

Chapter 3. Review of Literature

The literature review for “HSE Culture” is broadly classified into:

- Accident Statistics & cause of construction injuries or fatalities
- Accident Prevention
- Key Drivers for promoting a safety culture.
- Safety Culture Assessment techniques.

1. Accident Statistics & Cause of Construction Injuries or Fatalities:

According to Facts on Safety at Work compiled by ILO, it describes construction industry as a major employment generator in many parts of the world, construction is also a sector associated with a proportionately high number of job-related accidents and diseases. Despite mechanization, the industry is still largely labour-intensive, while working environments are frequently changing and involve many different parties. The industry also has a long tradition of employing migrant farm labour from lower-wage economies and much employment is precarious and short-term. **According to ILO estimate:**

- Each year there are at least 60,000 fatal accidents on construction sites around the world. There is one fatal accident every ten minutes.
- One in every six fatal accidents at work occurs on a construction site.
- In industrialized countries, as many as 25% to 40% of work-related deaths occur in on construction sites, even though the sector employs only 6% to 10% of the workforce.
- In some countries, it is estimated that 30% of construction workers suffer from back pains or other musculoskeletal disorders.

The major types of hazards prevailing in construction industry are as follows:

- Fall of persons from height.
- Falls, trip or slip of person on same level.
- Struck by object or material.
- Striking against object or material.
- Caught in, under or between object and material.
- Rubbed or abraded by object or material.
- Over-exertion, strenuous or awkward movements and free bodily motion.
- Exposure to or contact with extremes of temperature or environmental conditions.

- Exposure to or contact with electric current.
- Exposure to or contact with potentially harmful substances.
- Powered vehicle accidents.

The major types of occupational injury prevailing in the construction industry are as follows:

- Hearing impairment, deafness
- Diseases caused by vibration
- Bursitis, muscle strain
- Slipped disc
- Skin diseases
- Pneumoconiosis
- Decompression sickness
- Hernia
- Cancer

2. Accident Prevention:

Dr. N. Krishnamurthy in his study of Safety in the construction industry described that, in construction industry, safety is even more critical than in other industries. Every nation must take construction health and safety seriously, because the accident and fatality (death) rates in this industry are among the highest in most countries around the world, including the advanced nations. In his final analysis he concluded that, construction safety is merely a commitment by the authorities. Accident and failures can be prevented by promotion of the following:

- Knowledge (Training & Education)
- Competence (Experience)
- Care (Control)
- Improved communications and organization in the construction industry.

Many results of studies discussed in Review of Safety in Construction and Operation, by Muhammed Sohail, stated that there are six most important factors which are important for accident prevention. **They are as follows:**

- Maintaining safe working conditions,
- Establishing safety training.
- Safety education to promote good safety habits amongst workers and supervisors.
- Effective control of the main contractors on site.
- Maintaining close supervision of all the work.

- Assigning safety responsibility to all levels of management and workers.

Another study by Jaselskis et al (1996) conducted qualitative and quantitative analysis of data related companies and projects in US to identify the factors considered to be important for a good level of safety. The study recommends steps to achieve outstanding safety performance.

They are as follows:

- Strengthen upper management attitude towards the importance of safety.
- Reduce project management-team turnover.
- Ensure field safety representatives spend 30-40 per cent time on safety issues.
- Increase the number of formal safety meetings with supervisors and specialty contractors to once a week.
- Increase the number of informal safety inspections to 4 per week.
- Reduce the amount of money fined for poor safety performance of workers.

The Health & Safety Executive's published copy of Managing Health & Safety in Construction – Construction (Design and Management) Regulations 2007, stated that it is necessary to promote worker engagement and communication because involving the workforce in identifying and controlling risks associated with construction work will be helpful as they are the ones who have first-hand experience of site conditions and is often the first to identify potential problems. Worker engagement is the participation by workers in decisions made by those in control of construction activities, in order that risks on site can be managed in the most effective way.

3. Key Drivers for Promoting a Safety Culture:

The key drivers which aid in promoting a safety culture can be related to two main areas. One is those that are related to Organizational and the other is those that relate to Key Individuals. Organizational drivers may be characterized by management systems and procedures in a variety of areas that relate to organizational activity. These drivers include internal & external influences.

Internal drivers include:

- Corporate business plan.
- Organizational structure/change.
- Organizational standards.
- Performance metrics.
- Systems & procedures.

External Drivers include:

- The extent of alliance contracts.
- Industry standards.
- Legal requirements.
- Regulatory regimes.

