BRITISH SAFETY COUNCIL

The business benefits of health and safety

A literature review

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Contents

This report was prepared by Maria Maniati on behalf of the British Safety Council.

Foreword

Alex Botha
Chief Executive

The British Safety Council's vision is that no one should be injured or made ill at work. We are passionate about making this vision a reality. We start from the simple moral imperative that everyone has the right to safe and healthy working conditions as referred to in the Universal Declaration of Human Rights. This is what drives us.

However, I'm sure that we all recognise that for a variety of reasons, actions to ensure those safe and healthy working conditions are not always seen as important and valuable as it should be. Factors such as misapplied or disproportionate procedures, poor systems, inadequate or opaque legislation and regulation all contribute to this perception.

What we know is that poor health and safety practices result in an estimated 2.2 million people, worldwide, dying every year as a result of work-related ill-health, disease and injury. The human cost of these deaths and many more injuries is immense. However, these deaths, injuries and ill-health also have a tremendous social and economic cost. Some estimates place it at 4% of annual global gross domestic product or £1.5 trillion.

As a membership organisation, working with thousands of businesses all over the world, we have a sound understanding of the business benefits of well-managed health and safety. To this end, our commitment in our manifesto, *Working Well*, to demonstrate and publicise the business benefits of well-managed health and safety risks is all about giving employers positive reasons to do the right thing, keep their employees healthy and safe and enabling them to thrive at work.

We start from the evidence. In this document we have conducted an extensive review and analysis of evidence published over the last twenty years that considers the impact of sensible and proportionate health and safety practices. There is clear evidence that these practices result in reducing lost production time, reduced absenteeism and sick leave, reduced personnel turnover, reduced insurance premiums and reduced liabilities, legal costs and penalties. But it's not only about saving money and reducing cost. Based on our work with our membership, we can cite many examples of companies gaining much broader benefit, such as a more engaged workforce, winning work and enhanced reputations.

Foreword

This literature review is intended to set out the evidence base to inform and support an important programme of work we have planned to help illustrate and publicise the business benefits of good health and safety. Having a sound, comprehensive evidential base with intellectual rigour is essential in developing key messages and in producing persuasive case studies.

In challenging economic times we recognise that spending in the area of health and safety will be critically examined and balanced with the responsibilities of employers to manage the risks they create.

That is why the business benefit argument, based on evidence, is important. Encouraging business leaders to embrace sound health and safety practices must mesh with their existing motivation – to ensure that their business is efficient, successful and profitable. Casting health and safety in the language of productivity or reputation is not about forgetting the moral argument for keeping workers safe and healthy, but about framing the argument in terms that are understandable and relevant to businesses. At its heart we are still striving to achieve the same vision, that no one is injured or made ill at work.

Alex Botha
Chief Executive

Executive Summary

> The British Safety Council believes that if the business benefits of well-managed health and safety were better known it would also lead to more employers investing in sensible, proportionate and targeted occupational health and safety (OSH) interventions.

The costs of failure

The latest total costs of injuries and ill-health to Great Britain was estimated to be £13.8bn (HSE, 2013a), with ill-health alone accounting for £8.4bn of this total. It is this waste of money and lives that provides the starting point for the review and acts as a reminder of the burden of health and safety failure that is less publicised.

The benefits of well-managed health and safety

There is substantial evidence to show that investing in OSH interventions can reduce sickness absence, injury rates, the costs associated with replacing staff, increase productivity levels and lower insurance costs. There is evidence that investing in OSH can increase staff morale, organisation loyalty and contribute to its reputation. Illustrating the 'psychological contract' between the employer and worker, research shows that approximately 61% of workers said they would work harder for an employer who invested in their health (Aviva, 2011).

Investing in health and safety

There is some evidence to show a positive return on investment (ROI) on OSH interventions. It is apparent from the research that consistently attributing costs and benefits to health and safety matters is difficult and complex, notably due to challenges in measurement and attribution. As a consequence, the data on health and safety outcomes and financial data is often not integrated, a fact that makes statements on the proof of OSH and ROI more difficult. However, some case studies demonstrate that organisations can obtain significant returns on investment, with some interventions demonstrating a ROI of £12 saved for every £1 spent.

Not all interventions on OSH will deliver a positive ROI. Where the evidence for a positive ROI exists, it is noticeable that the interventions are sensible, proportionate and targeted. This is a key finding of the report and should equip employers with the confidence to take action to address specific problems.

The following conclusions can be drawn from this literature review. Firstly, some comprehensive and robust data about the cost of injury and ill-health in the workplace is available; for example well-developed academic and non-academic sources of data about the costs of occupational injuries and ill-health for Great Britain goes back for a number of years. However, comparable data does not exist for all Members States in the European Union.

The British Safety Council considers that there would be a significant benefit in the European Union working with individual Member States to get a comprehensive picture of the cause and cost of occupational health and injury.

There is strong evidence supporting the argument that good health and safety has measurable benefits.

Secondly, there is also a comprehensive and robust pool of evidence supporting the argument that good health and safety has considerable and measurable benefits for organisations, employees and society.

Case studies featured in other published literature cited in this review are somewhat dated and heavily concentrated on businesses operating in the UK. What is clear is that there is a need for an extensive set of business benefit case studies drawn from organisations of all sizes, operating in a range of sectors and jurisdictions.

Finally, there is limited published evidence around the ROI of OSH interventions. In particular, information calculating both the cost of injury and ill-health and the costs attributable to the OSH intervention seem incomplete and lacking. Related to this, many of the published case studies are dated and focussed on large organisations and a narrow range of sectors.

There is a clear need for organisations to adopt approaches to ROI calculation that's based on more robust and comprehensive data collection. In addition, a more consistent methodology on calculating the cost of OSH interventions is required.

1. Introduction

Research conducted by the International Labour Organisation (ILO) in (2005) estimated that, worldwide, nearly 2.2 million people a year die due to occupational injuries and ill-health and that the cost of this is around 4% of global gross domestic product (£1.5 trillion).

In looking at Great Britain, according to the Health and Safety Executive (HSE, 2013a), the cost to society of accidents, injuries and ill-health was £13.8bn. This is comprised of costs of nearly £8bn to individuals and some £3bn each to employers and government. Of this cost, the impact of occupational ill-health, at £8.4bn, is particularly stark (HSE, 2013a).

What is clear from our experience of working with businesses for nearly 60 years is that good OSH management can not only control the noted costs, but also produce a number of further benefits. In short good OSH management is good business.

Over the past 20 years a range of literature has been produced that analyses and articulates business and social benefits of OSH interventions. This review seeks to assess the written evidence that purports to show links between OSH intervention and business benefits. In doing so, the review will look at the quantity and quality of the literature and draw out findings to support (or otherwise) the contention that OSH interventions can create financial and other benefits. 54% of employers claim they would invest more in workplace health and safety, if they could see a tangible return on investment (ROI) (Aviva, 2011). Sharing and communicating evidence, which demonstrates links between action to improve OSH and economic benefits, supports employers' ability to make considered decisions. Small and medium enterprises in particular need to see this evidence, which will encourage them to take action (EU-OSHA, 2009).

We've structured this review in three main parts. We look at the costs of occupational injuries and ill-health, we look at the benefits of well-managed OSH and we look at whether the benefits of OSH interventions outweigh their costs.

Specifically, the section of the review dealing with costs (Chapter 2) presents evidence, mostly collected by HSE, on the cost of injuries and ill-health in the workplace. The high costs of OSH failure presented in this chapter give force to the argument that they should be avoided for the benefit of individuals, business and society as a whole. These costs are also put in the European context with data from EU-OSHA.

> 54% of employers claim they would invest more in workplace health and safety, if they could see a tangible return on investment (ROI)
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> **Aviva, 2011**

The next section on benefits (Chapter 3) gathers the evidence regarding the benefits of good OSH for employers. Evidence has shown that the benefits of investing in OSH can be both financial and non-financial. Non-financial benefits are associated with employee wellbeing, increased productivity and morale and the organisation's enhanced image to the public and the media. This review also presents a PriceWaterhouseCoopers study (2008), an international study by the International Social Security Association (2011) and a Business in the Community study (2009) which offer significant data in respect to the financial benefits continuing and lasting OSH interventions can lead to.

The final section on ROI (Chapter 4) presents the evidence showing that the benefits of OSH interventions outweigh their costs. The evidence in terms of financial benefits along with the nature of OSH interventions in some of the case studies serve as tangible evidence for the business case. Additionally, the cost of preventative measures is being assessed throughout this section. The last part of this section outlines two case studies, demonstrating how OSH interventions positively affect the bottom-line of an organisation.

2. The cost of occupational injuries and ill-health

2.1. Introduction

This section offers a synopsis of all the costs related to occupational injuries and ill-health. Specifically, the first part 2.2 concerns the statistics of injuries and ill-health in Great Britain (GB), followed by a comparison with European data. Furthermore, the review investigates the definition and the implications of the costs created when OSH interventions are inadequate (2.3). A division of costs is also included (2.4). Cost by bearer and cost by type are mentioned and analysed in this section. Finally section 2.5 provides guidelines for employers regarding methods that can be used in order to calculate the cost of occupational injuries and ill-health.

2.2. Empirical data – Statistics and costs of occupational injuries and ill-health

Great Britain

Assessing the national cost and impact of occupational workplace injuries and ill-health is clearly dependent on a robust and consistent data collection and analysis regime. To this end the Health and Safety Executive (HSE) provides annual reports about the occurrence of occupational injuries and ill-health as well as an analysis of the impact. Latest reports show a significant cost to Great Britain.

Table 1: Costs of injuries and ill-health in Great Britain in 2010/2011

Year 2010/2011	£ billions	% of total
Costs of injuries/ill-health at work for Individuals	7.9	57
Costs of injuries/ill-health at work for Employers	2.8	20
Costs of injuries/ill-health at work for Government	3.1	23
Costs of injuries/ill-health at work for Society	**13.8**	**100**

Source: HSE, 2013a

Cutting the data differently enables us to understand the economic impact of the different types of relevant occupational incidents.

