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WORKING CONDITIONS IN ONE SWEDISH AND TWO GERMAN FORWARDING COMPANIES - A CASE STUDY

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Abstract

The working conditions for employees in the field or transportation have remained outside the focus of research. In a comparative study three companies were investigated, two German and one Swedish. The focus was on the working conditions among blue-collar workers. The results indicate that there was a surprisingly high proportion of workers in all the work places that had musculoskeletal problems. The ergonomical working conditions seemed to be about the same and as unsatisfactory irrespective of country. Results concerning quality of working life were in accordance with this. The results also indicate that the Swedish employment system was less stratified and had fewer hierarchical boundaries.

INTRODUCTION

The working conditions of the employees in the field of transportation have remained outside the focus of research. This is surprising, considering that the few projects carried on yielded interesting results, indicating that a process of change is setting foot in the area of transhipment and warehouse operations: However, the development in the field of transportation is lagging behind (Danckwerts, 1991; Läpple, 1992; Deecke *et al.*, 1993). The enterprises in this field become the focus of interest as they struggle to reach a higher level of industrialisation in the face of fierce competition on the more open European market. At the same time there is a demand from society in general and the work force in particular for work with a more human character in terms of a better ergonomic situation and a higher quality of working life. On the contrary, an international perspective and research across borders is highly recommendable. Characteristic for the field of transportation and materials handling is that (Almström *et al.*, 1991). Goods are packed by one company in one country, transported by another company and perhaps handled by yet another company in another country. Because of this, it is difficult to control the work environment. National Swedish statistics show that there is a high frequency of work related accidents and illnesses in the field of transportation of goods and materials handling (Karlsson & Nilsson, 1993). Changes in the way work is organised are also taking place. Because of fierce competition, changing demands on the market and government regulations, new concepts of production and rationalisation strategies are introduced (Deecke *et al.*, 1993).

Specific Aims

The aim of the project was to draw a picture of warehouse business in different countries and to describe differences and similarities between two German and one Swedish company. A further aim was to present an adequate framework for variables that should be included in the analysis of working conditions in forwarding companies. In this paper, selected results about quality of working life, musculoskeletal symptoms, opportunities of participation and educational levels are presented. The main focus was on the working conditions in the area of materials handling.

Theoretical Framework

Different theoretical approaches were used to support the description and analysis of the subject of study. The analysis of the working conditions is based on a system approach implying the importance of both technical and social systems observations (Pasmore, 1988) of the material flow chain where the reception and the delivery of goods at the transhipment plant delimit the field of investigation. Sociological research on the change of working conditions has mainly focused on the manufacturing industry (Kern and Schumann, 1984; Altmann *et al.*, 1986). With respect to concepts like "lean production" and "lean management" (Womack *et al.*, 1991) from a sociological point of view, the question arises, of how the development of work conditions and industrial relations in manufacturing have influenced the special field of transportation, materials handling and logistics services (Gesellschaft für Verkehrswirtschaft, 1993; Bieber and Sauer, 1991). Starting from the viewpoint that workers are playing more and more important roles in organisational change processes, ergonomic factors are focused by psychologists, regarding their influence not only on health, but also on organisational efficiency. (Neubert *et al.*, 1993). The work environment can not solely be considered from a physical perspective but must also be considered from a psychosocial point of view, in order to understand the situation in the organisation and propose a path for organisational change (Ingel-

gård *et al.*, 1996). One current discussion concerning organisational change focus on the issue of participation. (Pasmore and Fagan, 1992) Hence, in the last years practitioners have tried to pay more attention to the combination of individual and organisational development efforts and to research that explores the impact of participation on the work process. Organisation development improvements (such as total quality programs, self-directed work teams, etc.) are based on effective participation while, on the other hand, many failures or disappointments with organisation development may be traced back to ineffective participation.

DESIGN AND METHODS

The research design in this study is based on individual case studies (Yin, 1984). Statistical and qualitative methods were used for data analysis. The study is to a large degree of an exploratory nature, which means that questions and focus were adjusted in the course of the study. It was also a multidisciplinary way that led to a broad set of data.

Short Description of the Investigated Plants

In this study three companies were investigated, two German and one Swedish. The studied cases were all parts of larger companies, which in turn were owned by or constituted parts of still larger groups of companies. Changes in ownership as well as organisational structure within these seemed to be a rather continual process that had been going on since the very early days of the companies under study, and that seemed to reflect changing business strategies, market demands and developing service products.

