

Construction Hazards and Risks Control

Lecture Title: – Case Studies in Construction Risk Assessment and Safety Management

Lecturer: Ryan Spiteri

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Undergraduate Diploma in
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Why do we use case studies?

They provide practical examples of how health and safety principles are applied in real situations, helping us to understand the implications of their work.

Case studies often highlight incidents or failures, allowing organizations to learn from mistakes by referring to them and improve their safety protocols to prevent similar occurrences.

They offer evidence that can support the development of best practices and safety guidelines, making it easier for organizations to implement effective health and safety measures.



The Øresund Link project

<https://www.youtube.com/watch?v=lm9XB9D3nzs>



- The national occupational accident statistics for two Scandinavian countries, Denmark and Sweden, show that the reported lost-time injury rate for construction workers is significantly higher in Denmark than in Sweden (The Swedish Work Environment Authority and The National Working Environment Authority in Denmark, 2001a).
- No explanation of the observed difference in reported LTI-rates for Danish and Swedish construction workers was found in the literature on occupational safety. However, several comparative studies have indicated that a number of factors might contribute to a difference in LTI-rates between different countries.

In 1991, the Danish and Swedish governments approved the construction of a joint railway and road link across the 16-km wide sound, Øresund, between Denmark and Sweden.

- The Danish land works, built from 1993 to 1998 by Danish contractors and a Danish labour force
- The Swedish land works, built from 1997 to 2000 by Swedish contractors and a Swedish labour force.
- The joint Danish and Swedish link between the coasts of Denmark and Sweden, built from 1995 to 2000 by joint ventures of primarily Danish and Swedish contractors and labour forces

- The study groups included 183 Danish workers and 208 Swedish workers employed at the concrete factory in Denmark, and 511 Swedish workers employed at the concrete factory in Sweden. Subcontractors were not included. At the Danish concrete element factory the age distributions of Danish and Swedish workers were similar

Lost Time Injuries

- All Danish and Swedish contractors at the Øresund project were required to register all injuries, regardless of lost working time, and submit an injury report to the site owners immediately. At month's end, they had to provide a summary including the number of injuries, actual working hours, and employees. Violations of these conditions would lead to withheld payments.
- Based on these activities, the National Working Environment Authority in Denmark and the Swedish Work Environment Authority estimated that close to 100% of all reportable work related injuries resulting from accidents were reported by all contractors

- 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 workers working at the Swedish concrete element factory

Group of workers	Working years	LTIs	LTI rate	LTI rate ratio	95% CI ^a
Swedes in Denmark	208	6	28.8	1.00	(ref.)
Danes in Denmark	183	25	136.6	4.74**	(1.94–11.54)
Swedes in Sweden	511	14	27.4	0.95	(0.36–2.47)

- The significantly higher LTI rate among Danish workers compared to their Swedish counterparts at the Danish concrete element factory is particularly noteworthy, as both groups were employed together in the same work gangs. Extensive efforts have been made to confirm that the nature of the work was identical for both Danes and Swedes. This included interviews with the employer and employee representatives, as well as reviewing a report by the site owner, which details the types of work performed, the organization of the workers into gangs, and other relevant aspects, effectively documenting the similarity of tasks undertaken by both groups.

Different Factors

- Macro level factors: factors determined at the national and societal level, such as work environment legislation, socio-economic structure of the construction industry, 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

- The national LTI-rate ratio (Denmark/Sweden) was 2.06 for minor injuries, while the rate ratio decreased to 1.23 for serious injuries. This indicates that minor injuries result in less absence in Sweden than in Denmark. A contributing factor in explaining this might be differences in national employment and waging practices during sick leave.

- Waging practices during sick leave are different in these two Scandinavian countries in one important aspect:
- Swedish workers have to pay for their first day of absence due to sickness or an 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 2 weeks of sick leave.

National educational programs

- A study comparing educational and social backgrounds of Swedish and Danish construction workers on the Øresund Link project (Adlouni, 1999) found that Danish workers were of a lower social status than their Swedish colleagues. 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.



- 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 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.

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

Work environment legislation

- The Swedish Work Environment Authority and The National Working Environment Authority in Denmark have compared work environment legislation in the building and construction industry in Denmark and Sweden.
- The study concluded, that there were only few and minor differences between the Danish and the Swedish legislation. The most marked differences concerned the responsibility for coordinating health and safety arrangements on site, and the election of the workers' safety representative. The site owner has the responsibility for coordinating health and safety arrangements at the construction sites in Sweden, while the site owner can hand over the responsibility to the main building contractor in Denmark.

Meso level factors

- 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 (Adlouni, 1999). 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.



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.

Rana Plaza Building Collapse

<https://www.youtube.com/watch?v=H9hau1Ek4-s>



- On 24th April 2013, more than 3,000 garment workers in Bangladesh were ordered to go to work in a commercial building that, the day before, had been evacuated due to the discovery of dangerous, structural cracks. During the morning rush hour, the 8-story building collapsed. 1,134 people were killed; thousands more sustained severe, life-altering injuries.

- Rana had secured a permit to build on top of the site of a filled in pond area. He illegally built three stories above the permit and allowed industrial activities in a building constructed for commercial uses. To top it off, he had reassured the public, garment factory managers, and workers that the building was safe on April 23, the day before the collapse, when there were already cracks showing in the building.
- Relatives of the injured and deceased, workers, and politicians in Bangladesh also immediately called for accountability against the powerful garment manufacturers' cartel in the country. Most of the money made on a piece of clothing goes neither to the workers who make it nor to the factory owner in countries like Bangladesh, Vietnam, or Turkey, let alone the owner of the building that houses the factories.

Imperial Sugar Company Dust Explosion and Fire

- On February 7, 2008, a huge explosion and fire occurred at the Imperial Sugar refinery northwest of Savannah, Georgia, causing 14 deaths and injuring 38 others, including 14 with serious and life-threatening burns. The explosion was fueled by massive accumulations of combustible sugar dust throughout the packaging building.
- <https://www.youtube.com/watch?v=Jg7mLSG-Yws&t=156s>

