pacing and hurrying'). From that point of view work pace and work culture ('fixing things anyhow') have to be changed in relation with human behaviour.

In the history of occupational health and safety research (Stoop, 1982) there is a shift of problem focusing: from accident proneness to motivation of people. Absenteeism and accidents are still important indicators of occupational health and safety, but the attention in literature and labour policy practices are going more and more 'beyond it'.

Three reports may indicate this shift in health and safety thinking in industry and in professional literature.

Philipsen (1968) did compare the causes of differences in sickness absenteeism patterns between 83 plants in 9 industrial sectors during the period of 1955 till 1965. The research was aimed at 'the structural and cultural determinants of social-psychological processes influencing absenteeism behaviour'. He noticed 'that as a consequence of this focus the interviewing of workers was skipped' (p. 114), the interviewees were plant managers and personnel officials.

Andriessen (1974) interviewed about 200 shuttering-carpenters in 10

construction firms during 1972-1973. He evaluated 'safety behaviour at the workplace', interviews were combined with group discussions in canteens on the spot. Interviewees were 'interested in the research, but did expect that the firms involved won't follow the recommendations of the researcher, because of the production costs' (p. 111). Schouten (1974) was interested in two main research subjects, 'the consequences of a low degree of autonomy for the mental health of workers, and organization structure and management-ideology related to the autonomy of workers'. Questionnaires were filled in by 1300 employees and 700 managers, supervisors and foremen of 72 metal factories during field research in the period autumn-winter 1970. The research met two 'intervening factors': a strike in august-september 1970 and the publication of the results. The subsidizer (anonymous: governmental agency or employer's organization?) did withdraw and in the final report the problem of 'social disclosure towards the clientsystem' was mentioned. After a stoppage of 1,5 year the researcher reveals in his preview 'that my preference of criteria of well-being at work to economic ones had become more explicitly' (p. 10).

The reports had in common that:

- low incidents rates and low incidence of sickness correlates with few work inconveniences, opportunities for self-realization and predictable working relations;
- leadership and management style, as well as a 'well designed organizational structure' (Philipsen), 'the workgroup culture and structure' (Andriessen), 'workers' participation and an autonomy-permissive organization' (Schouten) are vital elements of an occupational health and safety policy.

It has to be noticed that the three investigations were carried out in the Dutch post-war period of reconstruction and industrialization. An industrial policy which was rather similar to 'pacing up' and 'hurrying': work output in those days was often more important than work through-put. Moreover there was a sort of 'trade-off' attitude

of government, employers and employees: hazardous or bad working conditions were 'paid away' (compare Bundervoet, 1969, pp. 79-80). As a matter of fact the reports mentioned above, a state-of-the-art of the scientific debates at that time, do give a sort of an overview of the 'social accountancy' in terms of health, safety and well-being with regard to labour policy in Dutch industry in the fifties and sixties (De Swaan, 1972; De Ruigh, 1973).

2. Working conditions and work organization

From the seventies on trade unions, employers and government (as well as universities and research institutes) were paying more and more strategic attention to working conditions. Labour policy in the eighties was generally spoken a stipulation of this trend (Buitelaar, 1989). Several developments came thus together underlining the importance of the improvement of working conditions as an element of organizational change and innovation of the work place. Gradually the question was raised (see Pot/Van Waarden, 1983; De Bruijn, 1986) about the role of 'change agents': about employers and scientists at the beginning of the seventies and later on about a more active role for the workforce and the state. The new Law on Co-Determination (1979) and especially the Arbo-Law (1983) do illustrate these tendencies.

The improvement of working conditions has a technical and a social side as well, because of the man-machine interaction: the intertwining of technical and human factors. Perrow (1983) points at the negative side of the 'ergonomics or engineering psychology', that have implemented a rather 'mechanic social system' (p. 535):

'From the point of view of social structure, most organizations neglect (if not deliberately defeat) the extremely flexible and creative capabilities of humans, perhaps because they design that out of the operators. For want of a robot, an operator is used(-). The operator, in coping with the structure, provides the very resistance that confirms the predictions'.

