

EFFECT OF OCCUPATIONAL WORK HEALTH, SAFETY OF WORKER AND BUSINESS PRODUCTIVITY: A CASE OF CASTING INDUSTRY

Hardik Sheth¹, Rushik Trivedi², Kushal Shah³, Divyesh Sathwara⁴, Hemant Thakkar⁵
^{1,2,3,4} B.E. Students, Department of Mechanical Engineering, GCET V.V.Nagar, Gujarat technological University, Gujarat, India.

⁵ Associate Professor, Department of Mechanical Engineering, GCET V.V.Nagar, Gujarat technological University, Gujarat, India.

ABSTRACT

The research was done to judge the value of work health and safety (WHS) on productivity in a casting industry. The main objective of the research was giving links between productivity and health and safety at work and study work health and safety (WHS) problem of the different work area and their impact on productivity. Questionnaires, interviews, observations, experience were used as research instruments to collect data. The paper consists of 3 areas dealing with the Economic costs associated with workplace disease, injury, and death, Occupational health safety problems affecting workers' productive capacity in the casting industry and The relationship between work health and safety (WHS) and workplace performance.

Keywords: work health and safety (WHS), casting industry, worker productivity, business productivity.

I. INTRODUCTION

The International Labour Organization (ILO) estimated that, globally, about 2.2 million people die every year from occupational accidents and diseases, while some 270 million suffer serious non-fatal injuries and another 160 million fall ill for shorter or longer periods from work-related causes. Furthermore, the ILO estimated that the total costs of such accidents and ill health amount to approximately 4 percent of the world's GDP. These figures represent a considerable Lose that has a negative impact on economic growth of industry and also puts a burden on society. This paper examines the empirical evidence supporting the business case for better workplace health and safety. It commences with a brief overview of what we know about the economic costs associated workplace injury and illness. Most of the casting, industry aim at maximum productivity from their workforce and equipment. There are, however, a number of occupational infections and injuries affecting staff in the casting industry, leading to decreased employee productivity. As the duration of a person's employment in unpleasant environment increases, his/her fitness is compromised leading to reduced performance. Some of the tasks being done manually should be carried out mechanically. Most areas of work in the casting industry are dusty, hot, and noisy. Protective clothing is used as upfront protection rather than the last resort. There are high levels of absenteeism and ill health due to lack of sound work health safety (WHS) procedures.

II. SCOPE OF THE STUDY

- Better reputation for corporate responsibility among investors, customers, and communities.
- Increased productivity, because employees are healthier, happier and better motivated.
- To prevent inter-office violence and raise employee awareness of the danger.
- To avoid Lose of life of the employees .
- To improve employees satisfaction .
- To have a better cooperation with the employees union and hence to avoid conflicts between them.

III. OBJECTIVE OF THE STUDY

- To identify the kind of health problems that employees go through because of the type of their work.
- To examine the impact of low standards of WHS on productivity.
- To assess the attitude of management towards the WHS of employees.
- To avoid Lose of life of the employees
- To improve employees satisfaction

- To have a better cooperation with the employees union and hence to avoid conflicts between them

