Editor's Chronicle

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Safety Management Systems – Culture, Cognition or Cash?

The development of safety and health within the industrial society represents a mysterious and multi-faceted process. Political, social and economic dimensions overlap and interact and their confusion challenges our interpretative powers.

While we obviously have managed to reduce the overall incidence of fatalities at work in the developed industrial systems, we seem to maintain a very stable differentiation between high-risk and low-risk jobs in the modern labor market.

Concrete worker	**9.0**
Sawmill worker	**7.3**
Wood products industry worker	**6.8**
Seafarer, deckhand	**5.1**
Miner, driller, quarry worker, stonemason	**4.9**
Glazier	**4.8**
Panel beater	**4.6**
Dairy, bakery, brewery and food process worker	**4.1**
Welder	**4.0**
Metal products manufacturing worker	**3.7**
Fire fighter	**3.7**
Vehicle assembly worker	**3.7**
Abattoir and meat products worker	**3.6**
Cargo handler and porter	**3.5**

Carpenter	**3.4**
Steel maker, caster, blacksmith	**3.3**
Police officer	**3.3**
Bricklayer, tiler	**3.0**
Plywood and board manufacturing worker	2.5
Carpet layer	2.5
Air conditioning and ventilation technician	2.4
Truck driver, bus driver	2.4
Paper and pulp worker	2.4
Farmer, forestry and animal husbandry worker	2.2
Machine operator	2.2
Building and construction labourer	2.2
Military professional	2.2
Machine and motor mechanic	2.0
……	
Total 1997-2001	**1.0**

Five-year average relative risk of severe occupational injury in Sweden 1997-2001 (Larsson & Forsblom 2005)

The same 11 occupations exhibited a consistent 300% higher risk of death or impairment on the job, measured over five consecutive years, than the background national average incidence (Larsson & Forsblom 2005).

And while similarly structured companies apply virtually identical technological means and equipment to construct a multi-story building in Berlin as they do in Accra, the results in occupational safety and health of these projects might be very different.

The pace of development of safety probably varies between exposure areas. But to compare the improvements to road safety between 1960 and 2010 with the changes to patient safety in

the last 50 years – in the same countries – will depend on what you measure and how you assess the baseline.

Road fatalities in Sweden 1950 – 2009

		Per 100 000	
Year	Fatalities	Cars	Inhabitants
1950	595	172.5	8.4
1995	572	14.5	6.5
2005	440	9.5	4.9
2009	328	7.4	3.8

The safety of the road transport system has improved considerably; road design, system logistics and vehicle design are much safer today than 50 years ago. But a large proportion of the reduction in road fatalities must be ascribed to the improvement in ambulance, rescue and early medical intervention services. In fact, a well structured safety management improvement to the acute trauma care system has proven to be quite successful in saving lives in traffic.

Ironically, the medical system seems generally incompetent in applying systematic safety management to the hospitals and the in-patient care. Improved medical technology and monitoring systems will have prevented mishaps and reduced fatality rates in acute medical care, but the incidence of death among patients due to mishaps in medical care is still staggering.

Safety outcomes depend on interlinked systems

What's the link between cultural, industrial, political, social and economical aspects of life in relation to safety? I don't know the answer, but I am really interested in the question.

	RISK	
EXPOSURE		**MANAGEMENT**
System of production	--------	Cultural patterns
Technical-economic structure	--------	Political-legal system
Arenas of activity	--------	Norm systems

Patterns of activity	--------	Attitudes
Exposure situation	--------	Personality
Acute risk situation	--------	Individual coping skills

Model levels of safety culture (Hovden & Larsson 1987)

The levels of the model imply an increasing order of generality and collectivity. The lowest level is the gut reaction of the single individual; increasing levels imply social interaction, group behavior, sub-cultural attitudes, nationally and globally shared representations, historically defined global production systems.

Can you use this model for anything?

Maybe to prevent over-simplifications and reductionism! And to remind you that you have to state clearly what is observable if you want to intervene in the social process, control risk and manage safety.

Cash?

You cannot discuss the importance of monetary incentives in relation to decisions on risks unless you acknowledge the strong cultural differences between jurisdictions which believe in litigation and those which don't.

You cannot explain the reluctance of the Dutch to litigation in personal injury cases other than by assuming that there are strong cultural traits in the Netherlands supporting no-fault solutions.

It is hard to prove that the exorbitant premiums for obstetricians' professional liability insurances in Boston have resulted in safer birthing in Massachusetts - compared to a European national no-fault system, without ambulance-chasing lawyers and litigation costs driving insurance premiums through the roof. Boston Medical Centre and Sahlgrenska Hospital in Göteborg are probably as good – or bad – as each other.

