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INSPECTION AND PREVENTION; PRESENT CONCEPTS OF OCCUPATIONAL INJURY PREVENTION IN SCANDINAVIA AND AUSTRALIA

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ABSTRACT

The paper argues that prevention only will take place if enforcement is real, but that, for prevention to be successful, it should be kept apart from enforcement. The success of the road trauma prevention activities in Australia is used as an instructive parallel, and the potential of similar cost-efficient approaches, based on public fund workers' compensation systems in Sweden and Australia, is described. Sawing machines, beginners, rotating machines, coal miners, women in typically male jobs, forklift trucks, vibration induced white fingers, professional drivers, and regional intervention in Victoria, Australia, are the examples given. The necessary features of applied prevention activities include measurement of injury severity, identification of especially harmful machinery, costs associated with certain occupational exposures, groups especially exposed to injury risk, emerging occupations exposed to well-known injury risks, injury mechanisms especially related to certain machines, particularly injury-prone tasks in high-risk occupations, gender-specific risk exposure in certain occupation, specific hazard control for similar exposure in varying work environments, and the necessary combination of activities for successful regional intervention.

INTRODUCTION

The development of OH&S in the advanced export-oriented industrial economies after 1945 indicates that *technological development, investments and innovations* are the most critical factors in the reduction of occupational injury and disease.

But the competitive industrial development has, in most cases, been underpinned by a regulatory framework demanding equal compliance from all in the market, combined with reasonable levels of inspectorate detection. To uphold the regulatory framework has served to prevent unlawful shortcuts and undeserved market advantages.

The efficiency crisis of the industrial safety inspectorate in the 1990s is evident throughout the modern industrial world. In most countries the inspectorate has seen reduced pro-active inspection and control activities and the emergence of rather unconvincing forms of advisory services.

Today's big industrial company has little need for the inspectorate. Large numbers of medium-size companies often have great demand for OH&S advice and services, but they will not take their problems to the inspectorate. Small companies and the self-employed mostly exist outside control - and often outside the law.

The contradiction between *inspection and control*, on the one hand, and *prevention and industrial development*, on the other, has become more pronounced in most countries.

LAW AND ORDER

To apply the concepts of strict criminal law to industrial safety has been difficult for a long time. This probably has a lot to do with the issue of *risk exposure*, as well as with the traditions of property law and the development of industrial relations.

The general rule of safety at every explosives factory run by Alfred Nobel in the late 1800s was that the Factory Manager had to reside, with his wife and children, inside the factory gates, in the immediate vicinity of the production facility.

This represented a basic rule of successful industrial safety management: ie. the *legal* responsibility for workplace hazards, and the *actual exposure to risks*, were combined in a very practical sense.

When such practices were abandoned early this century, the concept of total management responsibility for the risk exposure of workers, to some extent, came into conflict with the delegation of responsibilities to the shop floor and the development of industrial democracy.

At the same time the industrial safety inspectorates were developing successful control procedures aimed at controlling physical hazards - eg. pressure vessels, cranes and trucks, ships, etc. - and industrial risk control became firmly established as a government responsibility.

The successful elimination of extreme industrial hazards - the modification of chainsaws, the redesign of controls for power presses, roll-over protection for tractors - are examples of regulatory approaches which have been instrumental in reducing fatalities and the incidence of severe trauma.

But in the present ideological climate, where government resources are scaled down and public service reduced in most economies, the principles of law in the workplace seem to be the victims of the economic rationalists. The concepts of "*self-inspection*" and "*internal control*" have been used to turn the cold necessities of tighter fiscal policies into the virtuous improvements of an "over-regulated" and bureaucratic inspectorate system.

The change of paradigm in the industrial safety inspectorates of the Western world stems from the Norwegian and British experiences in the North Sea off-shore oil and gas fields during the 1970ies. This very turbulent process of technology transfer and development made it convincingly clear that Government could not really compete with the competence of the high-tech process industry and thus should instead *concentrate on controlling that systems of control were in place*.

This represented a big step away from the specialised technical inspector, implied more of an organisational audit and was easy to combine with the general principle of "*duty of care*".