Put it another way, machinery or technology has been adapted on a static way to the worker. Hale (1985, p. 4) argues that a probabilistic risk analysis (PRA) aims at a safety system by means of a technological fix which shows a paradox: man seen as an originator of accidents can't be missed as a creative element for problemsolving at the workplace. To bring in humans in the design presupposes more than a 'simple person-environment fit' (Semmer, pp. 49-52), a dynamic view

on health and safety is needed as Christis (1988, pp. 75-76) points out:

'It is not that the work has to be adapted to capacities and needs, but that the work has to be organized in such a way that people themselves can adapt the execution of work to their varying capacities and needs: it is impossible to adapt the pace of work at a conveyor belt to the different fatigue patterns of the workers. But it is perfectly possible by the inserting of buffers and the like to give the workers the chance to vary the pace of work according to their own fatigue patterns..., stress research should be aimed at the discovery of typically high strain structures and not at the discovery of more and more possible straining factors'.

Remarkable in the present discussions and literature on the (im)possibilities of shaping and (re)designing technology and work, a certain fixation has taken place concerning the aspect of task or job content and (de)qualification of employees. The professional scene is full of 'new production concepts' (Kern/Schumann, 1985), 'flexible manufacturing' (Bolwijn a.o., 1986) and 'integral organizational change' (De Sitter, 1986). But less attention has been paid to one of the traditional overlaps of man and machine, the working conditions. It looks as if one expects that the working conditions will improve automatically, together with technological development and that they won't cause any problem at the end. In a certain way we are back in the sixties when it was supposed that the operator in the processing industry would meet fewer problems because of process-automation (Brenninkmeijer, 1963).

The opposite is true, actual information technological developments will incur a new (especially mental) strain, called 'technostress' (from the Japan Times, Van Alphen, 1986):

'Fear for the computer and everything that goes with it, is one of the causes of stress symptoms. A lot of employees cannot adapt themselves to changed procedures and to communication via screens. This brings about a certain fear having important effects. Besides these people, there are fanatics who are so intensively occupied with

computers that contact with fellowmen deteriorates. This deterioration of the social environment influences people unknowingly and often leads to depressive feelings'.

The operator in a chemical plant for instance meets three changing job aspects: more required task-knowledge, from active monitoring a panel-screen to passive monitoring a display, less physical handling and a him passing-by equipment. It illustrates a certain paradox of futural developments in technique and work: one gets more and better training for new routine jobs. An operator expressed this as follows: 'For 25% I feel like a professor in process-technology and for 75% I act like an orang-outang'.

It is certainly right and useful to emphasize the need to reflect on the 'new' information technology. Nevertheless, it can lead to a somewhat forced separation between 'old' and 'new' technology. On the one hand, new equipment is often based on past technological experiences (including the working conditions). On the other hand, existing or previous machineries can be further developed or (re)designed; moreover traditional or neo-Tayloristic management practices often continue to exist after technical innovation. Technological development is an evolutionary technical and social process by fits and starts, and as such a consequence of equipment design and organizational design. It is the interaction between those design processes that has to draw our attention in order to improve health and safety situations on a social innovative way. Perrow points out that process-equipment, the same runs for CNC-machines or PC-bounded work, enters in an specific organizational context (p. 533, see Scheme 1, page 8):

Scheme 1: Characteristics of social structure that affect operator

<u>Structure</u>	<u>Characteristics</u>
Authority structure	Centralized/decentralized
Span of control	Tall, narrow/flat, broad
Surveillance	Behaviour/output
Controls	Direct, obtrusive/ indirect, unobtrusive, decisions/premises
Production incentives	Present/absent, individual/group
Production pressure	Present/absent, individual/group
Within-group interactions	Many/few, stable/unstable membership
Career ladders in unit	Present/absent
Internal and external labour market	Open/closed
Safety units/ incentives	Present/absent, symbolic/operative

3. Technology, trade union and working conditions

Nowadays there is a lot of discussion in the trade unions on the theme of work and technology in relation to occupational health and safety. The impact of technology is not a new issue for employees; history shows two examples of influencing strategies of workers.

