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STRENGTHENING THE SAFETY CULTURE IN RAW RUBBER PROCESSING STAGE THROUGH HUMAN CAPACITY BUILDING: A CONCEPTUAL FRAMEWORK

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ABSTRACT

Safety and health in the raw rubber processing activity has been a neglected subject, though this sector is still a major foreign exchange contributor to the national economy in Sri Lanka. The rubber industry in the Sri Lanka employs many thousands of people and as it is a heavy industry, it poses a number of safety and health risks to workers employed in that sector. Occupational safety and health concerns in raw rubber processing organisations have always been and continue to be of the utmost importance. Often the impact of serious workplace injuries overshadows the damage associated with illnesses which may be linked to workplace exposures. Thus, establishing and strengthening of the safety culture is most critical in raw rubber processing environments with a high risk of health and safety concerns. The cause analysis for failings related to safety culture in raw rubber processing activity are varied and far reaching; with each issue coming into play at one critical point in time. However, most of the weaknesses are related with 'Human factors: How people feel (Heart and Mind)', 'What people do (Daily Action)'. Thus, developing of human capacities such as attitudes, behaviours, skills and knowledge etc. on this perspective will be an effective tool in addressing those failures and strengthening the safety culture in raw rubber processing activity. This paper therefore aims to develop a conceptual framework for strengthening the safety culture in raw rubber processing activity through human capacity building.

A comprehensive literature review was used as the research methodology for this paper. Research findings illustrated that yet, like in any other employment sector, workers involved in raw rubber processing activity run an equal if not higher risk of being injured as a result of the type of work they do. Due to management and worker ignorance and rubber products manufacturing chemicals and bad work practices in some factories, serious hazards have been created and many accidents have occurred. Strengthening the safety culture is about more than removing hazards and establishing safety procedures. It is about working with people of the organisation to change their attitudes, behaviours and thoughts, and improve their situational awareness. The finding of this research incorporated into a conceptual framework which proposes a better working condition so that the safety culture can be strengthen.

Keywords: Human Capacity Building, Human Factors; Raw Rubber Processing Activity; Safety Culture.

1. INTRODUCTION

Safe and healthy workplaces help businesses and organisations to succeed and prosper, and also benefit wider society (Sukadarin *et al.*, 2012). Safety and health at work have traditionally been approached mainly by means of legislation and enforcement measures. Effective safety management in the twenty-first century involves paying attention to human factors as system components with as much potential to cause, or save, dangerous system states as technical components. By paying attention to human factors, highly reliable organisations can identify and capture potential hazards before they manifest as accidents. One method of achieving this is by measuring the state of safety through so-called 'leading' indicators such as safety culture (Yule, 2003). Companies are being encouraged to adopt a positive organisational safety culture in order to safeguard their operations against accidents and it is accepted as the number one

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priority (Clarke, 2003; Sukadarin *et al.*, 2012). In industries, like aviation, nuclear power, manufacturing and rubber processing this makes sense. Since safety and health in the raw rubber processing activity has been a neglected subject, strengthening a positive safety culture through paying attention on human factors is important.

For a good safety culture, involvement of human of the organisation together with their positive attitudes and beliefs, behaviours, knowledge and skills, past experiences etc. is indispensable. This is due to the fact that strengthening a robust safety culture is about more than removing hazards and institutionalizing safety procedures. It is about working with human of the organisation to change their attitudes, behaviours and thoughts, and improve their situational awareness within the dynamics of today's world. Also, human resource as one of the most valuable resources in the organisation, they bring whatever the planned procedures, systems etc into reality. Therefore, capacitating the human to strengthen the safety culture in raw rubber processing sector is a timely requirement which will ensure the long term business continuity together with protection of employees and properties. Thus, in this study, capacity building is aimed towards capacitating the human for strengthening the safety culture in raw rubber processing activity.

2. RESEARCH METHOD

A comprehensive literature review was used as research methodology for this research paper. Literature review was carried out on a broader perspective with the purpose of getting familiarised with the subject areas of the research study while holding the focus on research problem. The background study took the attention of journal articles, online journals, e-books, web sites, electronic library data base and other publications. A conceptual framework for strengthening the safety culture in raw rubber processing activity through human capacity building was developed at the end by bringing in literal arguments.