In many countries the old officers of the safety inspectorate have decided to stop the proactive enforcement of law and regulation, take off their uniforms and become consultants and advisers to a limited number of reluctant and suspicious industrial companies.

WHAT IS PREVENTION AND HOW IS IT DONE?

The public fund workers' compensation insurance represents the most valid and reliable way of identifying occupational risks and severe occupational trauma.

The claims information forms the basis for decisions on which industrial exposures that warrants *control and monitoring*, and in relation to which equipment, tasks and processes *standards and regulations* should be explicit and specific.

Strategic and long-term *prevention activities* must also be based on the priorities measured by the workers' compensation system. Prevention should be directed towards problems representing excessive human suffering, medical impairment or other such severe consequences which are seen as unacceptable by a large majority in society.

Systematic injury prevention activities have been successfully performed by a number of organisations in the area of traffic insurance and road safety, eg. the Insurance Institute for Highway Safety in the USA, Folksam Insurance in Sweden, and the Transport Accident Commission in Victoria, Australia. Innovative approaches thus developed have been modified and applied within the area of occupational trauma.

In an international perspective, the systematic prevention and reduction of road trauma is an Australian success story. Here common sense and consensus, together with targeted investments in applied counter-measures such as "booze buses" for random breath testing, speed cameras, graphic and extremely well produced television advertisements, and systematic modifications of the road system - all funded by the Transport Accident Commission - have seen returns on investment in the order seven - ten times (Tziotis, 1993).

More importantly, the number of fatalities on Victorian roads has dropped from an annual figure of 776 in 1989 to 396 in 1992 - a drop close to 50% - and the numbers have stayed under and around 400 since then. Victoria's fatality rate of 1.6 deaths per 10,000 registered vehicles is among the lowest of any comparable community in the world.

The functional and precise enforcement of traffic safety regulation is crucial to reduce the risk of fatality and severe trauma on the road. It is supported by a large majority of the population. No-one is suggesting that the road traffic regulations are too specific and bureaucratic and that they should be abolished in favour of a general and fuzzy "duty of care".

When the road safety experience is applied to the prevention of severe occupational injury, the challenges are different, mainly because the areas of high risk exposure are so diverse and disparate. Approaches and interventions must therefore be more focused and selective.

The workers' compensation system is in a unique position to supply the tools for local injury prevention and safety management.

The information in the workers' compensation system make *comparisons* between perceived local risks and overview information of similar exposures possible. This means that the data-bank of claims is restructured into an *expert system of information exchange*; claims information is utilized as a *management decision support system* on occupational risk.

For prevention to take place, enforcement must be real.

But for prevention to be successful it should be kept apart from enforcement.

TO IDENTIFY THE PRIORITIES OF PREVENTION

Some of the problems high-lighted in our research over the last 10 years into the Swedish and Australian workers' compensation systems can exemplify how prevention activities can be driven by the priorities set by the claims information system.

Sawing machines

In order to identify which of the machines in the Swedish wood-products industry have the greatest impact on medical severity and permanent impairment, exposure in terms of man-hours was estimated with the help of industry experts and the claims associated with the five most injury-prone machines were analysed (Larsson, 1988).

The severity measurement was based on some of the available insurance variables and a complete National industry coverage. The additional information on exposure needed to produce the machine-specific price-tags was provided by industry experts who estimated manhours and machine “park” for different types of production (eg. office furniture, general furniture, structural fittings & joinery, etc.).

Measured this way, severe injuries this year added SEK 2:- (\$0.50) per operating hour to the cost of using a circular rip saw. An improved protective hood for retro-fit onto circular saws and trimming saws was developed in Sweden.

Beginners

The importance of good introductory training for the new-comer to hazardous machinery and dangerous tasks is often seriously under-estimated.

Independent analyses of the reports to the industrial safety inspectorate and the workers' compensation claims associated with permanent impairment in the Swedish wood-products industry indicated that new-comers in this industry ran a risk of sustaining a severe traumatic injury the first day on the job which was **50** times higher than after 3 months (Larsson, 1988).

New induction routines were introduced in the wood-products industry. The study has also been used in developing television messages for the Australian occupational safety campaign.

Rotating machines

Some machines create injuries which are far more severe and more difficult to repair than others. Rotating machines for drilling, grinding, sanding and lathing are examples of this.