Indirectly oriented at the machine; for example, the protest of workers against the introduction of machines, in the 19th century. Hobsbawm (1976, pp. 5-22) pointed out that this should not be interpreted purely as 'anti-machine behaviour'. What mattered were the social consequences of the machines which were to be introduced, especially the threat for employment. So a labour market strategy of employees of those days was in action focused on maintaining the amount of jobs. Traditionally, there is also a work organization strategy of employees which is focused on the slowing-down of the various production activities on one or more machines. Taylor (1913, pp. 30-39) calls this 'soldiering', while this strategy was aimed at the work pace which is regulated by the machines or by someone at a distance of the actual work spot. This 'anti-hurrying' describes Mok (1980) as a workers' strategy of job task control in order to defend or improve existing working conditions. Both strategies, the labour market and the job task control one, do express workers' modes of technology assessment. The last strategy on job tasks has been broadened to constructive technology assessment concerning job rotation, job enrichment, vocational training and design oriented proposals for technological and organizational development (see FNV, 1986).

Directly oriented at the machine. Here conditions are concerned in which an employee is working on or with the machine, the physical working conditions: problems from noise (abatement), climate (controlling), dangerous substances and materials (reduction). At the beginning of this century, the Dutch doctor Heijermans, pleaded for taking into account health criteria when designing new technologies

on looms, rotary presses and steamboilers. Concerning the latter he noted that:

'When a steamboiler is being built, one should not only strive for a construction with the largest possible benefit of fuel, but also for a construction which does not radiate warmth -concerning the disadvantage connected to working in high temperatures' (1907, p. 12).

Heijermans who lectured at the Delft Polytechnics was associated with the Social-Technical Association of Democratic Engineers and Architects that founded in 1908 a consulting bureau for trade unions. At that time a research was started with the Dutch Trade Union for House Painters on the use of white-lead which was identified as a hazardous substance. As a consequence of this cooperative research the Province of North-Holland did forbid as first authority in 1912 the interior use of white lead (Buitelaar/Vreeman, 1985, pp. 80-82). Another topic at that time was night-work in the glass industry and the hazardous working conditions in 'the glass-shop', typified by the Dutch Confederation of Trade Unions (NVV, 1912) as 'except the mine-pit, the most horrible work place in industry'.

Trade unions historically tried to develop, or introduced discussions about, health and safety criteria which had to be implemented in industrial practice. Recent examples are the maximum loudness level of 80 decibel and, due to the activities of the Trade Union for Construction and Woodworkers, the interdiction by Collective Agreement-1988 of handling and use of cement bags more than 25 kg.

The examples mentioned above show that actions and demands of employees and trade unions in relation to health and safety matters are design and impact oriented influencing strategies. They also illustrate the interaction between man and machine, between the technical and the social system:

- in the machine(ry) people do identify social implications;
- by that, machines do cause workers' reactions by means of different modes of coping and initiative behaviour in and outside the shopfloor;

- workers' and trade unions' reactions and activities concerning health and security do involve process innovations, labour market, work organization and working conditions as well;
- gradually an integral policy on the improvement of health and safety matters is in the making, whereby product innovation (not only product modification: the white-lead example, interdiction of asbestos etc.) is involved;
- the chain: design-supplier-producer-consumer is observed and trade unions are striving to combine the Arbo-law with the Law on the Environment; the following scheme (see scheme 2, page 13) reflects a discussion in the Dutch Confederation of Trade Unions-FNV (Korevaar/Soeterbroek, 1989), it may be described as a comprehensive ecological strategy on working conditions.

