



Workshop 8: Factors contributing to different accident rates of Danish and Swedish construction workers

Susanne Ulk

**The Danish Branch Environment Council
for Education & Research**

**8th Training & Innovation
Intercultural Dialogue in Work and Health
4 July 2008
BG - Academy Dresden**



? ? ? ? ? ? ? ? ? ? ?

Why is the Danish rate for lost time injuries (LTI's) four times as high as the Swedish rate?

Is it because of differences in education and experience, training and learning – or attitudes?





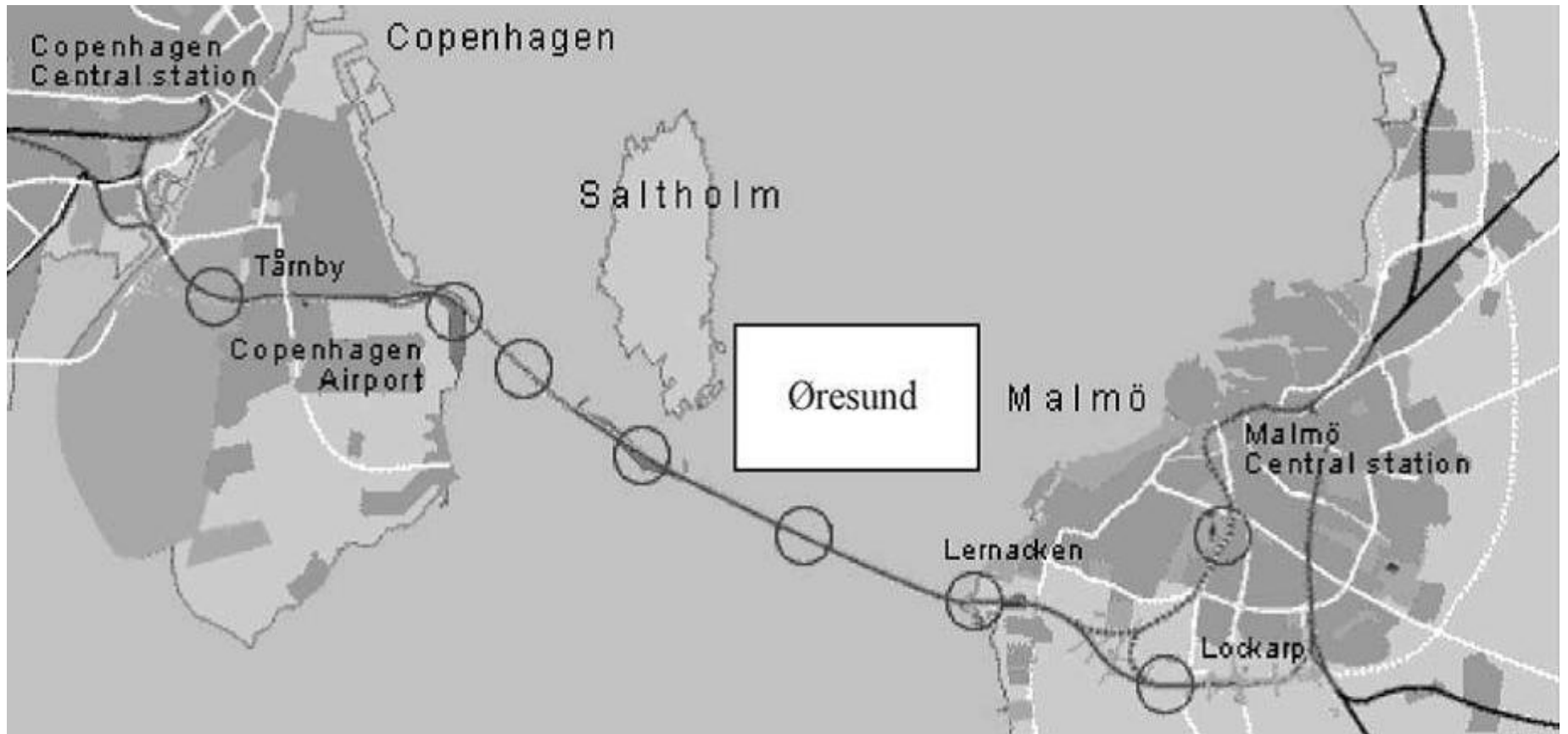
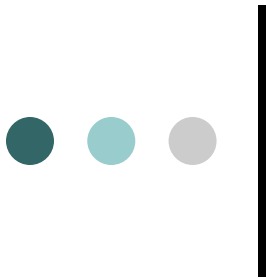
Several comparative studies have indicated that a number of factors might contribute to a difference in LTI-rates between different countries.