Case A was a fairly new terminal situated in the Ruhr area of Germany. The terminal was established in 1993. The areas of service were general cargo and logistics of stock. General cargo was divided into mixed consignment cargo and complete load cargo, which comprised cargo units weighing more than 2.5 tons. At the terminal, goods of a large variety were delivered and dispatched within a short time. About 210 customers were catered for. Approximately 40 blue-collar workers were employed at the investigated department.

Case B was a warehouse situated about 20 km outside the perimeter of the Ruhr area. It was established in 1989. The main services were storage and distribution of goods. The warehouse had 10 customers and the merchandise handled was mainly household products and food products. It was previously providing service for a single large producing company that was located near the warehouse plant. In the past five years the company gained two more large customers for this plant. About 50 workers were employed at this plant.

Case C was a warehouse situated in an industrial area just outside the city of Göteborg. The warehouse itself was built in 1991, but some of the other facilities were older. The warehouse was composed of several different units while the older facilities, three in all, were situated at a distance of several km from one another. The company offered third part logistics and it had six major customers for whom they stored and dispatched goods. A variety of goods were handled, including food, chemical products and plastic carpets. About 60 blue-collar workers were employed at the three locations.

Self-reported Musculoskeletal Symptoms

The standardised Nordic Musculoskeletal Questionnaire, which measures self-reported musculoskeletal symptoms, was used (Kurorinka *et al.*, 1987). The subjects were asked to indicate if she/he

had had problems with any of nine body regions during a 12 months period. The questionnaire has been used at various work places and with large numbers of subjects (Johansson, 1994). This questionnaire was also translated into German. No cultural problems in the translation of the questionnaire itself were found. It has been suggested that the original layout of the questionnaire can be improved, and a new layout has successfully been used in an English version of this questionnaire (Deakin *et al.*, 1994). Therefore, the layout of the English version was used for the German version of the questionnaire.

Quality of Working Life

The *Quality of Working Life* (QWL) was measured with a Swedish standardised questionnaire used to assess the psychosocial climate in the investigated work groups. The assumption behind the questionnaire is that there are five crucial psychosocial factors at work, crucial for the satisfaction the individual's fundamental psychological needs (Johansson, 1994). The questionnaire measured the factors by mean values. Each factor was composed of five questions with fixed response alternatives. The responses were given a point from one to five, where one was very unsatisfactory and five was very satisfactory. A mean value below three was considered as being unsatisfactory. The questionnaire has been proven reliable and the internal consistency using Cronbach alpha coefficients had been calculated on a set of data comprising 9 333 subjects (Johansson, 1994). An independent certified translator translated the questionnaire into German. Then it was arranged to suit German cultural conditions, e.g. vocative forms and expressions. This was done by German social scientists (Kern, 1995). The five factors were:

1. Influence and control of work, including such items as: influence on the rate of work, influence on working methods and influence on the allocation of work tasks.
2. Supervisor climate, including contact with immediate supervisor, if immediate supervisor asks for advice on work-related problems and if immediate supervisor considering viewpoints.
3. Stimulus from the work itself, including if work was stimulating and interesting, if work was varied and diversified and opportunity to use talents and skills.
4. Relationships with fellow workers, including relationships and contacts with fellow workers, talking with fellow workers about the job and extent of experiencing a cheerful atmosphere.
5. Psychological work load, including items such as stress at work and workload.

A factor analysis, using the Principal Component Analysis and Guttman's rule of extraction, was performed. The results showed that there seemed to be a pattern that had some resemblance to the Swedish material for example there were six factors extracted. However, with the small number of subjects the results from the factor analysis should be interpreted with caution. The Cronbach alphas for the German version of the questionnaire was calculated, see table 1.

Table 1 - Cronbach alpha coefficients for the Swedish and the German versions of the QWL questionnaire respectively

Factor	German version Cronbach alpha	Swedish version Cronbach alpha
1. Influence and control of work	0.58	0.65
2. Supervisor climate	0.84	0.84
3. Stimulus from the work itself	0.80	0.85
4. Relationship with fellow workers	0.73	0.82
5. Psychological work load	0.74	0.83

The results indicate similarities with the Swedish version of the questionnaire. As in the Swedish version, the factor 1 gets a lower alpha coefficient. The result was less satisfying than the Swedish version but on the whole, the German version of the questionnaire seems to hold together.