It has to be noticed however that in this scheme the Law on Co-Determination hasn't been explicitly mentioned in relation to health and safety matters. The strategy 'main stream' seems to be negotiations on sector level (collective agreement) and company level, whereby the Law on Environment and the Law on Products are the new norm-setting tools (with, specifically for the Construction Sector, tendering and project settlements). The Dutch Working Conditions Act (Arbo), and indirectly the Law on Co-Determination (WOR), happen to function then as structuring or procedural tools. These somewhat 'back-bench' roles of ARBO and WOR, it's not clear if this is the common FNV-strategy, may be induced by:

- the rise of the EC in 1992, trade union do fear a down-scaling of the Arbo-law towards global Brussels' directives;
- Dutch trade unions, due to the rather low unionization of about 30%, do regard Work Councils as a competitive organization and have developed a rather zigzagging course (partner, competitor, adversary) towards them.

Within this context it is useful to refer to combinations of Arbo- and WOR-activities by employees concerning the improvement of working conditions. For instance, the Work Council of the Heineken Breweries

at Den Bosch do judge investments and budget applications with the aid of a special committee consisting of Arbo-employee representatives and a delegation of workers from the section or department involved (Elderman, 1988). In Rotterdam, the Work Council of the container handling company Unit Centre concluded in 1985 to a technology agreement with the management which had clauses derived from the Arbo-law.

As the Arbo-law hasn't been completely implemented, especially Article 3 on the man-machine relationship (the so-called 'well being' prescription with its rather vague and somewhat static definitions), trade unions and employee representatives are looking for a mix of occupational health and safety strategies in this respect: enforcing, modifying and sharpening Arbo- and WOR-regulations.

Scheme 2: Working conditions and trade union strategies in the Construction Sector

	AL	LoE/ LoP	TP	PE	CA	CR
<u>Norm setting:</u>						
Interdiction of materials and techniques		X		X	X	O
Norms on use of materials and techniques		X		X	X	O
Norms on worksituation/hygienics regime		X		X	X	O
Liability manufacturer, designer, architect, employer		X	X			

Structuring:

Workorganization/cooperation/ industrial relations	X				O	X
Structure Arbo-law/professional support	X		X	X	O	X
Development of Arbo-policy/negotiations	X		X		O	X
Responsibilities project commissioner, employer, employee	X				O	X

AL : Arbo-law
 LoE/LoP : Law on Environment/Law on Products
 TP : Tendering policy
 PE : Project estimates
 CA : Collective Agreement
 CR : Company regulations

O : Depending on developments in Arbo-legislation and on Collective Agreements on labour policy in the Construction Sector

4. Workers' investigation in Dutch industrial relations

In a report on the Arbo-law in practice, commissioned by the Ministry of Social Affairs and Employment (Reubsaet a.o., 1988, p. 76), some company officials are being quoted who describe workers' behaviour towards the working conditions rather negative. Here we meet again the dual problem of risk analysis at the workplace (described in section 1), it concerns the man-machine interaction and the working culture on the spot. Perrow (p. 539) pleads for an 'ethnognition'-approach of the work place taking into account the dynamics of work group, supervision and work load. When we decode in that way the negative remarks from the Arbo-evaluation report, an outside- and an inside look (compare Kapp Howe, 1977) can be distinguished (Scheme 3):

Scheme 3: Views on working conditions behaviour

Outside look

(mechanic view)

Inside look

(ethnocognitive view)

at workers' occupational health and safety behaviour

'nonchalant'

go-ahead pressing production

'slovenly'

just-in-time doing work practices

'careless'

occupational sturdiness worker

'desinterested'

economics-prevail interpretation

'inexpert'

daily coping knowledge

An example of trade union policy to take these inside world culture more into account with reference to occupational health and safety is the recent discussion within the Union for Transport Workers FNV about working conditions' policy and the Collective Agreement-1988 concerning truckers (Meijman/Vreeman, 1988).