The transactional (i.e. legal) costs associated with workers' compensation cases in the United States are 5-8 times the costs in the Swedish no-fault liability insurance. These costs are covered by employers' insurance premiums – have the inflated premiums worked to reduce the incidence of occupational injury in the US? Or does the investment in legal activities represent a cultural priority in favor of compensation for sustained injuries over investment in prevention and safety management?

What is the proof that cash incentives – penalties, monetary compensation, risk-related insurance premiums – have a direct influence on the management of safety and will lead to reduced risks?

Culture and Cash ?

The development of systematic performance data for the crashworthiness of cars, based on large numbers of sustained injuries as collected and compensated by a large traffic insurer, has turned the inherent injury reduction or prevention properties of the car model into a viable marketing argument while, at the same time, pushing the different car manufacturers into developing safer vehicles.

A major cultural change in road safety was the introduction of Vision Zero as the regulatory principle, which is aimed at systematic safety management by road-owners, vehicle manufacturers and road-users in relation to all severe road injuries.

The cultural importance of this shift of paradigm in road safety is comparable to the shift heralded by the Robens report for industrial compliance control. Where the Robens report suggested the substitution of technical, inspectorial control for administrative/legal control, the Vision Zero principle does away with the cost/benefit argument in road engineering in exchange for the criteria of the tolerance of the human body and proposes concrete intervention in all cases of fatal and severe injury.

ROADS & HOSPITALS (Sweden)

ROADS:

Fatalities per 1 billion person kilometers (private cars only)	2.7
@ estimated average of 60 km/hour	
Fatalities per 1 billion person transport minutes….	2.7

HOSPITALS:

On average 5 600 hospitalized patients every day….

Fatalities per 1 billion patient-in-bed minutes	1100

ROAD = 1 HOSPITAL = 377

In the Swedish road system we can measure 2.7 killed in private cars per 1 billion person-kilometers. If we, optimistically, assume that the average transport speed of the Swedish private car is 60 km/hour, one person-kilometer would represent 1 minute. The numbers thus are 2.7 killed in private cars per 1 billion person transport minutes.

In the Swedish healthcare system, an average of 5 600 people are in-patients every day. If we calculate the incidence of fatal mistakes in Swedish healthcare, we are left with the staggering figure of 1 100 fatalities per 1 billion patient-minutes.

To spend one minute in a Swedish hospital bed is 377 times more hazardous than to drive your car on the road in Sweden for one minute. And this is not taking into account the inherent risk of what caused you to go to hospital in the first place.

You would assume that the traffic system and the health care system are interlinked via trauma care and ambulance and rescue services, but the safety management developments in the traffic system have not made any noticeable impressions on the health care system.

Cognition and Cash

If 100 small business operators in ten different industries are asked how inherently hazardous their jobs are, they give, on average, a correct estimate as measured by the long-term National injury record of their occupation (Larsson, 1998).

Industries according to perceived hazards and actual claims

(10 x 10 small business operators in Melbourne)

Industry	**Perception**	**Claims/$m remuneration**
Fishing	1	1.0*
Farming	2	1.7
Metal work	3	1.6
Electrical	4	1.4
Restaurants	5	0.8*
Cleaning	6	1.4
Concreting	7	2.0*
Nurseries	8	1.0
Printing	9	0.6
Hairdressing	10	0.3

(Larsson 1998)

However, occupations with clear fatality risks (e.g. fishermen, divers) tend to include these and thereby skew/overestimate the risk. This can hardly be viewed as a cognitive error.

And professionals in high-risk occupations (e.g. concreters) tend to view early retirement at 58 with a bad back as the professional norm and par for the course. This is also hard to term an incorrect perspective – since it is the statistical truth.

Australian Divers view increased restrictions in access and fixed quota as positive for risk coping and stress in the underwater search for Abalone, and Fishermen operating in unrestricted areas are positive to the introduction of more quota system (Larsson 1998). That is, risk-exposed professionals have a mature view of structural safety management and accept reduced competition and, potentially, capped earnings in return for reduced risks and increased safety.

Culture and Cash II

In the deregulated – read self-regulated – post-Robens safety culture of the modern industrial society, the sub-contracting construction worker is assuming the actual responsibility for his own occupational injury risks. His decisions on safety are geared by his professional competency and the economic viability of his company. He is formally self-employed and thus carrying his own workers' compensation insurance, but in actual fact his role in the building project is as an employed worker. He does not rule over safety on the site. He does not govern the logistics of the construction process, the comings and goings of vehicles and deliveries or the safety-related behaviors of other operators on site.