The Key Individuals & groups, within the organisation can influence and drive culture both directly and indirectly through their actions, words & commitment. **‘Some key individuals’ drivers may be:**

- Chief Executive
- Senior Managers
- Safety Personnel
- Elected Safety Representatives
- All employees
- Medical Team
- Visitors – External Enforcement personnel, etc.

4. Safety Culture Assessment Technique:

Ronny Lardner discussed in his Safety Culture Application Guide – Final Version 1.1 – August 2003, that there are a variety of methods that can be used to assess safety climate, and identify the main issues that need to be addressed. It is important to note that the very act of assessing the safety climate can have an impact on the culture. When people participate in the process they will wonder what is happening and how it is going to change their working environment. Frontline workers are likely to look for signs that indicate that management are doing this because they are truly interested in their safety, as opposed to some ulterior motive. The assessment method chosen can either reinforce the negative aspects of the current culture or be the beginning of the improvement process (Carroll, 1998). The assessment process should be consistent with the positive culture that is desired, for example one which gains a high degree of employee involvement.

The potential assessment methods can be divided into three main types:

- Quantitative (e.g. safety climate survey tools).
- Qualitative (e.g. interviews, workshops and focus groups, observation, ethnographic methods)
- Triangulated methods, which combine quantitative and qualitative methods.

One difference between these methods is the degree of confidentiality and security they offer to the participants. Another difference is the degree of structure they impose and the ease of analysing the output. Irrespective of the specific assessment method used there are a number of tips and good practice guidelines, which are outlined below, followed by a description of the three main types of assessment methods.

The appropriateness of the assessment technique depends on the requirements of the organisation. Table No. 2 given below provides a summary to aid selection of the most appropriate method. Remember that methods can be triangulated, for example by combining quantitative and qualitative methods.

Table No. 3: Comparison between Assessment Methods

Criteria	Assessment methods		
	Quantitative	Qualitative	Triangulated methods
Cost	<ul style="list-style-type: none"> • Purchase of instrument/ development of instrument • Staff time to complete questionnaire • Analysing results • Meeting with staff to identify interventions 	<ul style="list-style-type: none"> • Time to develop interview schedule • External assistance • Workforce time • Time to analyse results and identify actions 	<ul style="list-style-type: none"> • External assistance • Workforce and management time
Utility of results	<ul style="list-style-type: none"> • Produces a large amount of numerical data • Results may be difficult to link to interventions 	<ul style="list-style-type: none"> • Produces a large amount of written data • Data can be difficult to analyse and interpret 	<ul style="list-style-type: none"> • Qualitative data can be difficult to analyse and interpret • Can help with focus on solutions
Strengths	<ul style="list-style-type: none"> • Efficient way of collecting data about employee's perceptions and attitudes to safety • Can allow benchmarking and comparison between sites 	<ul style="list-style-type: none"> • High face validity – appears relevant • Interventions can be directly linked to interviews • Some employee involvement 	<ul style="list-style-type: none"> • High face validity – appears relevant • Can compare and contrast different types of data • Can lead to higher confidence in results
Limitations	<ul style="list-style-type: none"> • Limited employee involvement • Employees often do not see the link between the survey and interventions • Hard to know exact meaning of results 	<ul style="list-style-type: none"> • Confidentiality can be a problem • Results can be biased if level of trust is low • Relatively time consuming • Difficult to compare results across sites or over time 	<ul style="list-style-type: none"> • External assistance may be required • Time-consuming • Lack of comparable norm data for qualitative data

Five steps to risk assessment aims to help to assess health and safety risks.

Risk assessment is an important step in protecting your workers and your business, as well as complying with the law. It helps you focus on the risks that really matter in your workplace – the ones with the potential to cause harm. In many instances, straightforward measures can readily control risks, for example, ensuring spillages are cleaned up promptly so people do not slip or cupboard drawers kept closed to ensure people do not trip. For most, that means simple, cheap and effective measures to ensure your most valuable asset – your workforce – is protected.

A risk assessment is simply a careful examination of what, in your work, could cause harm to people, so that you can weigh up whether you have taken enough precautions or should do more to prevent harm. Workers and others have a right to be protected from harm caused by a failure to take reasonable control measures.

The law does not expect you to eliminate all risk, but you are required to protect people as far as is ‘**reasonably practicable**’. This guide tells you how to achieve that with minimum fuss.