3. SAFETY CULTURE

The concept of Safety Culture came into international usage following a report by the International Atomic Energy Agency (IAEA) in 1991, after the Chernobyl nuclear disaster in 1986 (Flin *et al.*, 2000). The investigation report by the International Nuclear Safety Advisory Group (INSAG) of the International Atomic Energy Agency (IAEA) identified that poor safety culture as one of the contributing factors to this worst nuclear power plant accident in history (INSAG, 1986 cited in European Agency for Safety and Health at Work, 2010) and which led to safety culture being defined as an organisational atmosphere where safety and health is understood to be, and is accepted as, the number one priority. From then on the concept of safety culture has been used more and more in safety research, particularly in high-risk industries. Safety culture is an abstract concept, giving researchers a large degree of freedom on how they understand these concepts and put them into practice (Havold, 2005). This implies that there is a lack of consensus on how the safety culture concept is understood, and now ideally accepted definition of the concept either (Guldenmund, 2010). In this context, following sub Sections 3.1 and 3.2 explore the relevant literature in the research arena with major focus is given on two areas: defining the safety culture and elements of safety culture.

3.1. DEFINING SAFETY CULTURE

Over the past years, the concept of safety culture has been studied by many researchers from different scientific backgrounds and disciplines. A distinction can be made between the approach taken by psychology-oriented research and the engineering-based approach (Antonsen, 2009). The psychological approach is interested specifically on how workers feel about and distinguish safety and safety management, and on their attitudes and behaviour regarding risks and safety. This psychological research refers more to the term 'safety climate' than to 'safety culture'. When it comes to the engineering approach, it is more focused and interested in the formal and managerial aspects and systems that have an influence on safety such as management systems, procedures, policies, control systems, etc.

Apart from this deviation between the psychological versus engineering perspective, safety culture can also be analysed from the viewpoint of organisational (culture) theory. For an example, Guldenmund (2010) considers safety culture as that part of organisational culture that is related to safety and risks. This is further emphasised by many researchers and they stated that safety culture is a subset of the corporate organisational culture that comprises workforce beliefs, attitudes, behaviours, norms and values, personal responsibilities as well as human resources features such as training and development with regard to safety (Sukadarin *et al.*, 2012; Clarke, 1999; Glendon and Stanton, 2000). Numerous definitions of safety culture exist in the academic literature, and examples of selected definitions are shown in Table 1.

Table 1: Definitions of Safety Culture

Reference	Definition
Cox and Cox (1991)	Safety culture is the ways in which safety is managed in the workplace, and often reflects the attitudes, beliefs, perceptions and values that employees share in relation to safety
Kennedy and Kirwan (1998)	An abstract concept, which is underpinned by the amalgamation of individual and group perceptions, thought processes, feelings and behaviours, which in turn gives rise to the particular way of doing things in the organisation. It is a sub-element of the overall organisational culture
Hale (2000)	Refers to the attitudes, beliefs and perceptions shared by natural groups as defining norms and values, which determine how they act and react in relation to risks and risk control systems
Glendon and Stanton (2000)	Comprises attitudes, behaviours, norms and values, personal responsibilities as well as human resources features such as training and development
Guldenmund (2000)	Aspects of the organisational culture which will impact on attitudes and behaviour related to increasing or decreasing risk
Cooper (2000)	the product of multiple goal-directed interactions between people (psychological), jobs (behavioural) and the organisation (situational); while safety culture is 'that observable degree of effort by which all organisational members directs their attention and actions toward improving safety on a daily basis
Mohamed (2003)	A sub facet of organisational culture, which affects workers' attitudes and behaviour in relation to an organisation's on-going safety performance
Richter and Koch (2004)	Shared and learned meanings, experiences and interpretations of work and safety - expressed partially symbolically - which guide people's actions towards risk, accidents and prevention
Fang <i>et al.</i> (2006)	A set of prevailing indicators, beliefs and values that the organisation owns in safety
National Institute for Occupational Safety and Health (NIOSH) (2008)	Underlying organisational principles, norms, commitments and values related to the operation of safety and health, as well as its importance compared with other workplace goals.