- **During the joint French and English construction of the Channel Tunnel seven workers on the British site were killed, whereas only two were killed on the French site (Linehan, 1992)**
- **In another study, Pekkarinen and Anttonen (1989) compared injuries at a construction project in Russia with construction in Finland.**



The study of "the Øresund Link project"

- **The study was carried out by Søren Spangenberg, Charlotte Baarts, Johnny Dyreborg, Pete Kines and Kim Mikkelsen from the National Institute of Occupational Health, and Lars Jensen, the National Working Environment Authority in Denmark.**
- **The Øresund Link project was chosen for this comparison, as it is a joint Danish and Swedish project carried out primarily by Danish and Swedish contractors and labour forces.**
- **At certain work sites Danish and Swedish workers were employed in the same organization and in cross-national work gangs (the languages are very similar) with the same type of tasks.**

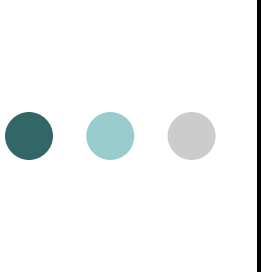




Results

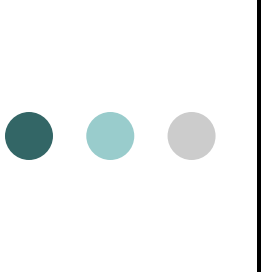
- **The LTI rate for Danish workers at the Danish concrete element factory was 4.7 times higher than for Swedish workers working at the same site.**
- **On the other hand the LTI rate for the Swedish workers working at the Danish concrete element factory was the same as for the Swedish concrete element factory.**





Number of reportable lost-time injuries and LTI-rates (per 1000 working years) for Danish and Swedish workers employed at concrete element factories in Denmark and Sweden, 1997

Group of workers	Working years	LTIs	LTI rate	LTI rate ratio
Swedes in Denmark	208	6	28.8	1.00
Danes in Denmark	183	25	136.6	4.74
Swedes in Sweden	511	14	27.4	0.95



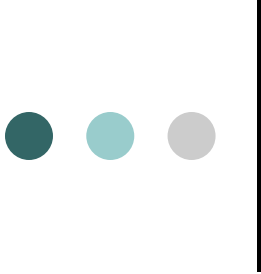
Distribution of the mode of injury for Danish and Swedish workers employed at the same concrete element factory in Denmark

Cause of injury	Danish workers	Swedish workers
Falls from heights or at the same level	12 (48%)	3 (50%)
Hit by falling/tipping/overturning object	4 (16%)	1 (17%)
Hit/squeezed by machinery or hand tool	4 (16%)	1 (17%)
Strain caused by lifting, pushing, pulling	2 (8%)	0 (0%)
Other causes	3 (12%)	1 (17%)
No of LTIs	25	6



Number of reportable lost-time injuries, working hours and LTI-rates for Danish workers employed at the Danish land works and Swedish workers at the Swedish land works

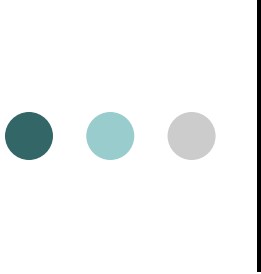
Year	1996	1997	1998	1999	2000	Total
LTI's						
Danish land works	77	37	15			129
Swedish land works		9	7	5	1	22
Working hours						
Danish land works	2.304	1.579	0.500	0	0	4.383
Swedish land works	0	0.936	1.066	0.584	0.095	2.681
LTI rates						
Danish land works		33.4	23.4	30.0		29.4
Swedish land works		9.6	6.6	8.6	10.5	8.21



Distribution of the mode of injury for Danish workers employed at the Danish land works and for Swedish workers employed at the Swedish land works

Cause of injury	Danish workers	Swedish workers
Falls from heights or at the same level	46 (36%)	9 (41%)
Hit by falling/tipping/overturning object	28 (22%)	5 (23%)
Hit/squeezed by machinery or hand tool	22 (17%)	5 (23%)
Strain caused by lifting, pushing or pulling	14 (11%)	2 (9%)
Other causes	18 (14%)	1 (4%)
No of LTI' s	129	22

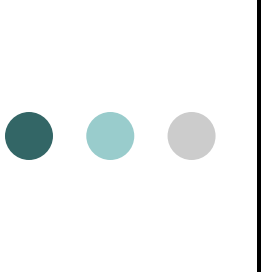




Non-specific factors were sought to explain the national differences using Landeweerd's breakdown of injury factors (1990)

- **Macro level factors:** factors determined at the national and societal level, such as work environment legislation, socio-economic structure, implementation of educational programs, national waging practices (during sick leave), etc.
- **Meso level factors:** factors determined at company or organizational level, such as employment practices, implementation of safety management, planning of work, selection of technical means and personnel, use of proper safety equipment, work load etc.
- **Micro level factors:** factors determined at working group (work gang) or individual level, such as working group cooperation, social and educational background, training and learning, attitude and behaviour towards safety etc.