RESULTS

Background Factors

Results of the part of the questionnaire measuring background factors are shown in table 2. A significant difference between the groups was found concerning time at present work place (H=9.43, corrected for ties). It was found that the German group at **Case A** had worked less time than **Case C** (U=383, z=-2.27 corrected for ties) and **Case B** (U=44, z=-2.85, corrected for ties). However, it is important to note that **Case A** started at its present location in 1993. It was also found that there was a significant difference in educational level between the groups (*Chi-square*=35.54), where **Case C** had a higher educational level than the German group at **Case A** (*Chi-square*=23.73) and **Case B** (*Chi-square*=18.70).

Table 2 - Means and standard deviations of background factors

Background factors	Case A (Germany)	Case B (Germany)	Case C (Sweden)	
Age	35.3 (sd=10.8)	39.6 (sd=12.6)	37.6 (sd=13.0)	n.s.
Women	0%	0%	2%	n.s.
Immigrants	14%	42%	20%	n.s.
Time at present work place (years)	2.7 (sd=2.7)	9.0 (sd=8.3)	5.2 (sd=5.0)	p<0.05
Educational level				p<0.05
level I	96%	100%	35%	
level II	4%	0%	50%	
level III	0%	0%	15%	

There were no significant differences between the groups concerning the proportion of immigrants in the work-force, although immigrants were more common at **Case B**. There were no differences between the groups concerning proportion of women in the work-force, as hardly any women at all worked in the investigated plants. The results with respect to the background factors indicated that the samples were fairly identical concerning age and sex. The workers at **Case B** had been working more time at the present work place than the other two groups. But as **Case A** had only operated for three years the differences could not be interpreted.

It is known that jobs in transportation and materials handling industries are hazardous (Karlsson & Nilsson, 1993). Our results supported this. **Case A** had an unsatisfactory value on the QWL factor "psychological workload" and also a significantly higher proportion of self-reported work related musculoskeletal symptoms in the hands. This may be related to the fact that **Case A** was a terminal and not a warehouse, which the other two work places were. **Case A** had more customers than the other two investigated companies, which meant larger variety of goods, amounts and sizes. It might be harder for **Case A** to adjust to variations in the flow of goods. There seemed to be more of manual materials handling at **Case A** than at the other investigated work places and the physical work environment seemed to be less satisfactory. This was somewhat surprising, as the plant was built only some years ago and the buildings were more modern compared to the other two work places.

Musculoskeletal Symptoms

There was also a surprisingly high proportion of workers in all the work places that had musculoskeletal problems. The results from the QWL questionnaire, where the factor "psychological work load" had the lowest mean values in all the groups, were in accordance with this. The sample of companies was too small for generalisations to be made, but the ergonomical working conditions seemed to be about the same and as unsatisfactory irrespective of country. The results indicate a significant difference between the groups concerning the percentage of self-reported work-related

musculoskeletal symptoms in the hands (*Chi-square*=11.21), see table 3. **Case A** had a higher percentage of self-reported work-related musculoskeletal symptoms in the hands than **Case C** (*Chi-square*= 6.48) and **Case B** (*Chi-square*= 5.20). On a descriptive level one can see that at **Case A,** the proportions of self-reported musculoskeletal symptoms were generally larger than at **Case B** and **Case C**. At **Case C**, less problems with upper and lower back symptoms were reported than at the two German work places, though the differences were not significant.

Table 3 - Percentage of self-reported work-related musculoskeletal symptoms

Body part	Symptom	Case A (Germany) %	Case B (Germany) %	Case C (Sweden) %	
Neck	yes	50	31	33	n.s.
	no	50	69	67	
Shoulders	yes	57	23	31	n.s.
	no	43	77	69	
Elbow	yes	24	0	13	n.s.
	no	76	100	87	
Hands	yes	52	8	19	p<0.05
	no	48	92	81	
Upper back	yes	29	38	13	n.s.
	no	71	62	87	
Lower back	yes	65	57	39	n.s.
	no	35	43	61	
Hips	yes	15	8	9	n.s.
	no	85	92	91	
Knee	yes	45	29	30	n.s.
	no	55	71	70	
Feet	yes	35	15	13	n.s.
	no	65	85	87	

Quality of Working Life

For comparisons between mean values of the Quality of Working Life factors, the Kruskal-Wallis one way of analysis of variance and the Mann-Whitney U-test were used. For comparisons between background factors and perceived musculoskeletal discomfort the Chi-square test with continuity correction was used. The level of significance was set at $p<0.05$. The mean values and standard deviations of the quality of working life factors are shown in table 4 below.