Table 2: Cost to society in 2010/2011 grouped by incidence type

	Estimated Costs (£ millions) – average		
		95% C.I.[1]	
	central	lower	upper
Fatal injuries	258	256	260
Reportable injuries	4,854	4,375	5,334
Minor injuries	121	114	128
Ill-health	8,192	7,228	9,156
Total costs	**13,425**	**12,162**	**14,688**

Source: HSE, 2012a

[1] A confidence interval (C.I) gives an estimated range of values which is likely to include an unknown population parameter, the estimated range being calculated from a given set of sample data.

> The cost of ill-health, in particular, is a long-standing issue in Great Britain

The cost of ill-health, in particular, is a long-standing issue in Great Britain. The most elaborate and comprehensive report on the costs of ill-health was conducted on behalf of the British Government by Dame Carol Black, published in 2008. Dame Black looked at the main health issues for the working and non-working population, and she found that the annual economic costs of sickness absence and worklessness associated with working age ill-health are estimated to be over £100 billion (DWP, 2008). Though the cost of ill-health identified in Black's report is greater than HSE's focus on OSH (£8.4bn), the challenge that ill-health presents to society is clear.

Further insight into these societal costs can also be obtained by looking at the cost of workplace injuries and ill-health by industry.

Table 3: Aggregate costs related to society of workplace fatalities, injuries and ill-health in 2010/11, broken down by those industries most affected

	Estimated costs (£ millions)		
		95% C.I.	
	central	lower	upper
Agriculture, forestry and fishing	227	172	281
Manufacturing	1,306	1,125	1,487
Construction	1,216	1,041	1,391
Wholesale and retail, repair of vehicles	1,366	1,176	1,556
Transportation and storage	812	678	947
Accommodation and food	437	345	529
Technical, financial, scientific and professional service	1,919	1,651	2,188
Public administration	993	831	1,156
Education	1,530	1,309	1,752
Health	2,605	2,283	2,926
Arts, entertainment, recreation and other services	648	529	767

Source: HSE, 2012a

The health industry, along with the technical & financial and the education industries are ranked high in the costs they cause to society. Manufacturing and construction are not far behind, each with average cost in excess of £1 billion to society.

Occupational fatalities and injuries have historically attracted attention in assessing OSH performance. Table 4 provides relevant information about GB.

2. The cost of occupational injuries and ill-health

> In 2000, there were 5,237 fatal injuries in the so called European Union 15 (EU-15) countries
>
> **Eurostat, 2004**

Table 4: Injuries in Great Britain in 2010/11 divided by industry and severity of injury

Standard Industrial Classification (SIC) 2007	Employees		
	Rate of injury (per 100,000 employees)		
	Fatal	Over 3-day	All reported injuries
Agriculture, Forestry and Fishing	6.9	373.4	602.9
Mining and Quarrying	3.2	430.4	576.6
Manufacturing	1.0	530.5	675.5
Electricity, Gas, Stream and Air Conditioning Supply	–	148.6	221.8
Water supply; Sewerage; Waste Management and Remediation Activities	5.8	1330.8	1712.6
Construction	2.5	362.7	539.1
Total Service industries	0.2	343.7	431.0
All industries	**0.5**	**367.5**	**467.9**

Source: HSE, 2012b

The highest rate of fatal injuries occurs in the agriculture, forestry and fishing industry (6.9 per 100,000 employees) and the second highest in mining and quarrying (3.2 per 100,000 employees). It should be noted that any conclusions about different rates among industry sectors should take into account the differences in the sample sizes of the respective industries.

Europe

The main providers of statistical data for costs and incidence rates of injuries and ill-health at work across Europe are Eurostat, the European Agency for OSH at Work and the Directorate General for Employment, Social Affairs and Inclusion. The most noteworthy data for fatal and non-fatal occupational injuries for the whole of Europe are presented opposite.

In 2000, there were 5,237 fatal injuries in the so called European Union 15 (EU-15) countries, which were estimated to result in a cost of €3.8 billion (c£3 billion), (Eurostat, 2004). To gain some understanding of the most risky sectors its worth looking at a breakdown of the cost of fatal injuries for some industrial sectors (Eurostat, 2004).

Table 5: The cost of fatal injuries by those industries most affected for 2000

Industries	€ millions
Construction	971.66
Manufacturing	750.50
Transport, storage and communication	20.91
Agriculture, hunting and forestry	387.43
Wholesale and retail trade	360.33
Real estate, renting and business	246.62

Source: Eurostat,2004

Finally it is worth looking at the percentage of accidents by sector in the EU-27 countries for 2007.

Table 6: Accidents at work in the past 12 months in the EU27

Industries	Accidents at work %
Agriculture, hunting and forestry	3.5
Manufacturing	3.6
Construction	5.1
Wholesale retail trade, repair	2.5
Hotels and restaurants	3.3
Transport, storage and communication	3.3
Financial intermediation	1.3
Real estate, renting and business activities	1.6
Public administration and defence	2.6
Education	1.8
Health and social work	3.1
Other community activities	2.3

Source: TNO, 2009

Though limited to safety issues and not directly comparable with GB, the information points to construction together with manufacturing and agriculture as being the most hazardous industries in Europe.

2. The cost of occupational injuries and ill-health

Great Britain and Europe

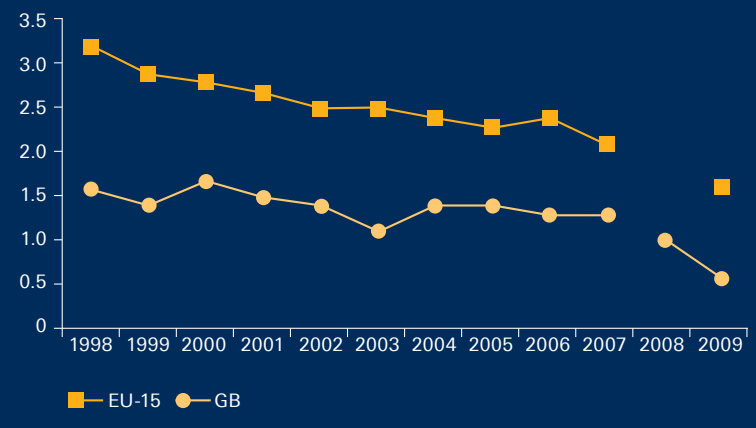
Comparing statistics is problematic, obstructed by the difficulty in acquiring specific and comparable data from the sources provided. Furthermore, European countries use different methods to calculate their domestic rates of injuries and ill-health.

For instance, GB statistics of injuries in the workplace do not include work-related road injuries (USHA & UCEA, 2008). Therefore, injuries that occur on the way to or from work are classified as 'commuting injuries'; the same happens in Germany and Italy. The rest of the EU countries, however, such as Belgium, Austria and Spain consider road injuries as 'injuries at work' and not 'commuting' ones (Jacinto & Aspinwall, 2004). This difference has massive implications in terms of the statistical data provided from various countries. One can appreciate that the low numbers in GB could be considerably higher, if the data surveys were conducted on the same basis as Austria or Spain.

Therefore, taking into account the above, the only viable comparison that could be done between Europe and Great Britain, concerns the incidence rates of fatal occupational injuries. In terms of the cost, a reliable comparison cannot be done at the moment, firstly due to the inconsistencies found in statistics and secondly, due to the varied statistical databases in use across Europe.

A comparison of incidence rates of fatal injuries between GB and Europe shows (Figure 1).

Figure 1: Standardised incidence rates (per 100000 workers) of fatal injuries at work in GB and the EU, 1998-2007, and GB 2008-2009 estimated incidence rate



Source: Eurostat, 2012

> The costs to Member States of all work-related injuries and diseases range from 2.6% to 3.8% of their respective GNP
>
> **EU-OSHA, 1997**

2.3. Costs of injuries and ill-health – An overview

Indications are that every year, 1 out of 10 workers are affected by an accident at work or a work-related ill-health issue in Europe (European Commission, 2011). Specifically, the costs to Member States of all work-related injuries and diseases range from 2.6% to 3.8% of their respective GNP (Gross National Product); for the UK, this cost is estimated between 1% and 2%, excluding the costs of pain and suffering (EU-OSHA, 1997).

However, these costs are usually difficult to identify and calculate due to their complex nature and to the fact that they are not directly connected with the economic consequences they carry. The literature has identified a range of bodies that bear the cost of workplace injuries and diseases (Figure 2).

Figure 2: The impact of occupational injuries and diseases

Source: De Greef & Van den Broek, 2004a

Some of these costs are a burden to the organisation, such as sick pay, production disturbances, information dissemination to employees and management, administration regarding government and corporate formal reporting procedures and lost working hours (Rikhardsson, 2004). Others are borne by individuals and those around them, such as diminished quality of life, health and present income losses (EU-OSHA, 2002). A further significant bearer of cost is society, due to reduction of human labour force and increase of healthcare costs (De Greef & Van den Broek, 2004b).

The following section analyses the different types of cost depending on who they affect (the individual, employer or society) and whether they can be characterized as tangible or intangible.

2. The cost of occupational injuries and ill-health

> The cost of workplace injuries can be categorised according to who bears the cost, namely individuals, employer/organisation and society/government

2.4. Costs of injuries and ill-health – Division of costs

Several studies have repeatedly illustrated that poor OSH management generates many types of costs for different entities. Costs can broadly be categorised into who bears the cost and what type of cost it is.

2.4.1. Cost by bearer (Individual/Employer/Society)

The cost of workplace injuries can be categorised according to who bears the cost, namely individuals, employer/organisation and society/government (HSE, 2012a; European Commission, 2011; EU-OSHA, 2002). Depending on whom the actual cost is directed to, the nature of the consequences of workplace injuries and ill-health change. In Great Britain, 23% of the cost is borne by the government, 57% by the individual and his/her family and 20% by the employer (HSE, 2012a).

i. Cost for individuals:

   The cost to individuals consists of financial and non-financial costs. The financial costs include: loss of income, compensation payments, health and rehabilitation costs and administrative costs (HSE, 2012a). HSE refers to the loss of income for individuals. This is comprised of the loss of gross income minus the benefits received by the individual, such as sick pay income, state benefits income and saved tax and National Insurance (HSE, 2012a). The 'victim' is subject to a net loss income, which corresponds to the potential income that he/she could have earned, should the workplace injury/disease had never happened. Compensation payments to individuals refer to those payments that are made after the 'victim' has made a claim for loss or damages. Health and rehabilitation costs are the costs associated with the amount that the employee has to pay commuting to hospitals or different medical expenses that need to be covered. Lastly, administration costs refer to the time spent by the employee on the various procedures, necessary in order to claim compensation and insurance payments.