A large US pharmaceutical company recently built new headquarters and production facilities in Sweden. The contracting construction company was given strong and penalty-linked instructions on site safety – absolute use of helmet on site by all, at all times, over the full term of the project and with no exceptions for anyone, ever. Certain modifications of technical safety standards were also enforced by the US pharmaceutical; evacuation stairwells had to conform to the NYFD standards, not to the local Swedish building standards.

The Swedish construction company obviously claims the credit for the introduction of the absolute and no-pardon rule of helmet use on their sites, but the organizational change came about as a result of contractual – and thus pecuniary - pressure from one of their buyers.

Culture and Cognition - Reporting

When discussing how to introduce safety management into the patient-handling system of the hospital, there are invariably suggestions to introduce a well-functioning incident reporting system. This, the proponents argue, represent the basis of a safety management system, showing you where the risks cluster and where the potentially severe injuries will take place.

After a multiple fatality due to poisoning in a Stockholm hospital in 1936, a Swedish law named Lex Maria forces all incidents in medical care deemed to expose patients to risk of severe injury or death to be reported. The estimated – but unknown - number of fatalities in Swedish health care due to mistakes is at least 3000 per annum and the severe and disabling injuries 250 000 per annum (Brennan et al 1991, Wilson et al 1995, Andrews et al 1997, Ödegård 1999).

Patient Injuries in Sweden 2010

250 000 disabilities
3 000 – 4 500 fatalities
1 200 reports

The reported number of incidents according to Lex Maria is around 1200 per annum, of which those representing a fatality risk are around 100.

Why is the reporting system not functioning?

The basic rule in the medical system is that mistakes are unacceptable. The Swedish Supreme Court recently tried a case of a Nurse mistakenly distributing a ten times too high and fatal dose of medication to a cramping pre-mature baby. The Nurse was convicted. The fact that the safety management system of the medical organization was shown to be inadequate and that journal notations were unclear and communications on the ward substandard, did not sway the Supreme Court.

If you make a mistake in health care it is your own fault and you can be prosecuted. Any mistake can lead to a conviction. Human error is defined as a punishable offence in the medical system (Larsson 2007a, 2007b).

Cognition

How would functioning incident reporting be possible in the medical system?

The basis must be a conditional immunity against early sanctions for mistakes and errors by medical professionals. Medical staff at all levels should report mishaps and rule violations and this should be regarded as a part of the normal professional routine. The reporting should be guaranteed by the transactional immunity of the no-fault system; the responsible party will not be punished and the suffering party – the system - will benefit from disclosure and repair.

The incidence reporting system best developed in this area is the Aviation Safety Reporting System in the US (1975), which has been copied by other aviation systems (eg UK, Australia, South Africa, New Zealand). The system is voluntary, confidential and gives immunity from sanctions for incidents reported within 10 days. All involved parties in the flying operation are

included in the system – pilots, crew, ATC's, ground staff, mechanics – and the output from the system is used to detect and control risks and manage safety in the US aviation system.