IV. LITERATURE STUDY

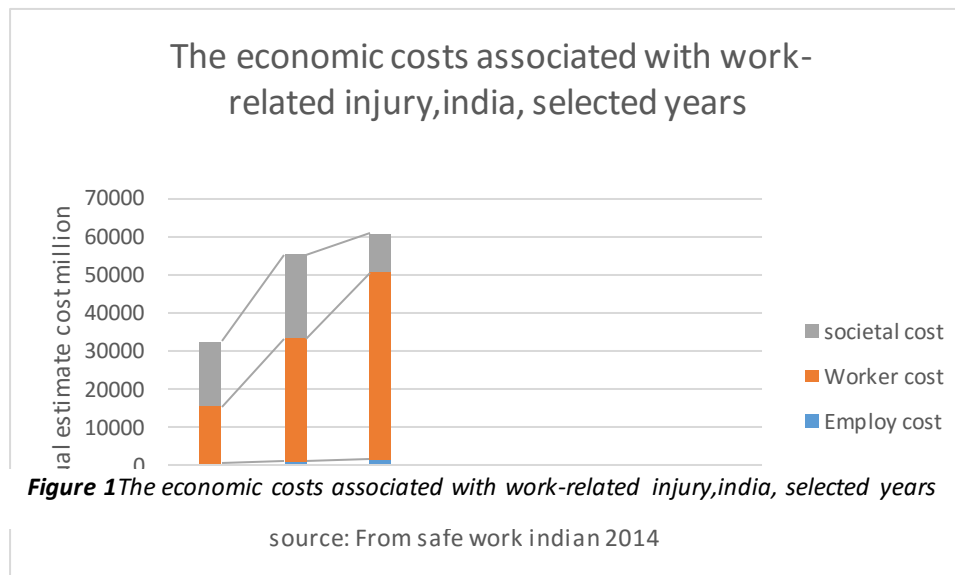
The economic justification for better WHS

Workplace illness, injury and death impose large costs on industry economics. These costs accrue to individual workers who suffer, their families, the businesses that employ them, and society at large due to the costs associated with health care and treatment. Within the research casting industry context, an estimated 7 serious workers' compensation claims were submitted during 2014-15. Employees who claim for a serious injury are absent from work, on average, for a period of 6 weeks, with one-quarter of serious claims requiring more than 6 weeks off work (Safe Work India 2014). during that time 21 minor injuries were reported in industry.

More recent estimates of the economic costs of workplace injury and illness focus on estimating the cumulative cost to the national economy as a whole (Safe Work india2013). Figure 1 provides estimates of the total costs of work-related injury and illness in India for three periods: 2010-11, 2012-13, and 2014-15. The most recent estimates (2014-15) indicate that the direct and indirect costs associated with workplace injury and illness stands at more than \$60 billion annually.

Table 1 Impact of ill-health on different groups

	<i>Non-tangible</i>	<i>More or less tangible</i>
<i>Victim</i>	<i>Pain and suffering Moral and psychological suffering (especially in the case of a permanent disability) Lowered self-esteem, self-confidence Strain on relationships Lifestyle changes</i>	<i>Lose of salary and premiums Reduction of professional capacity Medical costs Lose of time (medical treatments)</i>
<i>Family and friends</i>	<i>Moral and psychological suffering Medical and family burden Strain on relationships</i>	<i>Financial Lose Extra costs</i>
<i>Colleagues</i>	<i>Psychological and physical distress Worry or panic (in case of serious or frequent accidents/cases of ill-health)</i>	<i>Lose of time and possibly also of premiums Increase of workload Training of temporary workers</i>
<i>Company</i>	<i>Presenteeism (employees are present at work but limited in their job performance by physical and/or mental problems) Company image Working relations and social climate</i>	<i>Internal audit Absenteeism Decrease of the production Damages to the equipment, material Quality Losees Training of new staff Technical disturbances Organisational difficulties Increase of production costs Increase of the insurance premium or reduction of the discount Early retirement Administration costs Legal sanctions</i>
<i>Society</i>	<i>Reduction of the human labor potential Reduction of the quality of life</i>	<i>Lose of production Increase of social security costs Medical treatment and rehabilitation cost Early retirement Decrease in the standard of living</i>



The business case for WHS

While these estimates of the economic costs and benefits to national economies are useful for determining the economic case for regulatory standards relating to WHS this evidence alone does not provide an adequate basis to make a business case for investing in better WHS. The allocation of costs and benefits across different individuals or groups will therefore have significant consequence for the extent to which the general economic case translates into a business case. The business case is usually based on the assessment that investing in WHS can result in improved business performance and profitability in a number of different ways: more efficient work processes, better risk management, improving business reputation etc.

Productivity and problem of measuring productivity

Generally speaking, productivity could be considered as a comprehensive measure of how organizations satisfy the following criteria (Prokopenko, 1987):

- Objectives: The degree to which they are achieved.
- Efficiency: How effectively the resources are used. (Doing things right)
- Effectiveness: What is achieved compared with what is possible. (Doing the right things)
- Comparability: How productivity performance is recorded over time.