Most of the definitions are relatively similar in the beliefs perspective, with each focusing, to varying degrees, on the way people think and behave in relation to safety. The definitions (see Table 1) adopted by Hale (2000), Glendon and Stanton (2000) and Cooper (2000) are the most practical, as they clearly outline the contents of safety culture. As explained in above, safety culture is about the way of managing the safety in the workplace and it is a combination of safety attitudes, beliefs, perceptions and values that employees share in relation to safety, safety behaviours and organisational environment, systems and procedures in relation to safety. Many researchers have been illustrated key elements to be considered when strengthening the safety culture. In this context, next section explores the elements of safety culture.

3.2. ELEMENTS OF SAFETY CULTURE

The concept of safety culture has been studied by many researchers from different perspectives. These perspectives include psychology-oriented approach and the engineering-based approach (Antonsen, 2009). The researchers who have defined the safety culture from *psychological approach*, mentioned that safety culture consist with psychological elements such as values, beliefs and perception and attitudes towards safety. For an example, the definition by Cox and Cox (1991) stated that safety culture reflects attitudes, beliefs, perceptions and values that employees share in relation to safety. The psychological aspects state how employees think and feel about safety and it is usually about winning over people's heart and minds. In *engineering approach*, researchers highlights the formal and managerial aspects such

as management systems (Dissanayake and Fernando, 2014); procedures such as external and internal reporting procedures (Piers *et al.*, 2009; Gilbert *et al.*, 2012); policies (MacDonald *et al.*, 2000 cited Sukadarin *et al.*, 2012) and control systems safety evaluation, safety communication (Piers *et al.*, 2009; Dissanayake and Fernando, 2014) etc. as key elements of the safety culture.

When it comes to the study by Cooper (2000), he divided the safety culture into three elements which includes behavioural aspects in addition to the psychological and managerial aspects explained in above. Behavioural aspects discuss about what employees do in regards to safety and it includes their day-today activities towards safety in their working environment. This includes aspects such as Leadership (Reason, 1998); Supervisor subordinate relationship (Dissanayake and Fernando, 2014); Job satisfaction, Adequate equipments and its condition (Sawach *et al.*, 1999); Workmate’s influence, Awareness - Safety training, Safety knowledge and Competency (Nishgaki, 1994; Garza, 1988; Davies and Tomasin, 1999; Sukadarin *et al.*, 2012); Personal responsibilities and Adaptability (Piers *et al.*, 2009). Psychological and Behavioural aspects directly link with human factors. The organisational/managerial aspects cover the safety management systems that a company uses to set the guidelines for what people should do in various circumstances. Though organisational aspects directly discuss about ‘what the organization has’, it indirectly links with human factors as organisational aspects guide people on what they ‘should’ do in relation to safety. The Figure 1 depicts the all the psychological, behavioural and organizational aspects discussed in above.