Table 4 - Mean values and standard deviation of Quality of Working Life factors

Factor	Case A (Germany)		Case B (Germany)		Case C (Sweden)		
	mean	sd	mean	sd	mean	sd	
1. Influence and control of work	3.3	0.6	3.4	0.8	3.3	0.8	n.s.
2. Supervisor climate	3.3	1.0	3.6	1,0	3.1	1,0	n.s.
3. Stimulus from the work itself	3.1	0.9	3.3	0.8	2.9	0.9	n.s.
4. Work relations	3.7	0.8	3.7	0.8	3.9	0.6	n.s.
5. Psychological work load	2.7	0.7	3.1	0.6	3.1	0.7	p<0.05

A significant difference in "psychological work load" was found (H=6.93 corrected for ties), where **Case A** had a less satisfactory mean value than **Case C** (U=399, z=-2.48 corrected for ties) and **Case B** (U=96, z=-2.03 corrected for ties). The workers at **Case A** reported a less satisfactory psychological workload than the other groups. On a descriptive level one could see that **Case C** had an unsatisfactory value in the factor "stimulus from the work itself". The factor "relationship with fellow workers" had the highest mean values in all the groups and the factor "psychological work load" had low mean values in all the groups (lower values indicate higher work load).

Participation and Qualification

Participation in the Work Process

Work councils existed at all plants. At **Case A,** the head of the work council at the terminal was also the general chair of workers and member of the supervisory board. He thus had very strong position within the company. At **Case B** the co-operation between managers and members of the work council was reportedly very good. The relationship was based on an attempt to find common solutions to problems. At **Case C** most workers were union members. The union was consulted in all major decisions, as dictated by Swedish law. The union played an important role and its success in negotiations depended on the individual capacities of the union representatives.

Neither **Case A** nor at **Case B** had a formal suggestion involvement or system of recommendation. Informal suggestion involvement was not known either. The company of **Case C** did not have a regular programme running. During a couple of years a programme for collecting good suggestions from the workers existed. It faded out a couple of years ago. At the start, there was a great deal of interest on the side of the workers. After some time, the programme was criticised because it took a very long time for the suggestions to be passed up the organisational levels and too long a time before the person who made the suggestion received any answer or comment. Furthermore, the remuneration was not very high, so the whole program developed a bad reputation.

Groups were defined as consisting of at least two persons interacting towards a common goal, in this case the completion of a work task in a work environment (Antoni, 1990). For the German groups, **Cases A** and **B**, self-directed teamwork in a modern sense could not be found. Forms of co-operation varied between shifts and depended on age and skills. For example, at **Case A**, during their shift younger workers performed the tasks in teams of two persons while during shifts in which mostly older men worked, individual work was the rule. At the Swedish plants, **Case C**, on the other hand, most employees worked in work groups or teams. The activities were generally organised in such a way that the workers had to interact in teams. Very few employees worked entirely by themselves. The organisation was not formally built upon teams but the idea was generally accepted.

At **Case A**, there were no activities similar to quality circles or meetings for the discussion of improvements. At **Case B**, ad-hoc-meetings in which the terminal manager and workers were involved were sometimes organised around such topics such as quality and changes of packages. Performance feedback was also given to workers. The policy at **Case C** was that work group meetings at the different work places should be held regularly on a weekly basis. The quantity and quality of the meetings varied, however. At one work place meetings were very rarely held, while at another short daily meetings took place. At yet another work place meetings were held regularly, usually once a week. Characteristic for the meetings seemed to be a lack of a formal structure. Important strategic questions, more abstract issues concerning the future, the operationalisation of goals, key figures and so on were not discussed. The topics rather covered everyday problems. There were no quality/improvement circles. The supervisors, the production manager, office staff and the local manager met every week. Meetings other the regular ones could be called on very short notice as required by the daily operation of the plant.