Productivity measures the ratio of inputs to outputs. As this definition suggests, the concept derives principally from a manufacturing context where tangible inputs and outputs can be quantified and their values measured. In more diverse production and service environments a range of factors makes measuring productivity a more difficult proposition. Particular, the quantification of the inputs and outputs is difficult in work health safety environments.

Muchemedzi and Charamba (2006) define occupational health as a science concerned with health in its relation to work or working environment. According to Oxenburgh et al. (2004), the health and safety of all employees are closely linked to the company's productivity in all workplaces. In most cases, occupational health safety (OHS) is largely measured by negative outcomes such as workplace injury and illness but these measures have a shortfall, for instance, a low incidence of injury does not necessarily mean that adequate safety systems and controls are in place (Health and Safety Executives, 2006). At some food factories, attention is mainly on negative outcomes. As long as there are no serious accidents, occupational health and safety policies and practices are not carried out fully. As a result, threats to employees' safety are not eliminated in time because accident-prone areas are not recognized and taken care of before accidents occur.

Golaszewski (2001) reviews 12 studies published between 1980 and 2000 selected by a panel of experts as being the most influential in offering evidence for or against the financial impact of workplace health promotion programs. The review provides "moderate" support for the economic value of such programs. The strongest evidence is for reduced employer health care costs and absenteeism. In contrast, recruitment and retention benefits lack empirical support in these 12 studies.

Koopman (2001) states that accidents bring pain and suffering to the worker and his family. When it results in permanent disability, the consequences are disastrous for both the victim and the company. The victim loses his

earning capacity and ability to enjoy a normal active life, and the society and company are deprived of his/her skill and contribution to production.

The Health and Safety Executive (2006) further explains that genuine productivity gains can be realized by those businesses that invest in high-performance health and safety practices. However, the Health and Safety Executive (2006) also recognizes that there need to be a positive attitude by many organizations if they are to move on from simply attaining minimum legal compliance toward. Implementing the best practice of OHS. For those organizations that make the transition, the rewards are well worth the effort. In other words, when an organization is committed to OHS best practice and implements it in a properly managed manner, the result is a win-win situation that benefits both the workforce and the organization for which they work. There is a need for a workplace improvement in terms of occupational health and safety for the benefit of the employer and the employee in order to increase productivity.

The effect of medication usage on productivity is one focus of this literature. For example, Cockburn et al (1999) evaluated the impact of different illness treatments on worker productivity, analyzing retrospectively medical claims utilization data and work output among 682 insurance claims processors in a large insurance company. They compared employees who received prescriptions for sedating antihistamine medications, with coworkers receiving non-sedating medication, and controlled for the effects of worker and job characteristics. Workers' output was measured by computer, making this a unique setting to study the impact of medication on productivity. Workers using sedating antihistamines experienced an average 8% reduction in daily output in the 3 days after receiving the prescription, compared to the overall average productivity of these same workers, while the non-sedating drug use group experienced a 5% increase in productivity.

V. OBSERVATION MADE AT CASTING INDUSTRY

The workstation change will increase productivity; however, it is misleading to conclude that this change results in the improvement of WHS standards. New machinery can also be hazardous to health. A workstation change can cause increased efficiency and productivity leading to an ignorance of the resultant WHS implications. It is, therefore, misleading to conclude that a workstation change improves WHS standards in light of the increased productivity.

The current scenario of casting industry is such that workers have to perform strenuous tasks and work longer hours in order to increase productivity. This may result in work-related stress and muscular-skeletal disorders. For instance, workers manually load long trucks using their shoulders, necks, and heads. They also work longer than their normal eight hours up to twelve hours with a benefit of overtime money at the end of the month. Twelve hours are too long because of factory heavy work. Some workers were experience back, neck, leg, arm pain or respiration discomfort. There is now a recognition that safer and healthier workplaces translate into increased productivity, more job satisfaction, and stronger bottom-line results. And we answered four factors that explain the link between productivity and employees' overall health and safety

- The need for more innovative ways to reduce the high rates of workplace injury and illness.
- The pressure to reduce the social and economic costs of injury and illness, particularly compensation costs.
- The need to improve labor productivity without employees needing to work longer hours and/or taking on more work.
- The need to offer good working conditions as an enticement to recruit and retain skilled workers in a tight labor market.