   The non-financial costs are more difficult to define. For instance, grief and suffering, a factor of vital importance for the victim, is difficult to 'materialise' and therefore to measure; its impact, however, can be seen if there are consequences such as time off work or marital breakdown. Table 7 presents some cost factors for workplace accident and health at the individual level.

Table 7: Cost factors at individual level (non-financial costs)

Variable	Description	How to obtain monetary value
Health	Hospitalization (bed-days) Other medical care, such as non-hospital treatment, medicines Permanent disability Non-medical (e.g. vocational) rehabilitation, house conversions	Expenditures for healthcare that are not compensated by insurance or the employer
Quality of life	Life expectancy, health life expectancy Quality adjusted life years (QALY) Disability adjusted life years (DALY)	Willingness to accept, willingness to pay Height of claims and compensation
Grief and suffering	For victims, but also for relatives and friends	No reliable method available
Present income losses	Loss in income from present and second job	Reduction in present income, loss of wages
Loss of potential future earnings	Also including the second job	Differences between total expected future income and total compensation or pensions
Expenses that are not covered by insurances or compensations	Examples are costs for transportation, visits to hospitals, costs arising from fatalities such as funerals	Sum of all other expenses for a victim and his/her family (that are not compensated)

Source: EU-OSHA, 2002

> The cost for the employer concerns sick pay payments, insurance premia, production disturbance costs and administrative and legal costs
> HSE, 2012a

ii. Cost for organisations/employers:

HSE refers to the cost for the employer, which concerns sick pay payments, insurance premia, production disturbance costs and administrative and legal costs (HSE, 2012a).

Sick pay refers to the normal remuneration that the 'injured' employee receives from the organisation. This factor, however, constitutes an extra burden for the employer, since it is a given that another employee has already been hired in order to cover the 'injured' employee's responsibilities. Insurance premia concern the regular payments made by the employer to the insurance organisation to provide cover in the event of OSH failures, leading to injury or ill-health.

Production disturbance refers to the procedures that the organisation goes through in order to maintain output, i.e recruiting new staff or hiring temporary staff. Administrative and legal costs are associated with the cost the employer has to pay for administering all the above, plus the legal costs that may be liable for, in case of health and safety breaches. The following table (Table 8) highlights some of the most important cost factors for employers related to workplace injuries.

Table 8: Cost factors for the employers related to workplace injuries

Variable	Description	How to obtain monetary value
Effects of incidents that cannot directly be expressed in monetary value		
Fatalities	Number of fatalities	Sum of costs of subsequent activities, fines and payments
Absenteeism or sick leave	Amount of work time lost due to absenteeism	Sum of costs of activities to deal with effects of lost work time, such as replacement and lost production; indirect effect is that sick leave reduces flexibility or possibilities to deal with unexpected situations

Variable	Description	How to obtain monetary value
Personnel turnover due to poor working environment, or early retirement or disability	Percentage or number of persons(unwanted) leaving the organisation in a period of time	Sum of costs of activities originated by unwanted turnover, such as replacement costs, additional training, productivity loss, advertisements, recruitment procedures
Early retirement and disability	Percentage or number of persons in a period of time	Sum of costs of activities originated by disability or early retirement, fines, payments to the victim
Effects of incidents, injuries and diseases that can readily be expressed in a monetary value		
Non-medical rehabilitation	Money spent by the employer to facilitate returning to work (counselling, training, workplace adjustments)	Invoices
Administration of sickness absence, injuries, etc	(Managerial) activities that have to be performed by the organisation related to sick leave	Total wages of time spent
Damaged equipment	Damages or repair costs of machines, premises, materials or products associated with occupational injuries	Replacement costs
Other, non-health-related costs (e.g. investigations, management time, external costs)	Time and money spent for injury investigation, workplace assessments (resulting from occurrence injuries or illnesses)	Total wages of time spent

2. The cost of occupational injuries and ill-health

Variable	Description	How to obtain monetary value
Effects on variable parts of insurance premia, high-risk insurance premia	Changes in premia due to the incidence of injuries and occupational illnesses	Invoices
Liabilities, legal costs, penalties		Invoices, claims, costs of settlements; fines, penalties
Extra wages, hazardous duty pay (if the organisation has a choice)	Extra spending on higher wages for dangerous or inconvenient work	Additional wages
Lost production time, services not delivered	Production time lost as a consequence of an event which results in injury (e.g. because it takes time to replace machines, or production has to be stopped during investigation)	Total production value
Opportunity costs	Orders lost or gained, competitiveness in specific markets	Estimated production value, representing lost income for the organisation
Lack of return on investment	Non-realised profit because of accident costs, i.e. expenditure due to injuries and not invested in a profitable activity (like production, stock market or saving) generating interests	Interests of the expenditure amount, invested during x years, with an interest rate of y %

Source: EU-OSHA, 2002

> The cost of occupational injuries and ill-health for society is twofold; the total loss of resources and productive capacity and the reduction of welfare and health
>
> **EU-OSHA, 2002**

iii. Cost for society

The cost of occupational injuries and ill-health for society is twofold; the total loss of resources and productive capacity and the reduction of welfare and health (EU-OSHA, 2002). The most well-known phenomenon is the 'social ripple effect' (European Commission, 2011), where the effects of an accident at work affect the larger community, therefore influencing many of its members. However, it is difficult to attribute a cost to those consequences, since there are many factors involved. For instance, it has been claimed that the repercussions of workplace injuries and ill-health on the wider community of the victim is dependent upon the domestic, vocational and societal roles of the individual (Dembe, 2001).

Dorman (2000a) has estimated the economic and non-economic societal costs of occupational injuries and ill-health. The societal costs often remain invisible, unknown and not calculated (Dembe, 2001; Adams et al, 2002). Table 9 highlights the cost factors of work injuries at a society level.

Table 9: Cost factors of occupational injuries and ill-health for society

Variable	Description	How to obtain monetary value
Health-related costs		
Health	Hospitalisation (bed-days) Other medical care, such as non hospital treatment, medicines Permanent disability (numbers, age of patient) Non-medical (e.g. vocational) rehabilitation, house conversions	Actual expenditures on medical treatment and rehabilitation
Fatalities (numbers, age of patient)		Willingness to pay or willingness to accept

2. The cost of occupational injuries and ill-health

> The research suggests that there is more than one way of dividing cost of occupational injuries into classes

Variable	Description	How to obtain monetary value
Quality of life	Life expectancy, healthy life expectancy Quality adjusted life years (QALY) Disability adjusted life years (DALY)	Willingness to pay or willingness to accept. Total amount of indemnities and compensations
Grief and suffering	For victims, but also for relatives and friends	Willingness to pay or willingness to accept. Total amount of indemnities and compensations
Present production losses	Lost earnings due to sick leave, absenteeism and disability	Total lost earnings during period of absence
Loss of potential future earnings and production	Lost earnings during the whole period of permanent disability	Sum of lost income during expected disability period, in which both the income and the period are estimated on statistical data
Non-health-related costs and damages		
Administration of sickness absence, etc		Total wages spent on the activity
Damaged equipment (by injuries)		Replacement costs, market prices
Lost production due to incapacity of personnel and production downtime		Market price of lost production

Source: EU-OSHA, 2002

2.4.2. Cost by type (Tangible/Intangible)

Apart from the cost categorisation depending on who bears the burden, the research suggests that there are other ways of dividing the costs of occupational injuries into classes. The most significant characterisation focuses on whether the cost is reimbursed. In other words, if the cost is reimbursed by insurance money, then it falls into the category of 'tangibles', whereas if the cost cannot be translated into money, then it is an 'intangible' one. De Greef and Van den Broek (2004b), analysing the 'tangible/intangible' categorisation of cost, came up with the following table which demonstrates the various tangible and intangible costs for each one of the cost bearers (individual, family, colleagues, organisation and society).

Table 10: Tangible/Intangible costs

	Non-tangible	Tangible
Victim	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	Loss of salary and premia Reduction of professional capacity Medical costs Loss of time (medical treatments)
Family and friends	Moral and psychological suffering Medical and family burden Strain on relationships	Financial loss Extra costs
Colleagues	Psychological and physical distress Worry or panic (in case of serious or frequent injuries/ cases of ill-health)	Loss of time and possibly also of premia Increase of workload Training of temporary workers

2. The cost of occupational injuries and ill-health

> Presenteeism refers to the situation where someone is sick but still attends work

	Non-tangible	Tangible
Organisation	Presenteeism	Internal audit
	Organisation image	Decrease in production
	Working relations and social climate	Damages to the equipment, material
		Quality losses
		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
Society	Reduction of the human labour potential	Loss of production
	Reduction of the quality of life	Increase of social security costs
		Medical treatment and rehabilitation costs
		Early retirment
		Decrease of the standard of living

Source: De Greef and Van den Broek, 2004b

The first column of the table above is comprised of the intangible costs of an occupational injury in an organisation. Apart from pain and suffering (psychological and physical), which concerns the individual, a noteworthy intangible effect is presenteeism (see Aronsson, Gustafsson and Dallner, 2000). This refers to the situation where someone is sick but still attends work. Given demanding work environments, many working people feel compelled to work even when ill. This phenomenon can have negative consequences, as any reduced productivity by those people is likely to have a major effect on the organisation's performance, including service delivery.