This is not the only way to do a risk assessment, there are other methods that work well, particularly for more complex risks and circumstances. However, we believe this method is the most straightforward for most organisations.

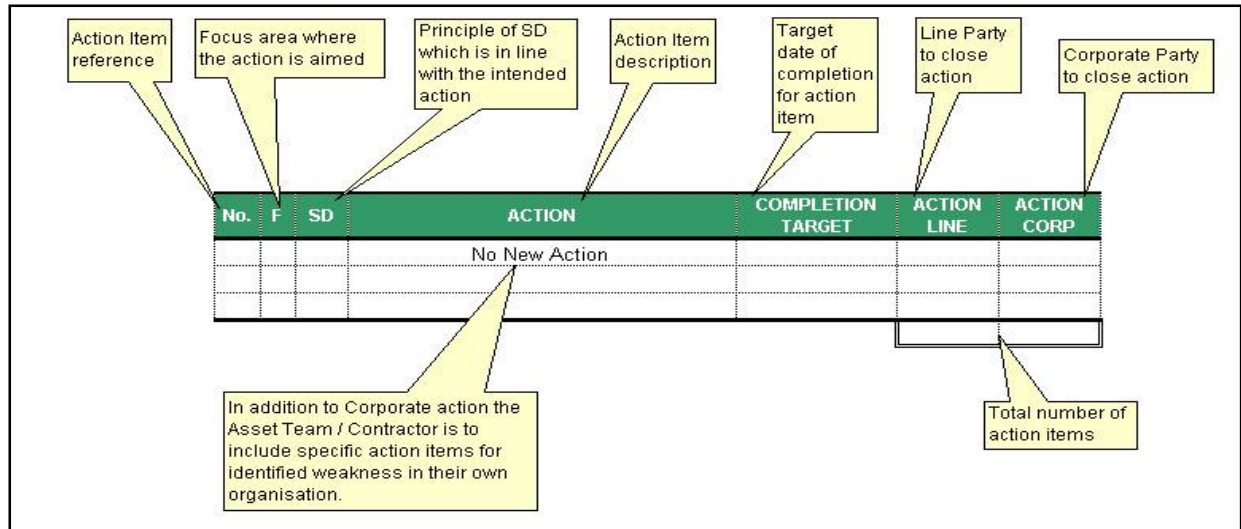
Step 1: Identify The Hazards:

First you need to work out how people could be harmed. When you work in a place every day it is easy to overlook some hazards, so here are some tips to help you identify the ones that matter-

- **Walk around** your workplace and look at what could reasonably be expected to cause harm.
- **Ask your employees** or their representatives what they think. They may have noticed things that are not immediately obvious to you. For information on how you can do this please visit our **worker involvement pages**.
- Visit the **HSE website**. HSE publishes practical guidance on where hazards occur and how to control them. There is much **information on** the hazards that might affect your business.
- If you are a member of a **trade association**, contact them. Many produce very helpful guidance.
- **Check manufacturers’ instructions** or data sheets for chemicals and equipment as they can be very helpful in spelling out the hazards and putting them in their true perspective.
- Have a look back at your **accident and ill-health records** – these often help to identify the less obvious hazards.
- **Remember to think about long-term hazards to health** (e.g. high levels of noise or exposure to harmful substances) as well as safety hazards.

Presentation of 'Action Plan'

Corporate action items have been identified in the plan. This is a significant reduction from previous year action items. **Asset teams and Contractors are expected to include specific action items for identified weakness in their own organisation in addition to these corporate actions.**



Step 2: Decide Who Might Be Harmed And How:

For each hazard you need to be clear about who might be harmed; it will help you identify the best way of managing the risk. That doesn't mean listing everyone by name, but rather identifying groups of people (e.g. 'people working in the storeroom' or 'passers-by').

Remember:

- Some workers have particular requirements, e.g. new and **young workers, migrant workers**, new or **expectant mothers** and **people with disabilities** may be at particular risk. Extra thought will be needed for some hazards;
- cleaners, visitors, contractors, maintenance workers etc, who may not be in the workplace all the time;
- members of the public, if they could be hurt by your activities;
- If you share your workplace, you will need to think about how your work affects others present, as well as how their work affects your staff – talk to them; and
- Ask your staff if they can think of anyone you may have missed.

In each case, identify how they might be harmed, i.e. what type of injury or ill health might occur. For example, '**shelf stackers may suffer back injury from repeated lifting of boxes**'.