TABLE:2 Helth hazards that are faced by a different group of people at different workstations.

Hazards	mixer	moulding	pouring	ejecting
finishing				
Dust 20	45	22	00	13
Muscle movement 35	5	20	15	25
Heat/steam 5	15	10	20	50

Work-related illnesses and infections

The researchers found out that workers are actually infected by occupational diseases due to the nature of their duties. The numbers of workers who suffer from different WHS problems are shown in Figure. Of the entire workforce, only 25% claimed to be free of any illness that is caused by their work at any given time. The remaining 75% suffers from one or more types of illness. The industrial nurse confirmed that most workers have respiratory diseases

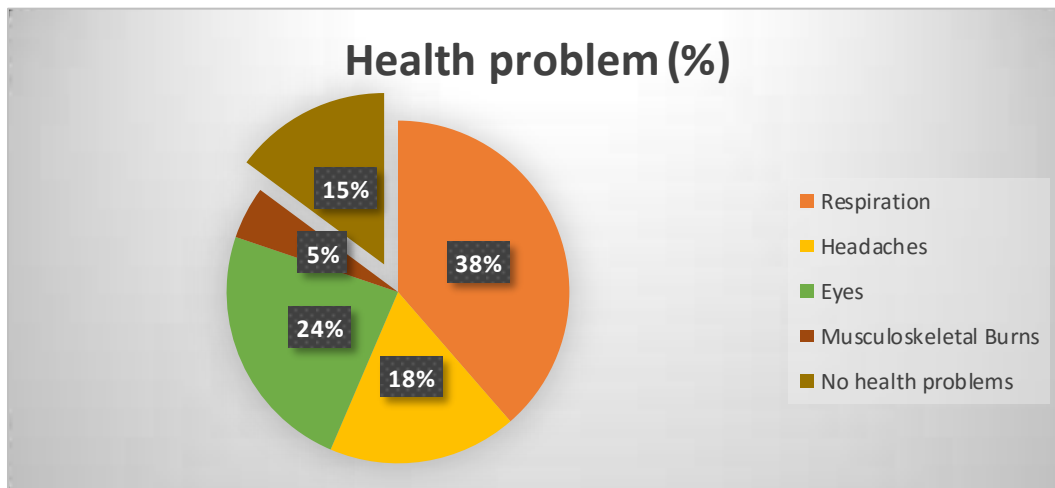


Figure 2 Health problem (%)

Protective clothing and equipment

It was found out from observations and interviews that protective clothing is used as forefront protection of workers from hazards. Protection of the worker is on the workers themselves and not on the sources of the hazards. Workers do not have dust masks that let fine particles of dust into their noses and throats. The study revealed that workers are given the reason for the lack of money when they ask the management about protective clothing and equipment. Workers in the casting factory do not have ear protection devices to protect themselves from the loud noise. Foreman working on finishing have inadequate goggles which are too old thereby putting their eyesight at risk. Safety shoes are also lacking, making workers prone to feet injury. Workers are exposed to many risks due to lack of adequate protective clothing and this endangers their lives and they frequent the clinic due to work-related illnesses like flu and chest pains. This reduces the time that they are at work and productivity declines. Lack of protective clothing reduces employee morale resulting in low productivity because workers become less willing to work. Lack of protective clothing and equipment also exposes workers' health to WHS hazards and diseases, thereby reducing their efficiency and productivity.

TABLE 3: Health and safety requirements

Key result area	Available	Not available
Disclosure of accident records		√
Disclosure of first aid statistics		√
First aid kit		√
Health and safety policy	√	

Accident report and investigation

Accidents are not reported or recorded, therefore, they are not known to the management. The result is that accidents go unnoticed and no measures are taken to prevent the occurrence of the same accidents in the future. Supervisors revealed that their duties do not include accident recording and reporting. They have not been furnished with an adequate job description. The result is that accidents are not prevented at all, thus putting the health of workers at risk. Workers are aware that they are not safe during work and their morale is low. This reduces the productivity of workers.