2.5. Focus on the employer: cost calculation

Given all the aforementioned costs of 'poor' OSH management, this section contains information and guidelines for employers regarding methods they can choose for calculating their organisation's costs. There are several specific pricing principles that can be used in order to estimate the monetary value of workplace injuries and ill-health. EU-OSHA (2002) offers a guide for that activity (Table 11).

Table 11: A guide for calculating the cost of occupational injuries and ill-health from an organisation's perspective

Variable	Common way to find money value
Lost working time	Total amount of wages
Damaged equipment	Repair or replacement costs, market price for new equipment
Quality	Value of lost products
	Value of time spent due to rework
	Warranties
Workers' diseases and injuries	Medical costs
	Indemnities
	Effects on premia
	Willingness to pay, willingness to accept
Workers' health, wellbeing and job satisfaction	No reliable method available
Organisation image (to customers or labour market)	No reliable method available

Source: EU-OSHA, 2002

However, various other methods for calculating the cost of workplace injuries and ill-health have been suggested. Rikhardsson (2005) for instance has identified two approaches for calculating cost.

The insurance based approach

A further elaboration of the 'tangible/intangible' division of cost is the insurance-based approach. This is based on the premise that only the costs that generate a specific amount of money, paid as compensation, are relevant costs. It is commonly used in order to give an estimate of the monetary value of the discrepancies in the workplace. In detail, this approach is focused on analysing the costs from an insurance perspective; the result is a large distinction of costs depending on whether they are refundable or not. The limitation of this approach can be appreciated when one considers that the non-productive time of colleagues or the replacement hiring costs when an injury occurs, are costs that are not refunded by the insurance organisations; therefore, they do not constitute viable costs that need to be measured (European Commission, 2011).

2. The cost of occupational injuries and ill-health

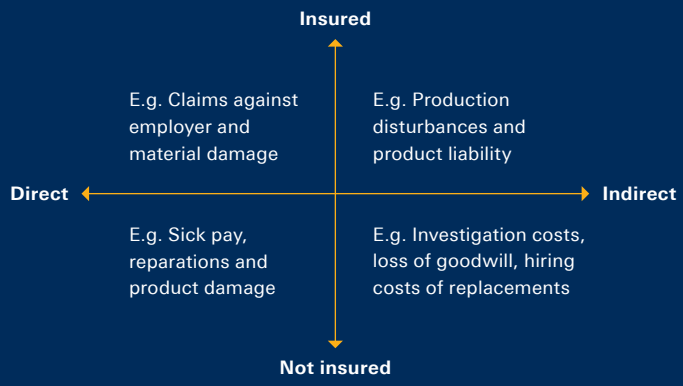
The activity based approach

The activity-based approach is more comprehensive, elaborate and multi-dimensional. It focuses on a cost analysis that documents all the activities that the event in question has led to and then an evaluation of the costs of these activities (Rikhardsson, 2005). The activity based approach is comprised of four different methods all of which can be used to calculate the costs of OSH failure.

- The 'Accident Consequence Tree' method (ACT), developed by Aaltonen et al. (1996), focuses on the costs of the activities following an injury, which are borne by the employee, the organisation and society. The premise is that an accident will generate costs for all those three categories, immediately after it occurs. The presentation of the method resembles a tree, the 'branches' of which correspond to the employees, the organisation and the society. The ACT method has some prerequisites in order to generate results; it predicates that the time period during which is used, should be somewhat substantial and not corresponding to an isolated instance and that the calculations of the three 'payees' should start immediately (real time) after the accident takes place (Rikhardsson, 2005).
- The 'Riel & Imbeau ABC' method, developed by Riel & Imbeau (1995), is based on the premise that the costs of potential injuries will be used as a basis for allocating insurance costs. Therefore, the costs of injuries when using this method correspond to production disturbances, which will or won't be reimbursed by the organisation's insurance scheme. These production disturbances can affect materials and assets, working time, lost working hours and lost production.
- The 'Systematic Accident Cost Analysis' (SACA) method, developed by the Aarhus School of Business and the PricewaterhouseCoopers in Denmark (Rikhardsson, 2005), is quite different, as it does not focus on the person who 'pays' the cost (ACT method) nor the costs that may be reimbursed (Riel & Imbeau ABC method). The SACA method categorises the cost into four categories: time, materials and components, external services and other costs. One of the main contributions of this cost calculation method, which has been used several times in different organisations, is that it highlights that calculating the costs of occupational injury can illustrate and visualise the value created by the OSH department by preventing injuries (Rikhardsson, 2005).
- HSE has also developed a method (1993) that distinguishes between 'hidden' and 'visible' costs using the insurance criterion (like the insurance based approach) and is applied in real time (like the ACT method). The figure below (Figure 3) shows the method's framework.

Rikhardsson (2005) for instance has identified two approaches for calculating cost. The insurance based approach and the activity based approach

Figure 3: Cost classification with the HSE method



Source: HSE (1993), cited in Rikhardsson (2005)

2.6. Summary

This chapter reviews the published data and literature concerning the costs of workplace injury and ill-health in Great Britain and Europe. In Great Britain the evidence published by HSE for 2010/11 reveals the estimated cost of workplace ill-health and injury to be £13.8bn. The cost of ill-health accounts for £8.4bn of this total. The review also examined data from European Union sources. What is clear is that this data is far less extensive than the data published for Great Britain by HSE. The chapter goes on to review the published literature concerning the composition of costs including compensation, lost productivity, reputational damage, health service and benefit costs and how the cost burden is distributed between individuals, business and the government. The review also examines the published literature concerning the different approaches to costing ill-health and injury.

2.7. Conclusion

The review of the literature undertaken makes it clear that the evidence concerning the cost of occupational injuries and ill-health with regards to Great Britain is comprehensive and robust. However, as HSE has noted, the costs of work-related cancer does not presently form part of the cost calculation. What is evident is that the information in the literature concerning the costs of ill-health and injury in Great Britain can play an important part in helping to determine broader strategic and sector priorities.

There are however, significant gaps in the available evidence for individual European Union Member States and indeed differences in what the data is comprised of. More robust evidence concerning cost would assist our understanding of the cause and true cost of health and safety failures and would enable us to make informed comparisons between Great Britain and EU Member States. The British Safety Council considers that there would be a significant benefit in the European Union working with individual Member States to get a comprehensive picture of the cause and cost of occupational health and injury.

3. Benefits

3.1. Introduction

This section reviews the literature concerning the financial benefits for employers when they invest in OSH interventions. Specifically, the first part (3.2) presents some distinctive case studies regarding the financial benefits of improvements in the OSH aspects of organisations. Section 3.3 demonstrates a wider spectrum of benefits and points out the best way to obtain monetary value for them. Furthermore, each one of the benefits is analysed, with the overall purpose to make the business case for OSH interventions. Finally, in section 3.4, the benefits are categorised having regard to the size of the organisation.

3.2. Financial Benefits

A study by PriceWaterhouseCoopers (2008) sheds light on the financial benefits of implementing workers' wellness programmes. The study looked at 55 organisations in the UK. A summary of the results can be seen in Table 12.

Table 12: Summary of financial benefits of 55 case studies implementing wellness programmes

A car manufacturer estimated gross cost savings of £11 million (1999-2002) owing to 1% reduction in absenteeism
A manufacturing organisation estimated costs associated with short-term injury sickness absence were cut from £130k to almost zero (2001-2006)
A manufacturing organisation estimated gross savings associated with reduced sickness absence of around £50k p.a.
A university estimated cost savings associated with reduced sickness absence as £165k (2002-2006)
A professional services organisation estimated cost savings at £23k associated with reduced sickness absence of 0.5% (2005-2006)
A professional service organisation estimated cost savings associated with reduced staff turnover as £464k, owing to a reduction in staff turnover by 10% (2005-2006)
A financial service organisation estimated that by reducing staff turnover by 9% the organisation has achieved cost savings of £1.6m
A manufacturing organisation calculated that injury claims fell from £700k to zero in 6 years
A pharmaceutical organisation cited health insurance savings of £200k p.a.

Source: PriceWaterhouseCoopers, 2008

> Whatever the original motivation, the organisations believed that improving health and safety was integral to business risk management... these benefits (to the organisation) included a mix of both tangible and intangible benefits, such as maintenance of brand and reputation, client requirements, and staff moral as well as health and safety
>
> **HSE 2004**

The most noteworthy fact deriving from those case studies is the analogy between the actual reductions in the various indicators of cost (e.g. 1% reduction in absenteeism, 0.5% reduction in sickness absence, 10% reduction in staff turnover etc.) and the money value savings they led to. The data shows a causal relation between the effects of ill-health at work and money savings for the organisations.

An international perspective on the benefits of prevention is given by the International Social Security Association (ISSA, 2011). Three hundred companies from fifteen countries were involved in interviews to see whether adopting a workplace prevention strategy is beneficial at the micro economic level. The research shows that in the views of those interviewed the main benefits of OSH are a prevention of disruptions, less 'lost-time,' an increase in employee motivation and a better corporate image.

In 2004, Greenstreet Berman produced a report for the HSE, regarding the business benefits of effective management of OSH (HSE, 2004). A key finding of the research was that "whatever the original motivation, the organisations believed that improving health and safety was integral to business risk management... these benefits (to the organisation) included a mix of both tangible and intangible benefits, such as maintenance of brand and reputation, client requirements, and staff moral as well as health and safety" (HSE 2004). The authors of this report noted, however, that few firms record the costs or benefits incurred in OSH initiatives.

A study into occupational health (OH) provision on the London 2012 Olympic Park and Athletes' Village is featured in a report undertaken by Claire Tyers and Ben Hicks of the Institute for Employment Studies on behalf of HSE and the Olympic Delivery Authority (HSE, 2012c). The extensive research undertaken included: an analysis of OH services provided to London 2012 construction and service workers by Park Health and Village Health; a survey of managers concerning their attitudes to OH provision; a paper based survey of almost 1,200 workers; and case studies featuring eight contractors across the Park to understand how the OH provision worked in practice.