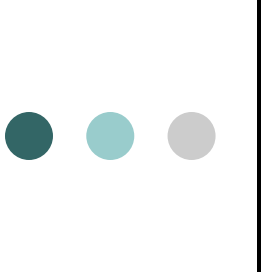
Macro level factors (1): National waging practices (during sick leave)

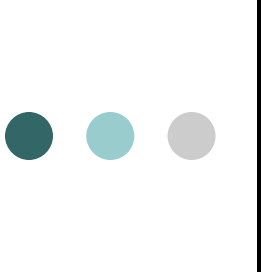
- **The national LTI-rate ratio for Denmark/Sweden was 2.06 for minor injuries, while the ratio decreased to 1.23 for serious injuries.**
- **Swedish workers have to pay for the first day of absence due to sickness or injury, whereas in Denmark the employer pays from the first day.**
- **Except for the 1-day waiting period in Sweden, the employers in both countries pay the workers during the first two weeks of sick leave.**
- **From then on similar public health insurance systems take over.**



Macro Level factors (2): National educational programs

- **Danish construction workers had less formal education both in terms of public schooling, as well as professional training. In Denmark, there is no basic training for earthwork and concrete workers. In principle, the work is classified as unskilled, although the work is often technically complicated and potentially hazardous.**
- **Danish construction workers usually have only 9 years of public schooling, and their professional training consists of practical on-site experiences, often with little regard for work environment health and safety issues.**
- **A formal education for earth and concrete workers—3 1/2 years in length—was introduced in Denmark in 1991, but so far it is of little significance, as less than 3% of the Danish earth and concrete workers had this education in 2000 at the national level.**

- 
- **Swedish work ethics on the other hand are learned through schooling and apprenticeship, and are thus based more on health and safety rules and regulations. Adlouni (1999) found that Swedish earth and concrete workers had a long and structured educational background. It provided structured knowledge of construction methods and techniques, knowledge of health and safety practices, as well as injury prevention.**
 - **During their formal and professional training, Swedish workers were encouraged to use safety equipment, and proper equipment and procedures for the required tasks, rather than take short cuts.**
 - **Most Swedish workers were high school graduates (3 years) specialised in construction, and they gained practical experience during their on site apprenticeship (2 1/2 years).**
 - **In addition to this, Swedish workers were often educated alongside fellow tradesmen and engineers, thus minimising social differences later on at construction sites.**



Macro level factors (3): Socio-economic structure of the construction industry

- **During the 1990s Sweden was plagued by stagnation and relatively high unemployment, resulting in only the strongest companies and most experienced workers remaining in the industry. In Sweden layoffs are handled according to the “last in–first out” principle.**
- **Unemployment in the Danish construction industry, on the other hand, was low, allowing more young workers to work in the Danish construction industry than in the Swedish.**



bridgephoto.dk



Meso level factors (1): Employment practices

- **The Swedish Øresund contractors' health and safety interests in their employees was also reflected by the fact that their employees were, to a greater degree, employed on a full-time salary basis, and that they stayed with the company for a number of years.**
- **The Danish construction workers, on the other hand, were often only employed temporarily, were more often paid by piecework, and to a greater degree moved from employer to employer.**



Meso level factors (2): Planning and preparation of work

- **The Swedish contractors used more time to plan and prepare for their work, including work environment health and safety issues.**
- **Danish contractors, on the other hand, were more inclined to rush into**
- **the project, and presumably, their lack of emphasis on planning of health and safety issues contributed to the higher LTI-rates at the Danish land works.**

© BridgePhoto.dk





Micro level factors (1): Training and learning

- **Swedish construction workers are initially trained through schooling and apprenticeship within specific industry sectors; concrete workers work with concrete, carpenters handle formwork, etc.**
- **Professional training of Danish construction workers consists of practical on-site experiences. As most of their training is based on hands-on experiences, Danish work ethics are more inclined to rest on traditions, often passed down through a work gang foreman and more experienced work gang colleagues, who in turn also are self-taught.**
- **Knowledge of and attitude towards safety may vary from worker to worker, and safety practices, norms and attitudes are continuously negotiated between workers, instead of being agreed upon collectively. At the Danish sites, the foreman's attitude to safety has great significance, and they are singled out by several sources as a crucial element in the endeavours to enhance the working environment at Danish construction sites**



Micro level factors (2): Attitude towards work

- **Swedish employment conditions result in a stronger bond between the employees and the company, which might give the Swedish construction workers a greater stimulus to go to work, in spite of minor injuries, than Danish construction workers with temporary employment.**
- **In Sweden construction workers have a tradition of returning immediately to work after a minor injury, and if unable to carry out their normal duties are set to doing other tasks.**
- **In Denmark it is an accepted tradition that workers with reduced work capability due to an injury take sick leave.**





Conclusions

- **The explanation for the four-fold difference between Danish and Swedish lost-time injury rates should be found at the group and the individual level.**
- **The study showed that factors at the micro-level e.g. differences in education and experience, training and learning, and attitude were important for the explanation of the significant difference in LTI-rates between Danish and Swedish construction workers.**
- **Further studies focusing at the micro level are needed in order to determine the importance of each of these factors.**
- **The study also indicated that comparison of national data on LTI-rates should be carried out with**

Bridgephoto.dk