To get a better insight in the daily coping of the worker with his or her work situation their proper view is of vital importance in order not 'to design the worker out' (Philipsen's research has this risk). Employees aren't only sources of information (the Andriessen report), but also bearers and initiators of change of their own working conditions. To get an understanding of their coping with their daily work, their input is a prerequisite for an effective improvement of work and technology. Bringing the worker as an actor on the stage, not just for showing his or her work-'intimacy' or for 'social understanding and outletting' (which is not seldom the Quality-Circles drive or the 'Peters and Waterman-scene'), their input has to be qualified as expert-knowledge of the workshop (Vreeman, 1982). Schouten tried to work in this direction: 'My research was too much aimed at knowledge accumulation and too little at operations support, my heart goes for action-research in future'. Looking back, he missed a knowledge transfer between clientgroup (production workers) and researcher while he was looking for a dynamic person-environment model of organizational strain structures.

Norwegian experiments in the field of electronic data processing show that on the one hand a deprofessionalization of technology is needed to broaden the traditional expertise concept. On the other hand a mutual reprofessionalization can be observed resulting from knowledge exchange between professionals and people of the shopfloor (Keul, 1983).

In English experiments this process last mentioned is called 'living thinkwork' as opposed to abstract (Hales, 1980) or mechanic views (Perrow). Workers' knowledge about the improvement of working conditions has to be utilized, better said: to be used as what we are calling an active risk analysis (ARA), in contrast with probalilistic risk analysis (PRA) where employees play a passive role.

Workers' investigation can be defined as (Buitelaar/Vreeman, 1985, p. 11):

- a. Workers' knowledge about their own working environment, which is more or less systematized on the basis of research and documentation by trade union members and employees;
- b. the use of such information to describe as well as evaluate the own worksituation, in particular regarding the quality of the working conditions;
- c. feedback of such investigations, directly to the workers involved in the investigations, or more generally as part of the trade union or employees' activities at shop-floor or company level;
- d. in addition to the evaluation of the working conditions, the investigations also aim to improve the working conditions;
- e. factory workers act as sources of information, as well as joint investigators and self-investigators;
- f. during the investigation process, and the feedback of it, potential data- and information generating contacts or coalitions are being looked for within and/or outside the workplace and/or company.

Workers' investigation has to be historically and internationally placed. It originated from the First International, where Karl Marx in the Rules, which were drafted by himself, pointed to statistics made up by the workers themselves as an organizing condition towards a modern labour movement.

In the Netherlands at that time the labour-leader (and ex-clergyman) Domela Nieuwenhuis tried to elaborate a shortened version of the extensive in France published original Enquete Ouvrière (Welcker, 1978, pp. 108-155). The aim of the questionnaire was to gather facts and information from workers as well as to educate them. The second goal has been changed since that time, the intended individual learning process transformed into a group process of data-exchange and feedback-discussions.

The four main categories of the original questionnaire haven't that changed:

- characteristics of manufacturing and working conditions;
- working times and home-factory travelling distance;

- collective agreement and mechanization;
- industrial relations and labour policy.

Perhaps the thread of workers' investigation is the following question anno 1880-nr.15 (Marx, ed.1972, p. 231):

'Describe the specific work in your department, don't only look at the technical side, but watch also the tiring impact of the job on the muscles and on the nerves and the total impact on the occupational health of the workers'.