3. Benefits

This Olympic Park and Athletes' Village OH programme is widely recognised as one of the most successful and effective on a major construction project, both in terms of its efficiency and for keeping workers healthy. The detailed report, which runs to over 130 pages, includes a chapter assessing the impact of the OH interventions and another that attempts to assess the economic benefits from this OH programme. The report concluded that it had only been possible to narrowly quantify just some of the economic benefits of the OH interventions for a number of reasons including:

- "There is no estimation of the potential health benefits evidenced through reduced absence rates on site. Absence recording within construction is notoriously poor, and it was beyond the scope of this research to compile the absence records of all contractors working on the site."
- "The benefits are limited to time saved through treatments and other clinical interventions. No account is taken of the potential longer-term health and wellbeing impacts of these treatments, for example through the identification and control of health conditions."

The report goes on to note:

"The net benefits of the treatment service are negative and are likely to lie somewhere between £400,000 and £2.8 million net loss. When the health surveillance is factored in, the results remain negative when hourly wage costs are used, but result in a net benefit of £4.8 million, when production costs are factored in.

"A simple return on investment calculation for these figures show that (if we assume all services would have been provided off-site in the same way that they were on site) for every one pound invested by the ODA the return was £3.46 in reduced wages and £5.96 in reduced production costs. Even if the ODA were less likely to offer the same services using off-site provision, the returns remain relatively high."

A different study conducted by Business in the Community (2009), investigated the introduction of various programmes to improve workers' health and wellbeing. The financial benefits, along with the innovative practices established, are presented in Table 13.

> There is a large quantity of published evidence, which asserts that investing in the management of OSH is an opportunity to gain a range of benefits

Table 13: Financial benefits from health promotion programmes

Organisation	What was done?	What were the business benefits?
AstraZeneca Research, Development, manufacture & marketing of prescription pharmaceuticals	Health promotion activities, health assessments, ergonomically designed working environments	£500k to £700k saved through improved productivity, £80,000 saved on health insurance costs for psychological illness.
British Gas Services (BGS) Britain's largest domestic central heating installation maintenance & breakdown organisation	Back care workshops in order to tackle MSDs, which accounted for 1/3 of staff absences, 120 workshops held with over 1200 participants	The return on investment was £31 for every £1 invested, or £1660 per participating employee.
EDF Energy Provider of power to a quarter of the UK's population via electricity distribution networks	A cognitive Behavioural Therapy programme was rolled out to employees at the organisation's 100 sites, in order to tackle psychological ill-health.	Improved productivity saved the business an estimated £228,000 per year.
First ScotRail It holds the franchise to operate 95% of passenger rail service within Scotland and between Scotland and London	Physiotherapy, Employee Assistance Provider, Wellbeing weeks featuring advice, in order to manage employee health more proactively	Absence decreased from 6.2% to 4.2%, saving around £3million per annum.
Parcelforce Worldwide Leading provider of time-guaranteed express parcels	On-site Health Screening clinics, better absence management, health education programme in order to improve employee health	Sickness absence reduced by 1/3 saving £55m, injuries reduced by 45% saving £440,000.

Source: Business in the Community, 2009

Though more information is needed on the costs of intervention, the examples outline some clear benefits to employees and employers and a likely ROI to employers.

3. Benefits

3.3. Benefits of OSH management and the relation with the organisation's performance

There is a large quantity of published evidence, which asserts that investing in the management of OSH is an opportunity to gain a range of benefits, including avoiding the costs of failure, and boosting the organisation's image. Table 14 highlights some examples.

Table 14: List of potential additional benefits from preventative activities at an organisation level

Variable	Description	How to obtain money value
Increased productivity and other operational effects	Reduced costs for facilities, energy, materials, increased productivity; reduced personnel costs	Total of cost reduction directly related to intervention to be estimated from effects on the organisation's operation
Improved quality of products and services	Changes in product or service quality; reliability of deliveries	Value depends on organisation strategy. Reduction in repair costs and warranties
Improved wellbeing, job satisfaction and working climate		Only indirect effects, e.g. on productivity, quality or flexibility. Increased capabilities to deal with unexpected situations
Compensations and subsidies received from insurance or authorities	Support for prevention only, compensations received for sick leave or disability are to be excluded	Compensations and subsidies received
Organisation image effects	Attractiveness to customers, attractiveness on labour market, attractiveness to contractors, ability to recruit personnel	Indirect effects
Impact on non-economic organisation values	To be derived from mission statements and the like, typically strategic considerations	Indirect, long-term effects
Innovative capacity of the firm	Ability to innovate in products and production processes	Indirect, long-term effects. No operational benefits

Source: EU-OSHA, 2002

> Two-thirds of workers said that they would work harder for an employer that invested in their health
>
> **Aviva 2011**

Increased productivity
The literature implies that if management takes steps to improve the OSH system in a given organisation, then the employees' productivity will increase substantially.

The Greenstreet Berman report for HSE (2004) included a case study for Huntsman Petrochemicals. This case study featured a behavioural safety programme, covering 300 employees and contractors in a manufacturing area of the business. Benefits of this initiative included a significant reduction in operating costs, increased productivity and a reduction in insurance premia. With respect to return on investment (ROI), the cost of running the programme was more than covered by the savings included in utilities and insurance premia.

A recent report from Aviva (2011), *The fifth Aviva Health of the Workplace Report*, demonstrates that nearly two-thirds of workers said that they would work harder for an employer that invested in their health. Moreover, the same study showed that 42% of the employers say that a good work/life balance helps increase morale and productivity and 63% believe that a healthy workforce is more productive than an unhealthy one-a rise of ten percentage points from last year's research (Aviva 2011). In terms of the connection between increased productivity and increased financial benefits for the organisation, Table 13 of this paper is representative, particularly the AstraZeneca and the EDF Energy case studies.

Improved quality of products and services
The argument is made that improved morale and wellbeing from the employees' perspective, derived from frequent assessments and improvements of the organisation's OSH system will have a significant impact on the quality of products and services provided.

This phenomenon is an example of Safety Citizenship Behaviour (SCB), which Hofman, Morgeson & Gerras (2003) developed. This 'Behaviour' is based on reciprocity and states that employees will reciprocate a high quality relationship with their supervisor by engaging in behaviours that are valuable to the organisation (Hofman, Morgenson & Gerras, 2003). Therefore, the argument is that by investing in the health and safety of the employees, the employer invests in the continuity and success of their organisation.

Improved wellbeing, job satisfaction and working climate
Several studies have pointed out that high standards of wellbeing and health at work, along with a well-sustained working climate can positively affect the organisation's performance.

3. Benefits

> An organisation's image is directly linked with the standard of its OSH performance

Workers' wellbeing and work climate are often cited as two of the most crucial factors that contribute to the success of an organisation. It should follow then that those organisations that manage OSH well will have a better chance of being successful. There is some evidence to show this. A study conducted by the International Labour Organization (ILO) and the Finnish Ministry of Social Affairs and Health (2002) showed that issues like employee participation, content of work, employee motivation and working atmosphere have the greatest effect when it comes to organisation's productivity. Table 13 illustrates the level of contribution those factors have on the organisation's productivity and performance.

Reduced compensation payments
A number of reports have shown that an investment in OSH will lead to increased savings from the employers' perspective, and especially when it comes to reduced compensation payments.

As it has been mentioned earlier on this paper, compensation is one of the main costs for employers when they are faced with a claim arising out of a workplace injury or ill-health occurrence. Though compensation is paid by the insurance organisations, employers bear the cost via insurance premia. It has been argued that the insurance premium paid by an organisation could be directly linked to its OSH performance, so organisations achieving a low rate of injury or ill-health would pay lower premia (EU-OSHA, 2011).

Regarding the insurance payments, the Association of British Insurers (ABI) says its members pay £5.2 million every day in liability claims for injuries at work, professional indemnity claims and injuries to the public (HSW, 2012). However, any literature demonstrating a direct correlation between low OSH failures and low insurance premium is not well developed.

Maintaining a 'positive' organisation image
There are examples in the literature showing that an organisation's image is directly linked with the standard of its OSH performance; an enterprise with a high number of injuries will not be attractive to prospective investors, nor to the public or the media.

An OSH failure can, it is argued, have a devastating impact on an organisation's image and reputation. HSE (2012d) has identified possible effects that include:

- Media grilling
- Negative public opinion that is hard to reverse
- Fines
- Unwanted attention from pressure groups
- Disastrous sales
- Reduced profits and benefits

These constitute some of the effects which can take a substantial amount of time to recover and get the business up and running again (HSE, 2012c), supporting the argument that it makes good business sense to do everything reasonably practicable to avoid accidents and injuries in the first place.

Impact on 'non economic' organisation values
Corporate values are embedded in all things to do with the organisation; therefore, if an employer does not pay the expected attention to the OSH of their employees, then employees will not, necessarily, behave responsibly.

Values are incorporated in the culture of the organisation, which can be defined as "shared behaviours, attitudes and values regarding organisational goals, functions and procedures" (Cooper, 2000). The values that an organisation possesses should enhance its image in the outside world.

Regarding OSH, it has been claimed that a negative safety culture can lead to a vicious cycle of inappropriate behaviour from the employees' side, which, eventually will harm the organisation's performance. Specifically, it has been argued that, a poor safety culture will 'push' people to engage in poor working habits and subvert safety defences, as they feel that it is acceptable. Eventually, those malpractices will lead to increasing risk, to the point where all the defence mechanisms cease to operate (Reason, 1998).

Improved innovative capacity
A number of studies have identified that the innovative activity of an organisation is all about taking risks; if, however, the organisation cannot control risks, it is unlikely that it will succeed in taking new ones.

The corporate world recognises the value of innovation. In order for an enterprise to be innovative, take risks and engage in securing a significant market share, the inward environment of the business must be sustainable, fully focused on new opportunities and completely aligned to the strategic goals of the organisation. Therefore, any 'distraction' from the management's and employees' perspective due to occupational injuries and ill-health would easily stall the organisation's trajectory to innovate and to exploit new opportunities. Innovation requires a 'healthy' working environment to yield full potential, skills, competence and sustain a hunger for success.