Step 3: Evaluate the Risks & Decide On Precautions:

Having spotted the hazards, you then have to decide what to do about them. The law requires you to do everything 'reasonably practicable' to protect people from harm. You can work this out for yourself, but the easiest way is to compare what you are doing with good practice.

First, look at what you're already doing; think about what controls you have in place and how the work is organised. Then compare this with the good practice and see if there's more you should be doing to bring yourself up to standard. In asking yourself this, consider:

- Can I get rid of the hazard altogether?
- If not, how can I control the risks so that harm is unlikely?

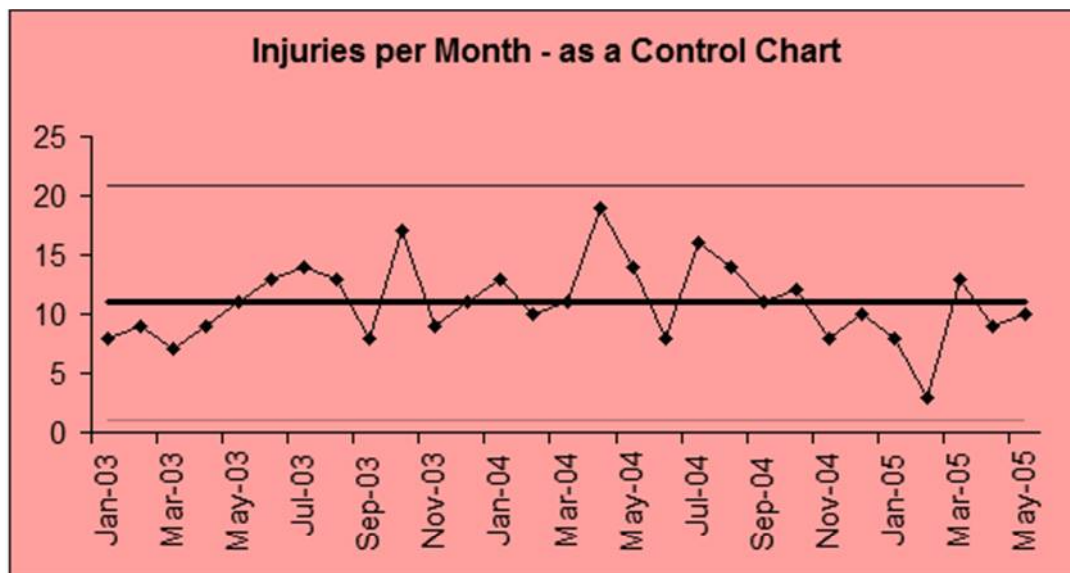
When controlling risks, apply the principles below, if possible in the following order:

- Try a less risky option (e.g. switch to using a less hazardous chemical);
- Prevent access to the hazard (e.g. by guarding);
- Organise work to reduce exposure to the hazard (e.g. put barriers between pedestrians and traffic);
- Issue personal protective equipment (e.g. clothing, footwear, goggles etc); and
- Provide welfare facilities (e.g. first aid and washing facilities for removal of contamination).

Improving health and safety need not cost a lot. For instance, placing a mirror on a dangerous blind corner to help prevent vehicle accidents is a low-cost precaution considering the risks. Failure to take simple precautions can cost you a lot more if an accident does happen.

Involve staff, so that you can be sure that what you propose to do will work in practice and won't introduce any new hazards.

Statistical Process Control:



Hazards and Effects Management Process:

The HSE-MS are to be achieved through the management of hazards and effects. A Hazards and Effects Management Process (HEMP) provides a structured approach to managing the hazards and potential effects of activities. Effective application of HEMP involves four steps: identify, assess, control and recover. The HEMP shown in fig below provides a basic structure but in reality each of the four main steps are overlapping and iterative.

The objective of this section is to ensure that the company reaches a state whereby:

- All HSE hazards associated with company activities and their effects to the company and third parties, have been identified, analysed and are properly managed to reduce the risk to ALARP.
- The whole process is clearly documented for monitoring purpose.

Fig below shows the four aspects of the Hazards and Effects Management Process.

I dentify	Are people, environment, assets or company reputation exposed to potential harm?
A ssess	What are the causes and consequences? How likely is loss of control? What is the risk and is it ALARP?
C ontrol	Can the causes be eliminated? What controls are needed? How effective are the controls?
R ecover	Can the potential consequences or effects be mitigated? What recovery measures are needed? Are recovery capabilities suitable and sufficient?