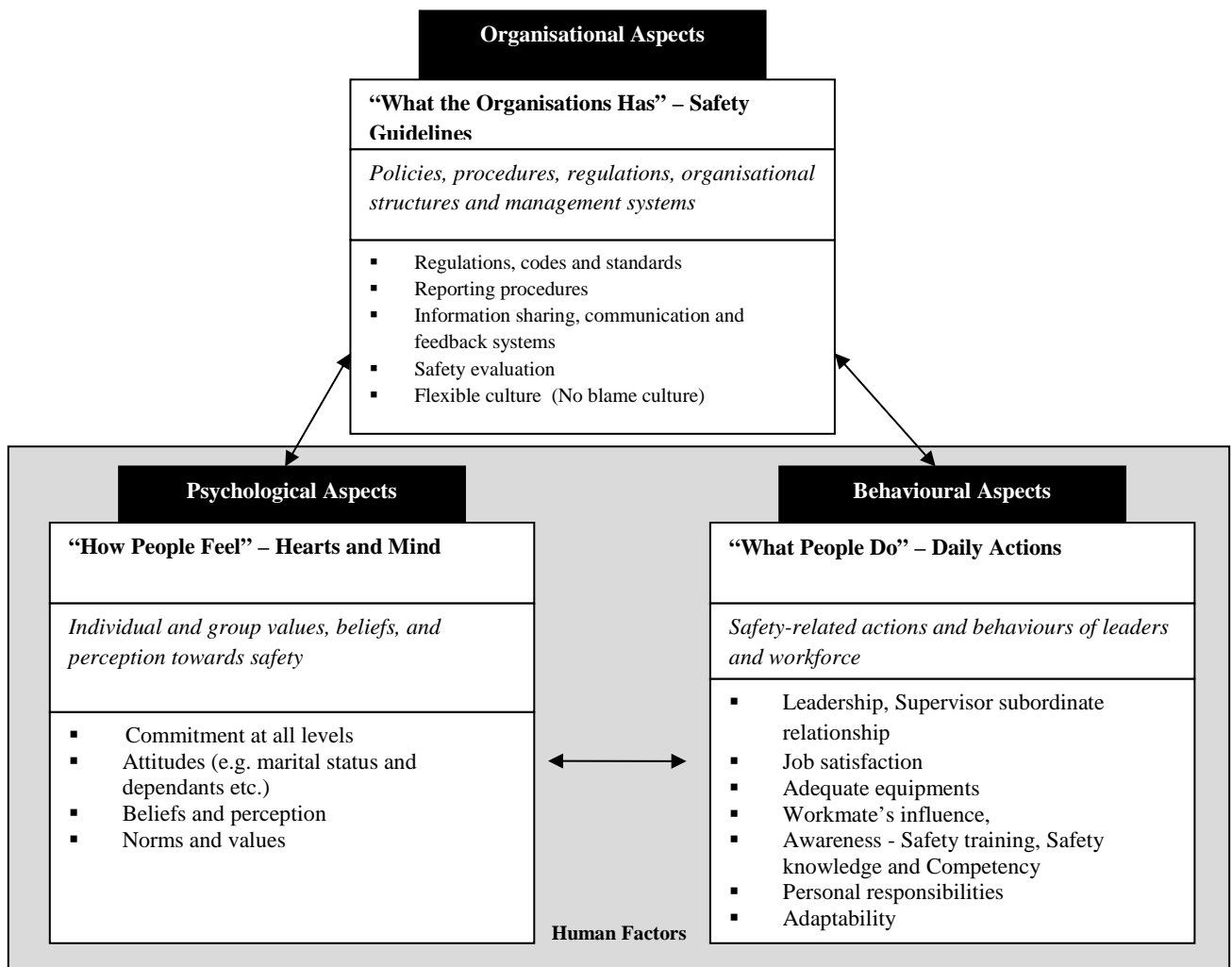


Figure 1: Elements of safety culture

4. SAFETY CULTURE IN RAW RUBBER PROCESSING SECTOR

This section basically discuss about the nature of raw rubber processing sector in terms of health and safety and cause analysis for failings related to safety culture in raw rubber processing sector.

4.1. RAW RUBBER PROCESSING SECTOR

Considering about the rubber manufacturing sector, the history of Sri Lanka's rubber industry began way back in 1876 with the planting of rubber trees while took place in Henerathgoda (Rubber Development Department of Sri Lanka, 2015). While the latex coming out from the rubber tree it is used in the manufacture of various rubber products. The rubber industry generates employment as well as rubber continues to be the second most import plantation crop in the nation and contributes nearly US\$ 600 million in exports (Horana Plantation PLC, 2013).