Retrospectively the objectives of various forms of Dutch workers' investigation show a certain development with regard to working conditions:

- | | |
|-----------------------|---|
| before 1945 | <ul style="list-style-type: none"> - asking the population at large for understanding or attention (the so-called 'sociale questie'); - asking Parliament for social legislation; - on the basis of workers' interests stimulating or influencing government initiatives (Parliamentary Inquiries); - influencing local and district authorities; |
| before and after 1945 | <ul style="list-style-type: none"> - negotiating collective agreements by providing intra- and inter-sector comparisons; |
| after 1945 | <ul style="list-style-type: none"> - developing health and safety oriented principles for remuneration systems (the incentive pay inquiry, 1947 by the United Workers' Federation EVC); - supporting and extending the union structure at shop-floor level by means of company reports (1965-1975, General Dutch Metalworkers' Unions of NVV, CNV and NKV); - influencing and changing company policies on working conditions by means of workers' reports and health and safety inquiries (1975-1980, Industrial Workers' Union FNV); |

- improving the quality of work and shaping technological developments and the restructuring of work by workers' reports, assessment studies and workers' business plans (1980-1990, various trade unions of the Confederations FNV and CNV).

As shown above, the objectives of workers' investigations have shifted, although earlier orientations in various forms can be traced in the more recent ones.

The range of workers' investigations also changed in relation to the development of the trade union movement. Initially, the investigations were mainly aimed at local branches and industry sectors, as well nationwide investigations concerning several branches of industry. Later on, the investigations were extended even more to the industry sector and the specific company or concern involved. The latest development is an inter-unions initiative research on branch-passing technological changes (networks, logistics). In that way the investigations correspond the growth of the employees' and unions' scope: local, regional, national, intra- and intercompany/sector oriented.

The methodology applied in the workers' investigations consisted of postal or face-to-face questionnaires, interviews, observations and inspections, talks with key-informants inside and outside the union and/or company, data-searches and inquiries in collaboration with internal and/or external experts and group interviews. Workers could take part in the investigation in various ways: in the organization of the research, by helping to complete questionnaires and in the collection of data, in drafting proposals for improvements and in evaluation of the investigation results and/or of the realized improvements in working conditions. Prioritizing of improvement proposals was done by a drafting committee, rank-and-file representatives, group of workers-activists or by union or personnel meetings. The number of participants varied strongly, for instance from 5 (UBO-Tyres Industry at Utrecht) to several hundreds (Pre-War Inquiries, AKZO-Coatings/Industrial Workers' Union FNV Questionnaire Amsterdam/-

Utrecht). Mostly there is a core-or steering group of 5 to 15 persons that monitors the investigation processes.

Unionists and employees do have a more organizing than facilitating role since the formal and practical implementation of systematic union activities at shopfloor level in 1965. Workers' investigations are explicitly mentioned by then in the official rules of the CNV, NKV and NVV Unions for Industrial Workers. After the modified Law on Co-Determination (1979) and the Arbo-Law (1983) also Work Councils and Arbo- or Safety-committees are more involved with workers' investigations. In all times also groups of unionists and non-unionists were active on this matter, for instance the Combined Committees of Carton Workers in the Province of Groningen in the seventies or the Associated Committees of Rotterdam Dockworkers 1979-1980.

Moreover, in the last decennium the investigations are using more and more the company or concern, the state and labour (medicine)agencies, universities (especially the so-called science shops, Koopal, 1987), research organizations and consulting firms as additional sources. For instance workers of Benraad Heating Installations Factory at Ulft executed a workers' investigation with the aid of a Labour Inspector. The Work Council of Nedstaal at Dordrecht developed a counterplan for employment with assistance of internal staff and an external expert. Another example is the Agfa-Geveart Plant at Mortsel/Belgium where workers in safety groups are analyzing the (near)accidents over a ten years period, using firm files and they are cooperating with personnel officials and foremen according to the principle of 'the worker as expert' (see also for a German case, Fricke, 1983).

After having overviewed some 100 workers' investigations, about 80 from the post-war period to the present, almost all the reports evaluate the working conditions in terms of health and safety, and in terms of job security. Especially on physical working conditions the various investigations are very informative: varying from a lead-risk generated check-list inquiry at a 3-months' term (DMV-Campina Dairy Industry Bergeijk), to a 1,5 year data-search on toxic substances

(Fokker-Aircraft Papendrecht) and a longitudinal questionnaire on working conditions in the period 1982-1988 (ICI-Chemicals Rozenburg).