3.4. Benefits depending on the size of the organisation

The size of an organisation can influence how it perceives the benefits that may derive from investing in OSH. For instance, a smaller organisation might not give the same level of attention to the image of the organisation or the comments of the media but rather focus on attracting more customers. On the other hand, a larger organisation will pay more attention to its image due to the fact that it affects the relationship with investors and other stakeholders. The ISSA research found that larger organisations tended to rate the impact and effects of OSH higher than smaller ones.

Relatively large organisations (more than 250 employees)
When the organisation is relatively large and the investment in OSH initiatives is substantial, then evidence from EU-OSHA shows that:

- There is a noteworthy improvement in the image of the organisation, the brand value is gaining ground and the reputation of the enterprise is indisputably enhanced.
- The organisation is recognised as being committed to Corporate Social Responsibility, which reinforces its power within the business world.
- The confidence of the various investors of the organisation is reassured and promoted.
- Stakeholders engage more positively and actively with the enterprise (EU-OSHA, 2007).

The Chief Executive of Unlq plc in the food sector articulates these points well by stating:

"The board recognises that both the group's corporate performance and its value to stakeholders are affected by its OSH performance. It therefore requires the managing directors and all employees to demonstrate a positive approach to OSH issues".

Relatively small organisations (less than 250 employees)
Research suggests that small organisations are not as much engaged in OSH as the larger ones (Dorman, 2000b). However, research by EU-OSHA shows that retention and commitment of employees is very important to small businesses. Active engagement with OSH initiatives can create a positive and 'caring' landscape, where the employees are committed and willing to give their best to the enterprise. Productivity can be enhanced and disruption created by sickness absence reduced. Specifically, when it comes to small organizations, OSH commitment can bring:

- Winning and retaining contracts with clients
- Avoiding business disruption and loss of key staff
- Motivating and retaining staff's commitment
- Availability and affordability of insurance (EU-OSHA, 2007)

The Regional Director of Cougar Automation, John Purnell articulates these points by noting:

"Not only we now have a higher staff morale and lower sickness, it also benefits the retention of existing customers, and it is a real differentiator when winning new business and helping the company to expand".

> The board recognises that both the group's corporate performance and its value to stakeholders are affected by its OSH performance. It therefore requires the managing directors and all employees to demonstrate a positive approach to OSH issues
>
> **Chief Executive**
> *Unlq plc (food sector)*
> Cited in EU-OSHA, 2007

3.5. Summary

This chapter reviews the published evidence regarding the benefits to an organisation of investing in OSH. Many of these benefits are based on avoiding the costs that were identified and explored in the previous chapter.

An example of the evidence reviewed is a study by PriceWaterhouseCoopers (2008), which revealed that, following an OSH intervention, a car manufacturer made gross savings of £11 million, based on a 1% reduction in absenteeism. Other interventions considered significant reductions in staff turnover and injury claims.

Other research reviewed in this chapter comprehensively addressed the range of benefits that targeted OSH interventions can produce. Benefits include enhanced recognition and reputation; greater success in winning and retaining contracts; and improved staff recruitment and retention.

3.6. Conclusion

What the evidence reveals is that the benefits of well-managed OSH are extensive and quantifiable. Studies undertaken by PriceWaterhouseCoopers (2008) and Business in the Community (2009) provide a solid foundation in support of the benefits that good health and safety can bring. The evidence highlights the many benefits that can be produced in given circumstances. However, the focus of published case studies is mainly on large organisations.

Case studies featured in other published literature cited in this review are somewhat dated and heavily concentrated on businesses operating in the UK. What is clear is that there is a need for an extensive set of business benefit case studies drawn from organisations of all sizes, operating in a range of sectors and jurisdictions.

4. Return on investment

4.1. Introduction

This section explores the evidence concerning a positive return on investment (ROI) on initiatives to improve the OSH performance and culture of organisations. By positive ROI we mean that the financial benefits gained by any investment in OSH, are greater than the costs associated with the original investment. Of course any financial benefit in addition to avoided costs of failure, such as increased productivity, will support a positive ROI.

In detail, the first part (4.2) illustrates the information needed for ROI calculations to be made, whether in the short, medium or long term. That way, the organisation will be able to create a link between an OSH intervention and financial performance. The next part (4.3) considers a PriceWaterhouseCooper survey featuring 55 case studies in the UK (2008), illustrating the ROI when it comes to OSH. Part 4.4 attempts an initial assessment of the cost required for establishing preventative activities within an organisation. Lastly, part 4.5 presents the simplest and most usual cost-benefit analysis method, namely the payback method. The payback method illustrates the ROI in numerical terms and finalises the business case for OSH of the paper. Two case studies are also included showing the ROI in a rehabilitation intervention and a preventative one.

4.2. Economic Assessments

The literature review has identified evidence to show that 'poor' OSH generates considerable costs for the individual, organisation and society as a whole. It is also evident that investing in OSH is not an initiative that concerns only large and high-risk organisations, but it rather affects all types of enterprises, regardless of their size and sector they operate in. Arguably, every enterprise should weigh the costs and the benefits of a potential improvement of its OSH management and make an informed decision about the level of capital needed in order to implement an OSH intervention and improve outcomes (financial or not).

However, to develop an assessment on ROI, the following data (Table 15) need to be collected, assessed and maintained by the organisation on a regular basis. Table 15 offers a number of recommendations for organisations that wish to obtain or maintain a link between the implementation of OSH initiatives and their financial performance.

> By positive ROI we mean that the financial benefits gained by any investment in OSH, are greater than the costs associated with the original investment

Table 15: Recommendations for organisations that want to maintain/acquire a link between OSH initiatives and economic performance

Recommendations	
Encouraging organisations to collect data routinely	Many organisations do not collect economic data routinely, due to their disinterest of near-misses or non-injury accidents. This mindset should be modified in order for the organisations to be able to make economic assessments and keep records of their performances
Having a separate budget for OSH	The initiative of keeping a separate budget for OHS activities is of the utmost importance for the performance of the organisation. It has been proven that enterprises with a separate budget have been experiencing reduced staff stress and sickness absence, increased productivity, morale and fewer compensation claims
Using intermediaries to promote economic tools in the organisations	This suggestion applies mainly to small organisations, which do not have the expertise to link OHS with economic performance. The use of intermediaries for small orgs will facilitate their economic assessments
Incorporating OSH as part of the Psychological Contract	Psychological Contract is the relationship between the employer and the employee, based on the responsibilities of the two. The employer should provide a safe working environment and the employee high performance and commitment to their job

Source: EU-OSHA, 2009

> 45 out of 55 organisations reported decreased sickness absence and 18 out of 55 reported a lower staff turnover
>
> **PriceWaterhouseCoopers, 2008**

4.3. Benefits/Evidence

As indicated earlier in the report, in 2008, PriceWaterhouseCoopers undertook a study of benefits of employee wellness programmes. They classified the programmes into 2 different categories:

- OSH and managing ill-health programmes; reactive interventions, focused on work attendance and performance, sickness absence management, rehabilitation, and return to work schemes
- Health promotion programmes; focused on the overall wellbeing, such as smoking cessation, healthy diet and subsidised exercise programmes (PriceWaterhouseCoopers, 2008).

The benefits the organisations reported back are shown in Figure 4.

Figure 4: Benefits attributed to workplace health promotion programmes in the UK

Source: PriceWaterhouseCoopers, 2008

The benefits associated with the wellness programmes can be found on the left side of the figure, whereas the number of the organisations that reported back the specific improvement can be found on the right. In terms of the 'intangible' benefits, one can see the evidence in Figure 4; 45 out of 55 organisations reported decreased sickness absence and 18 out of 55 reported a lower staff turnover. A summary of some of the financial benefits has already been noted in Table 12.

The evidence from the PriceWaterhouseCoopers case studies demonstrates that a minimum reduction in sickness absence or staff turnover will save a large amount of money to the organisation. One element the above study lacks is the cost of intervention programmes implemented. This is quite a common gap in the literature that can create difficulties in calculating the ROI regarding OSH interventions. Furthermore, this also makes it difficult to demonstrate a direct correlation between well-managed OSH and a positive ROI.

The ISSA research uses standardised interviews to show that the effort required to ensure OSH does produce a meaningful level of return. Responding organisations rated the benefits of OSH against the costs and found a Return on Prevention of 2.2. In practice this means that for 1 Euro (or other currency) per employee per year invested by the organisation on OSH, organisations can expect a potential economic return of 2.2 Euros (or other currency).

4.4. The cost of intervention/prevention

For improvements to be made, organisations and management will need to invest in preventative activities. Of course, this type of investment can be at a substantial cost, a fact that can dissuade organisations from taking proactive action to improve how OSH is managed. The table below (Table 16) provides an overview of the costs of preventative activities.

Table 16: Overview of the costs of preventative activities at organisation level

Variable	Description	How to obtain monetary value
Investments	Costs of specific 'OSH' equipment or additional costs of other investments related to top OSH	Market prices, quotations, invoices
Additional investments	Changes in non-OSH-related capital goods to facilitate functioning of OSH equipment (e.g. reconstruction of buildings)	Market prices, quotations, invoices
Engineering, consultancy and planning costs, related to investments	Expenditures for internal and external activities for design and implementation of new equipment or working procedures	Market prices, quotations, invoices, total wages of time spent

Variable	Description	How to obtain monetary value
Additional costs of substitution products (recurring costs)	Price difference (e.g. for non-toxic chemicals, lighter products)	Market prices, quotations, invoices
Purchase of personal protective equipment (recurring costs)	Costs of protective equipment	Market prices, quotations, invoices
Additional costs for changed working procedures and maintenance (recurring costs)	Price difference between old ways of working and new, directly related to the preventative action; note that new ways may also result in cost savings (e.g. extra costs to work according to safety standards)	Market prices, quotations, invoices
Extra work time of direct personnel (recurring costs)	Time spent on meetings, training, safety inspections, participatory developments	Total wages of time spent
Costs of internal or external OSH services, other preventative services (recurring costs)	Also includes occupational health services	Market prices, quotations, invoices
In-organisation activities	Human resource management, health promotion, OSH policy and management	Total wages of time spent
Other workplace costs	Anything that is not covered in the previous headings	Market prices, quotations, invoices, total wages of time spent

Source: EU-OSHA, 2002

Based on those costs of preventative activities and by obtaining a monetary value for the benefits of them, employers are able to formulate the two parts of the cost-benefit analysis in order to calculate the ROI.