An analysis of all permanently impairing injuries sustained in contact with rotating machines in the Swedish metal-working industries indicated that 6 out of 10 permanent impairments associated with rotating machines were sustained due to protective gloves being caught in the machine. Women were over-represented in the material (Larsson, 1990).

The personal protective equipment industry is still trying to come to grips with the complicated problem of making protective gloves in sizes fitting females, who seem to have smaller hands than the majority of industrial workers.

Coal Miners

The Coal Industry in New South Wales, Australia has their own industry workers' compensation system, copied on the German Berufsgenossenschaften. Such industry systems tend to carry useful injury information of very good quality.

An extensive analysis of the severe traumatic injuries in the workers' compensation system of the New South Wales Joint Coal Board indicated that among the underground coal workers, particularly the supervisors ran high risks of sustaining permanent impairments associated with tasks like trouble-shooting and on-the-spot maintenance of rolling equipment.

This indicated a necessary re-organisation of supervisory and maintenance tasks in the Australian coal mining industry (Mitchell & Larsson, 1994).

Women in typically male jobs

A national Swedish study of all permanent impairments described as related to over-use and strain in the national workers' compensation system indicated that among the ten occupations with the highest incidence of permanent impairment for Swedish women, nine were typically heavy, traditionally all-male occupations (Larsson, 1993).

These results were politically incorrect (both in Sweden and Australia) and contrary to policies of equal opportunity in the labour market, and ergonomic intervention in order to adjust exposure in such occupations to fit female incumbents, has been slow.

Forklift trucks

The forklift truck is a well-known safety problem in most countries, mainly due to its flexibility and its extensive interaction with surrounding workers on foot.

The Victorian workers' compensation data indicate that an annual toll of some 700 severe and 5 fatal injuries can be attributed to forklift trucks (Larsson & Rechnitzer, 1994). From the in-depth analysis of the claims material it was concluded that the forklift truck should be recognised as a *vehicle*, and that

- in a freight terminal, no forklift and pedestrian movements should ever take place at the same level or in the same space,
- in a warehouse, all forklift truck movements should be separated from manual picking in space - by the forklift truck filling shelves from one side and picking performed from the other - or in time,
- in a manufacturing plant, forklift trucks should be limited to specific areas and completely separated from pedestrian walkways and work stations.

Vibration induced white fingers

Another well-known symptom among certain occupations exposed to vibrating hand-tools, is "white fingers" or Reynauds syndrome.

A national study, based on all claims for vibration induced white fingers over five years in Sweden, indicated that while the problem seemed to be constant or decreasing in some of the occupational groups traditionally associated with this problem (ie. stonemasons and forestry workers), white fingers seemed to be on the increase among the large occupational groups of car repair workers and motor mechanics, who also were generally affected at a younger age (Larsson & Persson, 1995).

Professional drivers

In a national study of work-related permanent impairment among professional drivers in Sweden, it was shown that the main tasks associated with severe injury risks were manual handling of the load on the truck and falls associated with this (Oldertz et al, 1995).

Great similarities between countries were indicated by a replication of these results in the analysis of transport industry claims in the workers' compensation system of Victoria, Australia (Larsson & Rechnitzer, 1996).

Regional intervention in Victoria

Based on a priority analysis of the workers' compensation data in Victoria, Australia, and with specific reference to a defined region 150 km north-west of Melbourne around the town of Ballarat, severity measurements indicated that injuries associated with *manual handling among transport workers and nursing staff* represented a well-defined and prominent occupational health problem.

Based on these priorities, a regional six month campaign named “Operation Safety” was conducted. This campaign combined a large number of worksite visits, a special mobile truck display of lifting and manual handling devices which travelled the region, and telephone surveys of regional industries and households, with systematic publicity in print media of regional manual handling problems and their solutions, an intense advertising campaign in print media and outdoor billboards, and three specially produced and regionally screened television spots.

The preliminary analysis of the claims data in the Ballarat region indicate that there has been a dramatic reduction in severe injuries during the period of the campaign. This is particularly so in the targeted road transport and nursing industries (Larsson & Rechnitzer, 1996).