It is striking that many problems are mentioned in relation with a backlog of maintenance work and lack of maintenance. Workers are generally badly informed on the hazardous chemicals and fibres they have to handle or that are processed (Reijnders/v. Splunter a.o., 1988-1989). Unacquaintance prevails about new chemicals or bulk cargo the company is using or storing and about the dangers hidden behind chemicals with code- or made-up names (Heederik/Klaver a.o., 1988). A further problem for workers is that measurements concerning the danger of chemicals, or industrial noise levels sometimes are still kept secret (or hardly accessible) by the company or expert body concerned (Blanken, 1989). It is striking that in many cases temperature changes ('climate control for the computer yes, for the worker incidentally') are reported. Working times and overtime is a rather constant topic, varying from shift-work in industry to road-hours of lorry-drivers on international routes (Topsleeper-inquiry Union of Transport Workers).

In many cases there is a lot of criticism on job content, expressed in terms of the monotony of the job and paced work (causing a incompressibility of time for the worker). Next to the passive-monitoring operator, a new function has come into existence in factories: the belt-end operator ('the jack-of-all-trades'), who sometimes literally has to set off by hand disturbances, breakdowns or defects of the electronic equipment (compare Brouwers/Buitelaar, 1988, pp. 134-141). Most people operating automated equipment have built up in a specific coping way their 'spare system' (sheets, scribbles and sketches, abbreviations, 'shadow or hidden' files) to fall back on as a reserve and assistance capacity or 'informal technology'.

The over-all tendency is that stress in manufacturing is reported to be an increasing problem for workers, which is triggered by the various strain structures at the workplace. They seem to have a

multiple and cumulative impact on the quality of working life. A look into the inside-world of the working conditions through the glasses of workers' investigations do give evidence, in spite of a somewhat opposite appearing 'behaviour make-up' by means of 'the mask of routine', of a more or less chronic uncertainty of workers about:

- the continuation of the work tasks and/or the job;
- the physical, cognitive and mental health or fitness in the long run through lifetime.

As to the effects of workers' investigations the outcome may be classified as follows:

1. incidental impact,
 - a. elementary matters such as: (better) toilets, washing/canteen facilities, safety-attributes
 - b. relief of hazardous situations by means of: ventilation/suction systems, climate control
 - c. identification and abolishment of dangerous substances, protection measures/procedures
 - d. modification of products and/or machinery
 - e. new production processes and/or installment new machinery

2. strategic impact,
 - a. project oriented: one item issue (noise, dust)
 - b. program oriented: several items ('safe work shop')
 - c. budget prioritizing/allocating: health/safety budget
 - d. controlling new investments: 'the Arbo-paraph' by Work-Council and/or Arbo-committee (procedures option)
 - e. materializing in comprehensive regulations and/or Collective Agreement of 1,2 -elements- (package option)

3. cultural impact,
- a. eye-opener for one or more parties involved
 - b. tool for policy making for union/Work Council and management (internal impact)
 - c. exchanging ideas/demands/plans (external impact)
 - d. negotiated order of working conditions

Mostly the workers' investigations, speaking about the period 1979-1989 (See annex for a cross selection), are of a corrective kind with an incidental impact. The strategic approach -of an initiative kind- has been less developed, but shows a growing tendency the last five years. The cultural impact is concomitant with both incidental/corrective or strategic/initiative options, but it can be a main option (eye-opener, policy tool) too; for instance to obtain union or employee facilities, or getting attention from inside or outside the workplace/company ('putting it on an agenda').