Hazard and Effects Management Process:

Identification of Hazards

Identification of hazards and effects should cover:

- All activities, products and services controlled and influenced by company.
- The activities and services carried out by all personnel having access to the workplace and Facilities at the workplace including contractors and sub-contractors.
- Routine, non-routine and emergency operating conditions and activities.
- The lifecycle of an asset or activity, from the planning stage, through operation to decommissioning, disposal and restoration.

Step 4: Record Your Findings And Implement Them:

Putting the results of your risk assessment into practice will make a difference when looking after people and your business.

Writing down the results of your risk assessment, and sharing them with your staff, encourages you to do this. If you have fewer than five employees you do not have to write anything down.

When writing down your results, keep it simple, for example ‘Tripping over rubbish: bins provided, staff instructed, weekly housekeeping checks’, or ‘Fume from welding: local exhaust ventilation used and regularly checked’.

We do not expect a risk assessment to be perfect, but it must be suitable and sufficient. As illustrated by our example risk assessments, you need to be able to show that:

- A proper check was made;
- You asked who might be affected;

- You dealt with all the obvious significant hazards, taking into account the number of people who could be involved;
- The precautions are reasonable, and the remaining risk is low; and
- You involved your staff or their representatives in the process.

If, like many businesses, you find that there are quite a lot of improvements that you could make, big and small, don't try to do everything at once. Make a plan of action to deal with the most important things first. Health and safety inspectors acknowledge the efforts of businesses that are clearly trying to make improvements.

A good plan of action often includes a mixture of different things such as:

- A few cheap or easy improvements that can be done quickly, perhaps as a temporary solution until more reliable controls are in place;
- Long-term solutions to those risks most likely to cause accidents or ill health;
- Long-term solutions to those risks with the worst potential consequences;
- Arrangements for training employees on the main risks that remain and how they are to be controlled;
- Regular checks to make sure that the control measures stay in place; and
- Clear responsibilities – who will lead on what action and by when.

Remember, prioritise and tackle the most important things first. As you complete each action, tick it off your plan.

Assessment review date:

(Usually within one year, or earlier if working habits or conditions change)

For information specific to your industry please go to **www.hse.gov.uk**.

Employers with five or more employees must have a written health and safety policy and risk assessment.

For further information and to view our example risk assessments go to **www.hse.gov.uk/risk**.

Combined risk assessment and policy template published by the Health and Safety Executive 09/09

- HSE
- Guidance
- Topics
- Risk Management
- Five Steps To Risk Assessment
- Review Your Assessments



Step 5: Review Your Risk Assessment and Update If Necessary:

Few workplaces stay the same. Sooner or later, you will bring in new equipment, substances and procedures that could lead to new hazards. It makes sense therefore, to review what you are doing on an ongoing basis.

Look at your risk assessment and think about whether there have been any changes? Are there improvements you still need to make? Have your workers spotted a problem? Have you learnt anything from accidents or near misses? Make sure your risk assessment stays up to date.

When you are running a business it's all too easy to forget about reviewing your risk assessment – until something has gone wrong and it's too late. During the year, if there is a significant change, don't wait: check your risk assessment and where necessary, amend it. If possible, it is best to think about the risk assessment when you're planning your change – that way you leave yourself more flexibility

Risk Assessment Matrix:

This Risk Assessment Matrix (shown below) shows risk as the product of likelihood and consequence. It can be used to assess and evaluate company's HSE risks.

Use of the Risk Assessment Matrix will:

- Enhance appreciation of HSE risk and achieving ALARP at all levels in company.
- Assist in setting clear risk based strategic objectives.
- Provide the basis for implementation of a risk based HSE Management System.

- Provide a consistency in evaluating risk across all activities

PDO's HSE Risk Assessment Matrix

Severity	CONSEQUENCES				INCREASING LIKELIHOOD				
	People	Assets	Environment	Reputation	A Never heard of in E&P industry	B Heard of in E&P industry	C Incident has occurred in PDO	D Happens several times per year in PDO	E Happens several times per year in a location
0	No health effect/injury	No damage	No effect	No impact					
1	Slight health effect/injury	Slight injury	Slight effect	Slight impact					
2	Minor health effect/injury	Minor damage	Minor effect	Limited impact					
3	Major health effect/injury	Localised damage	Localised effect	Considerable impact	Low Risk				
4	PTD* or 1 fatality	Major damage	Major effect	National impact		Medium Risk			
5	Multiple fatalities	Extensive damage	Massive effect	International impact			High Risk		

PTD* = Permanent Disability