Induction training on work health safety (WHS)

It is found that most of the casting industry do not carry out proper WHS induction training. Most of the employees who are not yet permanent divulged that induction training on WHS was very low for them. Two contract workers claimed to have been inducted on WHS while ten fixed contract workers out of thirty claimed to have been trained on WHS upon employment. These statistics show that there is indeed a difference in the amount of induction training that is done with the three different groups. The least percentage of trained workers is in contracts. Even though a high amount of training (80%) is done with the permanent workers, the overall training is as low as 39%. With a percentage of 61% uneducated employees, it is very difficult to eliminate potential hazards because these workers are not aware of the implications of bad WHS hazard practices. The workplace is thus more prone to accidents due to lack of knowledge. The morale of contract workers is reduced because it appears that management does not recognize their importance to the organization or their safety at work. Low morale reduces productivity because workers breed resentment against management and they do not work to the best of their capabilities. Efficiency of production

VI. CONCLUSIONS

Industrial progress of the country depends on its committed labor force. Efficiency in work is possible only when the employees are safe in their working environment and also provided with some safety measures. The study found out that WHS related problems negatively affect workers' productive capacity in the casting industry resulting in reduced worker output. Workers develop a negative attitude and low morale towards work. High incidents of accidents at work also occur and due to that bad work health safety(WHS) practices in casting industry decrease the workers' performance, leading to the decline of productivity. A worker who is suffering from an occupational illness is slower and weaker, thereby, missing set targets. The morale of workers in the casting industry is very low. The general attitude of management towards WHS is largely negative since little attention is paid to training on work health safety(WHS) and investment in WHS pays.

ACKNOWLEDGMENT

The authors thankfully acknowledge to **Mr. Viay Parmar**, a supervisor at fine cast Pvt. Ltd. We would like to show our gratitude and thank them for sharing their pearls of wisdom with us during the course of this research. His guidance, motivation, and immense knowledge helped us a lot in preparing of the manuscript. We could not have imagined having a better advisor and mentor than them. Last but not the least, we would like to thank our family, college, Microsoft office, google scholar and the respected journal for giving us immense knowledge, a good platform, supporting us throughout writing of the manuscript.

REFERENCES

1. Abrahamsson, L. (2000). Production economics analysis of investment initiated to improve working environment. *Applied Ergonomics*, 31(1), 1-7.
2. Albert, A. and Hallowell, M. R. (2013). Safety risk management for electrical transmission and distribution line construction. *Safety Science*, 51, 118-126.
3. Barling, J., Kelloway, E. K., and Iverson, R. D. (2003). High-quality work, job satisfaction and occupational injuries. *Journal of Applied Psychology*, 88(2), 276-283.
4. Basha, S. A., and Maiti, J. (2013). Relationships of demographic factors, job risk perception and work injury in a steel plant in India. *Safety Science*, 51, 374-381.
5. Gronroos, C., and Ojasalo, K. (2004). Service productivity towards a conceptualization of the transformation of inputs into economic results in services. *Journal of Business Research*, 57, 414-423.
6. Health Safety Executive (2006) The Department of labor. Model for Business, Excellence. Government Printers: Harare. Koopman C, Pelletier RK, Murray JF, Sharda CE, Berger ML, Turpin P.
7. Safe Work India. (2012). The cost of work-related injury and illness for India employers, workers, and the community: 2008-09.
8. Workers' Participation in Workplace Hazard Screening. Research Training Manual (2001). Zimbabwe Congress of Trade Unions (ZCTU). Health and Safety Department: Harare.
9. Towers B (2003). The Handbook of Employment Relations: Laws and Practice (4th edition). Kogan Page: London.
10. ZCTU (2001). Workers Participation in Workplace Hazard Screening, Research Training Manual: Harare.