It has to be underlined that the above mentioned effects aren't one-dimensional. Often there are other facilitating factors involved (Di Martino, 1988, pp. 46-65) next to a workers' investigation (a market call for quality, existing plans within the company, innovative climate, industrial relations involved etc.). Workers' investigation does have potentially an 'unfreezing' effect, as well as a 'freezing' one. The last situation may occur when the parties involved do hide behind formalities or the item(s) involved are supposed to be matters for (management and/or employees) specialists. So at the end a working conditions' bureaucracy or 'expertocracy' will arise (see Rasmussen, 1984) where the feed-back to the workplace is fading away.

The impact may differ with company size, unionization or specific industrial tradition, but workers' investigation has to be called anyhow (and sometimes rehabilitated or recognized as) a fruitful instrument of active risk assessment of working conditions (compare Wintersberger a.o., 1985).

5. Concluding remarks

As far as working conditions are concerned in the workers' investigations, it is striking that both criticism and proposals for improvement are extremely varied. Maybe two opposite alterations are crossing each other:

- management and staff is switching from technical towards social alternatives and a behavioural guidance of health and safety matters (preventive management);
- employees are switching from a social expression of alternatives (facilitative or better health and safety plant leadership) to a more articulated technical one (renewal of tools, machines or procedures).

In contrast with the variation of alternatives and proposals concerning (physical) working conditions, alternatives to the existing work organization and job content are much less pronounced; although the relationship between work organization and employment has been often discussed in the reports. For example, workers emphasize that a rigid and inefficient work organization may endanger the continuity of employment.

The various cases show three complications on this matter:

- assessment of impact of technological change is difficult to organize, because it requires new prognostic skills for workers' investigation (see Van Dijk, 1988);
- not seldom workers are involved in processlike forms of co-determination concerning reorganization of work and technology which has a reactive (and sometimes informal) character that hinders elaborated counterproposals (compare Levie/Moore, 1984, Van Asch/Jansen, 1986);
- in order to achieve a prognostic way of investigating in stead of a more historical one (about gradually grown work situations), workers and their representatives do need precise information and data from staff and management (see AWV a.o., 1987); they are confronted however with an overflow of information ('a data snow')

or with an absence of information ('a data blackness').

A concluding remark has to be added here to avoid the impression that workers' investigation reflects a negative attitude towards the job; mostly one is satisfied to have a job. In general, the reports do express a constructive aim and an invitation to discuss; in so far there is a change from the original 'sociale questie' via 'social accountancy' to a 'social dialogue' (compare Gustavsen on the Swedish situation, 1988).

For the improvement of workers' investigation some suggestions have been stipulated by the reports and their accompanying discussions, such as:

- comparative studies of companies or production processes with a more advanced technology or work organization: forecasting of working conditions;
- taking into account the production chain (suppliers, just-in-time delivery, customer), with regard to the company or branch involved: the stage-before and stage-after outlook at the work place;
- facilities for a social-technical prototyping (if needed, with governmental support) with a specific look after workable alternatives concerning the relevant strain structures: experimental approach of occupational health and safety.

Finally, the workers' investigations and the different management reactions and responses can be graded scale-like.

(See scheme 4, pp. 25.)

The above sketched situations do on the one hand imply that there are many combinations between the extremes ('distant voices'). But on the other hand they may indicate that in modern industrial relations management and workforce are able to meet each other on a common target of innovation of the working conditions which brings about a shared managing ('coping voices') of occupational health and safety improvement.

Scheme 4: Workers and management interaction on working conditions

Sort of workers' investigation

list of grievances	f	↓
recognition of problems	r	
summing up of working conditions	o	
alternative(s) pronouncing list of proposals	m	
set-up for an improvement programme or project	t	
	o	

Sort of management reactions

negociation and innovative involvement/ 'substantial affirmative response'	o	↑
communicative consultation/ 'instrumentally affirmative response'	t	
integrative absorption/ 'the company-community blanket'	m	
paternalistic rejecting/ 'the unhappy father'	o	
pushing back/ 'the fordistic reflex'	r	
	f	

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Annex: Cross-selection of workers' investigations 1979-1989.

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