> A simple and often used method of the cost-benefit analysis is the payback method

4.5. Methods

The cost-benefit analysis constitutes an instrument for organisations to assess their investments and the benefits of those investments. The main premise of the method is:

- calculate the costs related to the investment of intervention
- summarise and calculate potential economic benefits, annual or savings (only the benefits associated with the intervention should be incorporated in that stage), and
- create a cash-flow table which summarises the expenditure and the income for a specific time period (EU-OSHA, 2002).

A simple and often used method of the cost-benefit analysis is the payback method. Payback time refers to the period that is required for a capital investment to start generating positive cash flows.

The cost-benefit analysis, however, even if it is the most common method, has been criticised. It has been argued that one cannot put monetary value on health conditions or health effects (Tudor, 1999). More broadly, the method assigns monetary values to everything and clearly ignores the qualitative aspects of OSH (European Commission, 2011). Nevertheless, since the method leads to clear results and is conducted in such way that highlights the ('monetary') value of OSH, it still can be viewed as a useful method.

Apart from the cost-benefit analysis, the cost-effectiveness analysis measures costs and effects (consequences) in different units (Biddle, 2009). The cost-utility analysis on the other hand, introduces the value of utility, measured in Quality Adjusted Life Years (QUALY) (see Drummond, 2005). The cost-minimisation, lastly, assesses which of the investment choices is the cheapest (Hoch & Dewa, 2008).

The real challenge is not what method an organisation should choose, but rather for the management and financial department of any organisation to understand that there is monetary value in preventative activities and this value contributes to the organisation's name, reputation and sustainability.

Cost–benefit analysis (the payback method): a hypothetical example
A construction organisation has encountered several problems with its earth moving equipment in recent years, with many employees been injured; this situation has led to sickness absence and lost time. Possible issues with this type of equipment concern injuries and MSDs due to a machinery deficiency (transporting, machine commissioning), management time lost for repairing possible unexpected problems (fabrication, rewiring), money associated to the repairing and unproductive personnel time lost during the repairing time.

The organisation decides to make an investment to buy 1,000 brand new earthmoving machines, at a cost of £4 million. The organisation's target is to achieve benefits of £500,000 per year from this investment, either by saving money related to compensation to employees, by more productive working time, or by avoiding repairing costs. The payback period, refers to the period that the investment will take to start generating cumulative positive cash-flows and can be calculated as:

P = £4,000/£500,000 = 8 years

Case studies
Two case studies drawn from two separate reports (HSE, 2006; HSE, 2004), demonstrating a positive ROI, are featured below. One focuses on a preventative intervention, the other on rehabilitation. Both are concerned with musculoskeletal disorders (MSD).

Cost-benefit analysis 1 – A case study on preventative intervention
A HSE report in 2006 by Nicholson et al. (HSE, 2006) uses cost-benefit analysis regarding MSDs. One case study concerns a transport organisation, seeking to find ways to reduce the working days lost due to employees' complaints for back pain. The organisation delivers 1.5m long rolls of material in 12m long containers to their customers. The rolls are 'handballed' by one warehouse worker standing inside the container and positioning the rolls as best as he can in order to fill the space. The rolls weigh between 8 to 10 kg and are wrapped in a slippery plastic with no handles. The container needs to be filled, so workers have to handle some rolls up to a height of 3m.

A number of warehouse staff began reporting neck and shoulder pain. A risk assessment was carried out, which identified that the problems were arising from loading the rolls at above shoulder height. Additionally, the task posed a high risk of back and upper limb injury.

Since the organisation had no control over the way the product was packaged by the manufacturer, the problem was narrowed down to the way the product is packed in the lorry. The solution was to load two rows of products up to shoulder height at the far end of the container and then load a layer along the floor at just above knee height in front of these rows. A platform (a layer of boards) was placed on these rows to facilitate the storing. The platform was wide and stable and enabled the workers to eliminate most of the loading above head height.

> There was a net saving of more than £47,000 per annum
>
> HSE, 2006

During the next few months, the warehouse manager noticed that the staff were consistently loading more product per container. It was found that using the original loading system, each container was packed to 89% capacity by volume, but with the new system, the capacity was increased to 95%. This resulted in the drivers being able to load the entire day's deliveries of product into 9 containers instead of 10. The annual cost to operate one container and tractor unit in terms of repairs, license fees, insurance, depreciation and running costs was £48,586.

After implementing the intervention, the time taken to load the container increased from 35 to 45 minutes. However this was more than compensated for by the increase in delivery volume. So, although the full-time equivalent resource required loading the entire fleet per week increased from 2.2 to 2.5 workers, the costs to run 9 containers instead of 10 was less. There was a net saving of more than £47,000 per annum.

Economic analysis

Direct Intervention Costs	
Management time (0.75 per day at £500 per day)	£375
Warehouse staff time estimated to be 3 days at £77 per day)	£231
Estimated cost of platforms for 10 trucks	£900
Direct intervention costs	£1,506
Pre-intervention costs	
Cost in worker's hrs to load the entire fleet (29 hrs at £9.69 per hour)	£281
Total cost of running 10 trucks for a year	£485,857
Pre-intervention costs	£486,138
Post-intervention costs	
Cost in worker's hours to load the entire fleet (34 hours at £9.69 per hour)	£329
Total costs of running 9 trucks for a year	£437,271
Post-intervention costs	£437,600
Annual post-intervention benefit	
Pre-intervention costs	£486,138
(Post-intervention costs)	(£437,600)
Annual post-intervention benefit	£48,538
Net intervention benefit	
Annual post-intervention benefit	£48,538
(Total cost of intervention)	(£1,506)
Net intervention benefit	£47,032

The organisation claimed that the payback period was 1.2 months; this means that in a period of a little bit over a month, the organisation started generating profit from the platform intervention.

This rehabilitation scheme created the solutions we needed in terms of health and safety and occupational health. It was popular with the workforce and their representatives, and it made excellent business sense; for every pound we spent on the scheme we made a saving of £12

Andy Collinson
Group health and safety manager
BPI

Cost-benefit analysis 2: a case study on rehabilitation intervention
The HSE case study report published in 2004 (HSE, 2004) illustrates the costs and the business benefits of interventions implemented in various businesses. One of the OSH interventions described was applied by BPI (British Polythene Industries), one of the largest producers of polythene film products worldwide. Due to the number of days lost caused by MSDs, the organisation decided to start a programme called 'Osteopaths for Industry.' This programme suggested that BPI implements a 'Musculoskeletal Injury Management System' (MIMS), in order to access a national network of 3,000 osteopaths, chiropractors and physiotherapists in a 5 mile radius from every UK site of the organisation. MMIS concerned any type of injury that affected work time, regardless if the injury started at work or at home.

The main types of costs of the initiative included external consultants ('Osteopaths for Industry') and increased time in communication activities. Each session with the MIMS cost £40 and the average number of treatments was 3 per employee per injury. The first year of the initiative, more than 400 treatment sessions took place, resulting in an annual cost of around £16,000.

Regarding the benefits of the initiative, BPI concluded that for every £1 spent the organisation benefit from savings of £12. This number stems from the fact that at the end of the first year, the savings reached £192,000.

Plus, as a result of the early treatment of employees' conditions, only 16% of the referrals had to take time off, whereas 14% were given restricted duties and 70% were fit for work. Before the MIMS, one MSD incident resulted in an average 26 working days lost, whereas after its implementation this number was down to 4. Lastly, there was a significant reduction in civil compensation claims, which was reflected in reduced insurance premia.

After the implementation of the MIMS initiative, the organisation constantly checks for ways to improve OSH performance. Andy Collinson the group health and safety manager of BPI noted that:

"This rehabilitation scheme created the solutions we needed in terms of health and safety and occupational health. It was popular with the workforce and their representatives, and it made excellent business sense; for every pound we spent on the scheme we made a saving of £12."

4.6. Summary

This chapter reviews published literature evidence concerning the ROI in managing OSH. Evidence is scarce, mainly as a result of a lack of financial data collected on costs of intervention or data on OSH outcomes. However, the evidence, although limited, show that a business case to support well-managed OSH can be made, for example in ISSA's research that found a return of 1:2.2 for investment in OSH.

Two case studies are highlighted. Firstly, an OSH intervention to prevent MSDs led to a net saving of £47,000 per annum. Using the payback method (explored in this chapter), the organisations calculated that payback was achieved in a little bit over a month. The second case study found that a rehabilitation intervention costing £16,000 per year led to savings of £192,000; that is, for every £1 invested the organisation saved £12.

The chapter highlights the need for good data, including detail on the costs of a specific OSH intervention. Such evidence is essential to support the claim that investing in OSH not only creates 'ethical' organisations but also profitable ones.

4.7. Conclusion

There is limited published evidence around the ROI of OSH interventions. Also, while there is extensive literature concerning the methodology for costing ROI, certain approaches to costing, such as the cost-benefit analysis approach, have attracted criticism. This chapter cites research that has resulted in the development of other analytical methods for calculating ROI.

While the published evidence shows the willingness of many organisations to share information concerning the identifiable benefits that have resulted from OSH interventions, there is sometimes a reluctance to detail the full extent of the incidence of injury or ill-health, and the related cost that spurred the intervention. In addition, the literature review revealed that many organisations do not capture any meaningful information concerning expenditure related to OSH interventions.

There is a clear need for organisations to adopt approaches to ROI calculation that's based on more robust and comprehensive data collection. In addition, a more consistent methodology on calculating the cost of OSH interventions is required.