Neither at **Case A** nor at **Case B** were there any regular discussions among workers about goal setting and goal fulfilment. The goals were set at the top by the management and passed down to the workers. At **Case C**, the goals were clearly formulated by the top management, especially concerning the amount of profit to be made. There were also official policies set down in documents prescribing how the business should be run; for example the ISO-9000 quality polices. In addition, the

head office ran special programs concerning issues such as better communication with customers. All employees were informed about these programs through written material in the form of posters and newsletters. There was also a regularly published special regional newsletter. One problem was that the goals of the management were difficult to translate into action at the local level, for example at the work places.

Qualification

In the questionnaire study, subjects were asked about their educational background. The German and Swedish levels approximately corresponded to each other. Among the German groups **Cases A** and **B** *Level I* included "Haupt-/Volksschule" and "Realschule" altogether 10 years with or without "Diploma". *Level II* included "Gymnasium" altogether 12-13 years. *Level III* included "Universität". At the Swedish group **Case C** *Level I* included "Grundskola" 9 years or "Folkskola" 6 years. *Level II* included "Gymnasium" 2-3 years. *Level III* included "University". The results indicate that the level of education achieved, as indicated by educational degrees and professional training, was considerably higher in Sweden than in Germany, see table 5.

Table 5 - Educational levels

Educational Level	Case A (Germany)	Case B (Germany)	Case C (Sweden)	Total
I	96%	100%	37%	97%
II	4%	0%	50%	3%
III	0%	0%	13%	0%

At **Case A** the workers for the transhipment area were often recruited among persons who had been lorry drivers for the distribution of goods. There were a number of people who were not specially qualified for working in a terminal. The German workers did not have the specific qualification of packing specialist ("Fachkraft für Lagerwirtschaft" or "Handelsfachpacker") which was not surprising since this program does not yet enjoy a good reputation on the German labour market. The proportion of the workers who had taken part in some form of vocational training varied between the cases, as indicated by the table 6 below.

Table 6 - Participation in vocational training

Attendance	Case A	Case B	Case C
yes	14	7	8
no	8	3	0

It appeared that about half of the workers at **Case A** had some kind of vocational training, though not in the field of materials handling. At **Case B** this figure was lower, perhaps 1/4 of the workers. One has to keep in mind that the temporary workers were not studied and, since some of them were students, one would expect them to have a high level of education. At **Case C** the number of respondents with a vocational training was lower than in the German plants, only around 1/10 of the work force. However, one has to remember that the Swedish workers had a higher educational level in general and, therefore, they may have received vocational training in high-school ("Gymnasium").

Further education was defined as qualification training related to work tasks and offered to employees by the company to supplement the first vocational training. The results are indicated in table 7. At the German plants further education programmes were hardly developed. At **Case A,** only two supervisors of the terminal had taken part in a special qualification program. According to reports at **Case B**, few employees expressed interest in advancing their career, although a recently established, innovative, training programme for supervisors had been well-accepted by the supervisors of the

plant. At **Case C** the supervisor was initially responsible for teaching the basic skills required for the job and then an experienced worker informally took over the training. There was a checklist at each work place that the supervisors had to follow. After some time the worker had the possibility to go to an introductory course in two parts. This course was an introduction to the company as a whole and not a specific training for work at the plant.

Table 7 - Participation in further education

Attendance	Case A	Case B	Case C
yes	8	4	32
no	13	8	-
missing	2	2	(31)
total	23	14	63

There seemed to be a difference between the German and the Swedish plants concerning further education sponsored by the company. About half of the Swedish workers had received such education while the number at the German plants was smaller. The results also indicate that on-the-job-training was more common at the Swedish than at the German plants. At the German plants, further education was a privilege reserved for administrative staff. The assessment of further education programmes at German plants appears contradictory. For example, the local manager at **Case B** mentioned that there were motivational problems, arising from the fact that higher qualification meant that the worker had to be engaged in the transportation of dangerous goods. The terminal manager himself, on the other hand, was very interested in further education and took part in a program for supervisors and shift leaders offered by the head office for personnel development at **Case B**. The opportunities for qualification at **Case A** and **Case B** were limited to what was legally required, namely training for a licence to handle fork lifts, truck driving training for increased security and training necessary for the safe handling of dangerous goods. At **Case B** qualification offers, such as training in transportation of dangerous goods, specialising in work place security etc received little interest from the workers. The reason behind this may depend in a lack of interest also from the managers. This is illustrated by one manager's opinion: "In 90% of all cases there was no interest because the workers' mentality was short-term orientated and it was impossible to motivate them to think ahead."