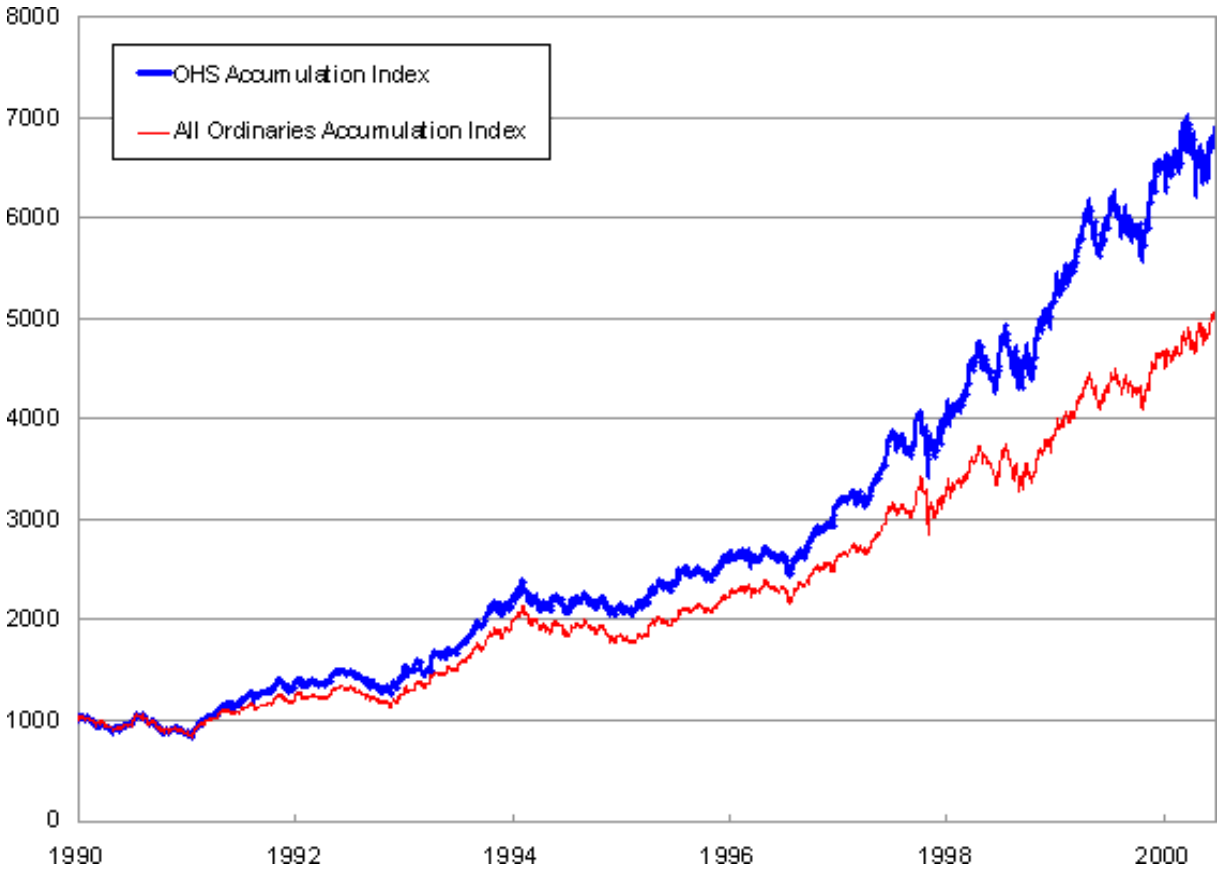
Imagine such a system at the hospital and in the primary health care system; a management system where you could keep track of every patient – continuously – as if they were airplanes in flight. Every doctor, nurse, nursing aid, physiotherapist, OT, pharmacist would be immune from legal and professional sanctions for their errors, mistakes and near-misses – as long as they report them to the system within 48 hours. The system is manned by engineers, medical and human factors specialists, who represent the analytical crew of the safety management team of the care organization. And, as in the Vision Zero system, any reported incident which represents a fatality or severe injury risk would require a concrete preventative action.

Cash, Cognition and Culture

When we reviewed the 100 largest companies on the Australian stock-exchange and sought to assess the quality of their safety management systems, the aim was to produce an OHS filter for a share investment fund (Larsson et al 2007).

The corporate social responsibility (CSR) wave had been rolling among multi-national companies for a few years, but this initiative, from one of the big commercial financial institutions, was aiming for the new options among union-owned superannuation to make

choices and govern investment of their big retirement funds. If it could be shown that it was possible to identify companies who were better at OHS than their competitors, this could be a good motive for investment, particularly for unions. This would operationalize CSR.



Larsson et al 2007

The testing of the portfolio put together by the fund manager using the OHS filter showed that safety management was a corollary to company share value.

The relation between share value and OHS is an indirect one – we have assumed that well managed companies make more money and well managed companies also manage their OHS well.

Culture, Cognition or Cash - Conclusion

The Dialectics of Prevention	
LEGAL	SYSTEMS
Individual faults	Systems failings
Guilt	No-fault
Litigation	Improvements
Compensation	Prevention
Hospitals	Aviation
Work	Road transport

The ***legal*** paradigm is built on the basic assumption that accidents and injuries are unavoidable due to human weaknesses and individual faults; there is always someone to blame; damages and compensation can be assessed in litigation. This is safety by lawyers who find the guilty, litigate and compensate the victim; they need blood on the floor to start working, prevention is a non-sequitur.

The ***systems*** paradigm assumes that errors, accidents and injuries are the result of failings in the system that can be amended and improved; by fixing the system, building redundancy and resilience it will be error-tolerant; risks will be controlled and injuries prevented. The system allocates compensation to injury victims according to the no-fault principle; no blame and no need to prove guilt in order to get damages.

The medical system operates predominantly under the *legal* paradigm; most industrial compliance control systems in the western world post-Robens do.

Aviation operates under the *systems* paradigm, and with Vision Zero the road transport system will also.

How can we convince politicians, journalists and voters that we should control, contain and reduce the influence of the *legal* paradigm?

How can we convince decision-makers in the medical system that they must join the *systems* paradigm and start saving lives in the hospitals?

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