5. Conclusion

> Where the research shows a positive ROI, it is clear that the interventions are sensible, proportionate and targeted

This literature review sought to identify the existing research on the business case for OSH interventions in the workplace. Starting from the costs of injuries and ill-health in GB for the year 2010/11, this paper has incorporated representative data regarding the real costs borne by individuals, businesses and society. The presentation of these costs should alert employers to the benefits of investing in appropriate OSH initiatives – to reduce lost resources and improve business effectiveness.

The review goes on to identify some of the most recent case studies which show the financial benefits of OSH interventions. For example, the list of financial benefits from health promotion programmes by Business in the Community in its 2009 study, highlights the ROI flowing from sustained health improvements.

The presentation and guidance of how employers should calculate the benefits from OSH interventions are set out in the last chapter, with the cost of preventative activities and the evaluation of the ROI being of vital importance. The view that emerges from this last chapter is that every organisation wishing to assess the impact of OSH initiatives on its financial performance should maintain comprehensive records of inputs, outputs and outcomes and carry out regular assessments of progress and results.

This literature review shows the pool of evidence available, demonstrating that the benefits of investing sensibly in OSH significantly outweigh the costs of avoidable injury and ill-health. Though this evidence needs to be improved in scope and quality, the available research should encourage employers to see the relationship between investment and return on OSH interventions and give sufficient motivation to act to improve OSH outcomes.

Central to this review is the argument that the costs of workplace injuries and ill-health occurrences, which are preventable, are a significant burden on individuals, businesses and wider society. This review does not ignore concerns about the costs associated with an 'excessive health and safety culture' (e.g. as described in 'Health and safety: reducing the burden' by the Policy Exchange in 2010).

There is no doubt that uncertainty drives some businesses to invest unwisely in elaborate risk assessments or to simply ban activities rather than manage them. However where the research shows a positive ROI, it is clear that the interventions are sensible, proportionate and targeted. Given how difficult it would be for a regulator like HSE to visit every business, demonstrating the business benefits of good health and safety should play a positive role in inspiring all businesses to take action.

This review makes it clear that such interventions are as a result of careful planning, with detailed understanding of the challenge and clear knowledge of the finances involved. This review lays the foundation for further work by the British Safety Council, in partnership with other stakeholders, intended to help make a compelling case for the benefits of sensible investments in OSH.

References

Aaltonen V.P. *et al.*, (1996), 'The Accident Consequence Tree Method and its Application by real time data collection in the Finnish Furniture Industry', *Safety Science*, Vol. 23, No. 1, pp. 11-26

Adams M. et al, (2002), *Aftermath, The Social and Economic Consequences of Workplace Injury and Illness*, Department of Labour and the Accident Compensation Corporation, Wellington

Aronsson G.,Gustafsson K. and Dallner M.,(2000),' Sick but yet at work. An empirical study of sickness presenteeism', *Journal of Epidemial Community Health;* 54; 502-509

Aviva, (2011), *The fifth Aviva Health of the Workplace Report*, www.aviva.co.uk/healthcarezone/document-library/files/ge/gen4279.pdf

Biddle E., (2009), *The Business Value of Occupational Safety and Health Activities*, Keynote paper presented at the Ecosh conference, Helsinki

Bräunig D. & Kohstall T., (2011), *The Return on Prevention: Calculating the costs and benefits of investments in occupational safety and health in companies*, International Social Security Association, Geneva

British Safety Council, (2012), *Working Well. Five steps for healthier and safer work activities,* London

Business in the Community, (2009), *Healthy People = Healthy Profits*, London

Cooper D., (2000), 'Towards a model of safety culture', *Safety Science*, Vol. 36

De Greef M. & Van den Broek K., (2004a), *Making the case for workplace health promotion*, ENWHP

References

De Greef M. & Van den Broek K., (2004b), *Quality of the working environment and productivity, research findings and case studies, report*, EU-OSHA, Luxembourg

DeJoy D., (2005), 'Behavior change versus cultural change: Divergent approaches to managing workplace safety', *Safety Science*, Vol. 43, Issue 2, pp. 105-129

Dembe A., (2001), 'The social consequences of Occupational Injuries and Illnesses', *American Journal of Industrial Medicine*, Vol. 40, pp. 403-417

Dorman P, (2000a), 'The economics of safety, health, and wellbeing at work: an overview', InFocus Program on SafeWork, ILO, www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safework/documents/publication/wcms_110382.pdf

Dorman P., (2000b), 'If safety pays, why don't employers invest in it?' in Frick K., Jensen P. L., Quinlan M. and Wilthagen T. (eds) *Systematic Occupational Health and Safety Management – Perspectives on an organizational development*, Oxford: Pergamon Press

Drummond M. et al., (2005), *Methods for the Economic evaluation of Health Care programmes*, 3rd edition, Oxford University Press

DWP (Department of Work and Pensions) (2008), 'Working for a healthier tomorrow' (Dame Carol Black)

DWP, (2011), 'Reclaiming health and safety for all', www.official-documents.gov.uk/document/cm82/8219/8219.pdf (Professor Ragnar E Löfstedt)

EU-OSHA, (1997), *Economic impact of occupational safety and health in the Member States of the European Union*, Luxembourg

EU-OSHA, (2002), *Inventory of socioeconomic costs of work accidents*, Luxembourg

EU-OSHA (2007), *The business benefits of good occupational safety and health*, Facts 77, Belgium

EU-OSHA, (2009), *Occupational Safety and Health and economic performance in small and medium-sized enterprises: A review, Luxembourg*

EU-OSHA, (2010), *Economic incentives to improve occupational safety and health: a review from the European perspective*, Report prepared by TC-OSH Work Environment

EU-OSHA, (2011), *How to create economic incentives in occupational safety and health: A practical guide*, Working Environment Information, Literature Review

European Commission (2011), Directorate General for Employment, Social Affairs and Inclusion, *Final report: Socio-economic costs of accidents at work and work-related health*, European Union

Eurostat (2004), Work and health in the European Union, *Statistical Analysis of socio-economic costs of accidents in the European Union*, Luxemburg

Eurostat, (2010), *Occupational Health and Safety at Work in Europe 1999-2007: A statistical portrait*, European Commission, Luxembourg

References

Eurostat, (2012), Statistics-Database-Occupational Health and Safety at Work, http://epp.eurostat.ec.europa.eu/portal/page/portal/health/health_safety_work/data/database

Hoch J.& Dewa C., (2008), 'Kind of analysis and decision rule' in Tompa E., Culyer A. & Dolinschi R., *Economic evaluation of Interventions for Occupational Health and Safety. Developing Good Practice*, New York

Hofman A., Morgeson P. & Gerras J., (2003), *Climate as a moderator of the relationship between leader-member exchange and content specific citizenship: Safety climate as an exemplar*, Journal of Applied Psychology, Vol. 88, pp. 170-78

HSE, (1993), *The Cost of Accidents at Work, HMSO*, London

HSE, (2004), *The development of case studies that demonstrate the business benefits of effective management of occupational health and safety*, HSE Research Report 249, Greenstreet Berman, HSE Books

HSE, (2005), *Perceptions of the cost implications of Occupational Health and Safety failures*, HSE books

HSE, (2006), *Cost benefit studies that support tackling musculoskeletal disorders*, Hu-Tech Ergonomics, HSE

HSE, (2013a), *Costs to Britain of workplace injuries and work-related ill-health: 2010/11 update*, HSE, www.hse.gov.uk/statistics/overall/hssh1213.pdf

HSE, (2012b), *Index of Data Tables*, HSE, www.hse.gov.uk/statistics/tables/index.htm

HSE, (2012c), *Occupational Health Provision on the Olympic Park and Athletes' Village: Final report, http://www.hse.gov.uk/research/rrhtm/rr921.htm*

HSE, (2012d), *Keep your reputation*, HSE, www.hse.gov.uk/business/costs-damage.htm, accessed on 11/12/12

HSW (Health and Safety at Work), (2012), *A little less compensation*, Pat Perry, www.healthandsafetyatwork.com/hsw/little-less-compensation, accessed on 11/12/12

ILO, (2005), *Introductory report: decent work-safe work*, Geneva

ILO & Finnish Ministry of Social Affairs and Health, (2002), *The economics of health, safety and wellbeing*, Barefoot Economics, Safework

IOSH (2008), Ward J., Haslam C. & Haslam R., *The impact of occupational health and safety management on organizations and their staff*, Research Report 08.1

Jacinto C. & Aspinwall E., (2004), 'A survey on occupational accidents' reporting and registration systems in the European Union', *Safety Science*, Vol.42, pp 933-960

MMU (Manchester Metropolitan University), *Cost-Benefit Analysis toolkit*, www.mmu.ac.uk/bit/docs/Cost-Benefit-analysis-toolkit-v2.pdf

Policy Exchange, (2010), 'Health and safety. Reducing the burden', http://tinyurl.com/cy5zto6

References

PriceWaterhouseCoopers, (2008), *Building the case for wellness*

Reason T., (1998), 'Achieving a safe culture: Theory and Practice', *Work and Stress*, Vol. 12, no 3, pp 293-301

Riel P. & Imbeau D., (1995), 'Applying ABC to ergonomics and safety costs', Proceedings of the 46th International Industrial Engineering Conference

Rikhardsson P.M, (2004), 'Accounting for the cost of occupationalaccidents', *Corporate Social Responsibility and Environmental Management*, Vol. 11, pp. 63-70

Rikhardsson P.M, (2005), *Accounting for occupational health and safety costs: Review and comparison of selected methods*, Working Paper, Department of Accounting, Finance and Logistics, Aarhus School of Business

Shore M. & Martin J., (1989), 'Job satisfaction and organizational commitment in relation to work performance and turnover intentions', *Human Relations*, Vol.42, pp 625-638

TNO report, (2009), *Health and safety at work. Results of the labour force survey 2007 ad hoc module on accidents at work and work-related health problems*, The Netherlands

Tudor O., (1999), *Strengths and weaknesses: occupational health and safety at Work, a question of costs and benefits*, European Agency for occupational health and safety at Work, OSH Magazine, 1, pp. 35–37

USHA (Universities OHS Association) & UCEA (Universities and Colleges Employers Association), 'Leading occupational health and safety at work', www.ucea.ac.uk

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