A good number of qualification programmes were offered in the area of administrative work, judging from internal information. Special programmes for the development of personnel had been favourably introduced to young professionals. Qualification was considered very important in the area of administrative work. Qualified employees were valued as an existential capital for the enterprise. Further education programmes had been continuous at **Case C**, but became fewer during the years of recession 1991-1993. At the time of this study they had increased in number and had been formalised in a recently started 'Company C - school'. The focus was on the general competence of workers, for increased flexibility at work within the warehouse. Moreover, they were presently running a qualification programme with the specific aim of introducing lean production. The educational aims were for as many people as possible to learn more about administrative tasks. The younger workers generally had a higher educational level than the older workers did. There was no formal education in Sweden for workers in warehouses. There was only training for lorry driving within the Swedish gymnasium system. Nor did the branch have any special educational programmes. Comrades already working in the warehouses mostly recruited the workers. Only rarely did the company advertise job positions.

At Case A and Case B there were no formalised ways for the workers to make a career, and there were no official incentive programmes promoting career planning. Workers could advance to overseer or supervisor. At **Case C** the workers could advance to foreman or supervisor. Generally, the chances of becoming promoted were rather small because such positions were seldom open. Long

employment in the company used to be important concerning promotion, but individual qualifications had become an increasingly decisive factor. Though there was no formal promotion system for the blue-collar workers, there were discussions about a promotion system that would encourage individual workers to broaden their competence. There were opportunities for people occupying higher positions to apply for other jobs. They could also be 'discovered', indicating that there were also informal ways of keeping an eye on people perceived to be good performers who, when a position was vacant, could be encouraged to apply for the job. There was an informal system of hiring employees within **Case C** or from other firms in the same business. Job training at **Case C** would not automatically lead to higher positions. On the supervisor level, it was possible to make a career based on personal qualifications more than on formal merits and seniority. The supervisors were supposed to have yearly talks with their subordinates about how they perceived work in general and also about career planning. These yearly talks could be a mean of investigating the interest for advancement. For the higher positions at **Case C** there was a more systematic career planning. So-called 'trainees' were hired regularly. The trainees usually held a university degree that included studies in economics. The trainees were placed at different plants and were encouraged to meet each other regularly to develop a network throughout the organisation.

Specific vocational training for workers in the materials handling branch called "Fachkraft für Lagerwirtschaft" had been developed in Germany. This was a fairly new educational programme that was started about ten years ago. In Sweden there were no special training programmes for materials handling. Questionnaire results showed that only a small number of workers at the Swedish plants had attended vocational training. Learning seemed to take place as on-the-job-training. According to the results, systems for participation in terms of work process was more elaborated in the Swedish plants, see table 8.

Table 8 - Summary of participation items

	German Plants	Swedish Plants
Work councils	+	+
Suggestions involvement	-	(+)
Work in groups	-	+
Meetings	-	+
Goal setting	-	(+)

DISCUSSION

If the work organisation and thus the work environment was dependent upon the kind of goods that was handled, then it was not surprising that the work environments were about the same, as the goods that were handled were the same. This was in line with the statement that the field of transportation and materials handling is international in character. But the results showed differences among the three investigated plants. The most significant differences were not between the German and the Swedish plants but rather between the plant of **Case A** on the one hand and the **Case B** and **Case C** plants on the other. Organisational levels were more numerous and the division of labour was more pronounced. The Swedish plant was more "modern" in terms of way work was organised, as there were fewer organisational levels, more work place meetings and, at least theoretically, the possibility to perform a greater variety of work tasks than at the German plants. It was therefore surprising that this was not reflected in the results of the quality of working life (QWL) part of the questionnaire: the Swedish workers were not more satisfied with the QWL than the German workers. Nevertheless, at **Case A** there seemed to be more manual materials handling than at the other investigated work places and the physical work environment seemed to be less satisfactory. This was

somewhat surprising, since the plant was built only a few years ago and was thus rather modern compared to the other two work places.