Conclusions

In the examples above a number of necessary features of the applied prevention activities have been demonstrated:

- measurement of injury severity,
- identification of especially harmful machinery,
- costs associated with certain occupational exposures,
- groups especially exposed to injury risk,
- emerging occupations exposed to well-known injury risks,
- injury mechanisms especially related to certain machines,
- particularly injury-prone tasks in high-risk occupations,
- gender-specific risk exposure in certain occupations,
- specific hazard control for similar exposure in varying work environments,
- necessary combination of activities for successful regional intervention.

THE ROLE OF WORKERS’ COMPENSATION IN PREVENTION

The claims administration system in the area of workers’ compensation represents a valid and reliable way of identifying occupational risks and severe occupational trauma; either in the comprehensive (public) system, at the large self-insured company, or among groups of small companies affiliated with a co-operative insurer or banded together in a “risk-pool”.

The claims information, with details of the accident process and aetiology - and the medical, social and economical consequences of trauma and disease - is normally used solely for compensation purposes, but is easily turned into a tool for occupational epidemiology.

However, there is an obvious contradiction between *private insurance* and *prevention*. If prevention is systematic and efficient, injury incidence will drop and risk decrease. Premiums, in the private insurance world, would then be pushed down by competition. This would, over time, decrease the volume of the insurance business and reduce the amount of capital available to the finance division of the company, which is the core business of the private insurance company. If the finance volume drops, the company will shrink, profit will drop, the company will lose money, be forced to cut staff and eventually be taken over or fold.

For systematic injury prevention to be an efficient and successful activity, the compensation system must be of a comprehensive, co-operative or non-profit character, and *not* be run in competition, for profit on a private insurance market.

The prevention of injuries - at work, during leisure, on the road, or in the home - is a basic question of improved public health. This demands policies, organisation and activities beyond the scope and interests of the private insurance business.

DETERRENCE - BEFORE OR AFTER INJURY?

It is hard to see how the workers' compensation system could provide equitable compensation, cost-efficient rehabilitation and effective targeted prevention if it does not operate against a background of law and order.

However, the present version of law and order for the industrial environment, at least in the in the Anglo-Celtic world, is becoming more and more general and unspecific. The law will not stipulate what the employer must do, and standards and regulations will not describe the parameters of safety. The law can only be used to prosecute after the fact - once someone has been killed or severely injured.

In most countries, industrial inspection and control are being drastically reduced, making the chance of detection very slim. The force of deterrence in work environment regulations is weak. Detection is almost entirely reliant upon the workers' safety representatives, and their influence is reduced in times of high unemployment.

Fortunately, this trend towards the general and unspecific is modified by the European Union in favour of legally interpretable minimum requirements. In that way the separation of *inspection and policing* from *prevention and risk reduction* is possible and logical.

By defining what is the legal minimum performance requirement for an employer, criminals can be apprehended *before* someone is killed or severely injured. To target areas of severe occupational injury risk, if such areas fulfil the minimum legal requirements, can then be the task for the prevention system.

CONCLUSIONS

I believe that the Industrial Safety Inspectorate can be resurrected as a taskforce for the efficient control of safety and industrial development. But it will require a number of changes related to structural and ideological factors:

- the relative *priorities* for inspection and control must be carefully analysed, based on the needs of the risk-exposed, and assessed with the help of good and valid data, eg. claims information;
- laws, rules and regulations must be formulated to operate in a strict and precise manner, and must always be applicable to risks *before* injury;
- the development of *rules and regulations* should be based directly upon the priorities indicated by the continuous monitoring of good and valid data, eg. claims information;
- the enforcement of work environment laws, rules and regulations should be directly associated with, and, if possible, integrated into the *regular organisation of jurisprudence* in society.

For the workers' compensation systems to develop efficient and successful prevention programs it is necessary to

- maintain the public fund, the comprehensive coverage and the non-profit or co-operative character of the workers' compensation insurance,
- keep the legal inspection and control strictly *separate* from the systematic and constructive prevention activities,
- develop and maintain reliable methods of *applied epidemiology* suitable for the detection of hazardous exposure in the workplace,
- develop and maintain efficient *methods of local risk assessment and intervention*, and reliable *information services* for insured companies and collectives.

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