A surprisingly large number of workers in all the work places had musculoskeletal problems. However, it was reported that jobs in transportation and materials handling industries were among the most hazardous (Karlsson and Nilsson, 1993). Our results supported these findings. With respect to the work organisation, it was shown that at **Case A**, the division of labour was more pronounced, the number of work tasks per worker was lower, the average level of qualification was lower, the options in decision making were fewer and participation was lower than at **Case B** and **Case C**. We can find an explanation if we look at some of the relevant microeconomics data. There were also significant differences in the number of products, the degree of standardisation and the number of customers between **Case A** on the one hand and **Cases B** and **C** on the other hand. Therefore, we can formulate the following hypothesis: the higher the number of products, customers and the degree of standardisation, and the lower the weight of the products, the more pronounced is the work division, the lower is the number of work tasks per worker, the fewer are the options in the decision making, the lower is qualification and participation. Concerning the use of technology it was observed that the control over technology was unevenly distributed among the groups. At **Case A**, technology supported standardisation of material flow and led to the creation of specialised and simple tasks. At **Case B** technology supported manual transportation and, to some extent, information flow. At **Case C** technology supported information flow and manual transportation. The number of hand lift trucks and forklift trucks available determined the work pace at all plants.

There were different forms of participation. Indicators for participation were working in teams, the importance granted to meetings, the options for decisions within work tasks and the resources invested in processes of change. Generally, in the Swedish company there were fewer hierarchical levels and more importance was given to participatory work organisation, based on shared decision making. Approximately the same was observed at German warehouse **Case B**, but participation was limited. The work organisation of the German terminal **Case A** was structured according to a pronounced division of labour, in connection with sophisticated technical equipment and lack of instruments for participation. At all plants work organisation had not so much focused on "human resource development" and organisational issues such as information, meetings etc. In this light, the Swedish plants were pioneers. In their current work organisation employees usually had a broader experience, due to vocational training in different fields, which enabled them to be more engaged in organisational change processes. Moreover, blue-collar workers at the Swedish company displayed almost the same attitude to work performance as that of white-collar employees, an attitude, which was assumed to be based on relations of trust. Therefore, one might argue that the Swedish employment system was less stratified and that there were fewer hierarchical boundaries for co-operation, information flow and attitudes towards work.

There was no vocational education that was accepted by employers in both countries. In this light, it was remarkable that the German terminal **Case A** had started its first qualification programme for blue-collar workers in transhipment. Previously further education sponsored by the company was only offered to administrative employees. Furthermore, the attempts to increase the qualification of the workers seemed to run contrary to the almost tayloristic work organisation. Perhaps this marks a turning point in the management's way of structuring work processes. The differences in educational level indicated also differences between the Swedish and German educational systems. A relatively high educational level in combination with limited possibilities for varied and complex work tasks may partly account for the workers at **Case C** perceiving the QWL factor "stimulus from the work itself" as unsatisfactory. The differences in educational level may also have implications for the potential for change, implying that a higher educational level may facilitate change and have impli-

cations for the possibilities to participate in the development of the work place if such possibilities are available.

Using an industrial sociology view on the past years of fundamental organisational changes in the manufacturing sector, we can observe two different directions in the development of the work organisation in transport companies. One development is focused on the taylorisation of the work organisation. Perhaps it is a kind of "neo-taylorism" as could be found at **Case A**. The general impression was that there was considerable problems related to the work organisation. The organisational structure at this plant seemed to have more hierarchical levels than the Swedish and seemed to be more bureaucratic, not only because of organisational structure, but also because there was less participation in the work process. The second development is based on processes of work optimisation. Different strategies have been adopted and improved at manufacturing companies. These strategies, with all their implications for human resource management, self-directed teamwork, job enrichment, flat hierarchies etc, are now being introduced in forwarding companies. Perhaps we can consider this as a "post-tayloristic" work organisation that was partially observed at the Swedish Plants. In fact, at Swedish plants, teamwork had longer traditions than in Germany (Berggren, 1991). Teamwork was first introduced in car manufacturing and by now forwarding companies also has experience from this kind of work organisation. Which respect to the hypothesis that changes in work organisation in the manufacturing industry will diffuse to the transportation sector, German companies seemed to be lagging behind Swedish companies.

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