Producing natural rubber requires obtaining the latex sap from trees, and flattens it into sheets. To make the sheets, workers blend latex from various sources and sometimes mix it with water and coagulants. Then the latex is passed through grooved rollers to produce sheets of rubber that are allowed to dry to produce latex sheets of rubber that are easy to transport and transform into rubber products. On small rubber plantations, these sheets are visually inspected where in larger operations, they are tested technically. After imperfections are removed, the sheets are baled together with talc in between to keep them from sticking to each other. Block rubber goes through the same initial stages, but is chopped up and pressed into bales (Barksdale, 2013; Dontigney, 2014). As per Horana Plantationa PLC (2013), Sri Lankan rubber plantations produce high quality natural latex processed products, primarily constituting of Sheet Rubber, Crepe Rubber and TSR (Technically Specified Rubber). Crepe rubber is manufactured using a process of coagulation that creates a crinkled rubber texture. The process involves combing coagulated latex with some natural form of coagulum. The combined material is further processed through large rollers that are known as crepers (Horana Rubber Plantation PLC, 2013; Wikipedia, 2014). Crepe rubber is most often used for manufacture of shoe soles and rubber boots and gloves. Sheet rubber is one of the oldest and still most popular type processed latex products. As stated by Rubber Development Department of Sri Lanka (2015), there are two board types of sheet rubber are produced and marketed in Sri Lanka, namely the Ribbed Smoked Sheets (RSS) and the Air Dried Sheets (ADS). Among these two types, a ribbed smoked sheet is the most popular and is available for volume consumption. Ribbed smoked sheets consist of deliberately coagulated rubber sheets, dried using smoke. Ribbed smoked sheets are mainly used in automobile tyre manufacturing or when extra tough rubber is needed. Air Dried Sheets look like Ribbed smoked sheets, but it tends to be more transparent than due to it being processed in smokeless environment. Air dried sheets are widely used in Coloured Rubber Products (Horana Rubber Plantation PLC, 2013) Technically specified rubber is a newer form of grading rubber that has become popular in the past 30 years. This process grades rubber using technical specifications instead of visual identification (Horana Rubber Plantation PLC, 2013; Rubber Development Department of Sri Lanka, 2015).

As revealed by Yogaratnam (2010), many mechanical and chemical hazards exist in the plantations and raw rubber processing where a large number of unskilled and semi-skilled workers are employed. The next section discuss about the causes for failings related to safety culture in raw rubber processing sector.

4.2. CAUSE ANALYSIS FOR FAILINGS RELATED TO SAFETY CULTURE IN RAW RUBBER RAW RUBBER PROCESSING

The raw rubber processing sector as a heavy industry, it poses a number of health and safety risks to workers employed in that sector (Department of Census and Statistics, 2013). As an overall, the cause analysis for failings related to safety culture in raw rubber processing sector are varied and far reaching; with each issue coming into play at one critical point in time. As stated by Yogaratnam (2010), since a large number of unskilled and semi-skilled workers are employed in the raw rubber processing, many mechanical and chemical hazards exist. Not only that but also management and worker ignorance, negligent use of chemicals and pest and weed controlling and rubber products manufacturing chemicals, bad work practices, communication issues, prioritising cost-cutting and production above safety and poor

competency of managers in risk/hazard management lead to create many serious accidents and hazards where about 15 percent of the total poisonings and deaths in Sri Lanka reported due to occupational accidents (Yogarathnam, 2010). Further, it causes a number of health and safety risks to workers employed in that sector. The main risks posed are from unguarded machinery in the factory and also many mechanical (i.e., rolls and centrifuges) and chemical hazards are exist in raw rubber processing which require strict safety controls and appropriate safety precautions during installation, use and maintenance, including attention to machine guarding (Alan, 2011). Since large quantities of chemicals are used as fertilizers and pesticides, many accidents have taken place among the workers, who are mainly estate labourers (Yogarathnam (2010). Alan (2011) further highlights that proper concentration should be paid to the working area to slips, trips and falls. Employees should receive training in safe work practices and above findings highlight the lack of training on safe work practices. Generally, raw rubber processing involves mixtures of various chemicals which use to heat, pressure, and catalytic action during a variety of manufacturing processes. As a result, the work environment may be contaminated with dusts, gases, vapours, fumes, and chemical by products present (Centre for Disease Control and Prevention, 1993; Thompsons Solicitors, 2013). Therefore workers may be exposed to these hazards through inhalation and skin absorption during rubber processing and product manufacturing.

The critical analysis of causes for failings related to safety culture in raw rubber processing sector show that said sector has been highlighted as having a higher rate of accidents than other similar industries. Simply, workers in this sector also having a high risk of being injured as a result of the type of work they do. Most of the weaknesses mentioned in above are related with '*Human factors: How people feel (Heart and Mind)*', '*What people do (Daily Action)*'. Thus, developing of human capacities such as attitudes, behaviours, skills and knowledge etc. on this perspective will be an effective tool in addressing those failures and strengthening the safety culture in manufacturing environment will ensure the long term business continuity together with protection of employees, customers and properties. This is further emphasized by Vecchio-Sudus and Griffiths (2004) as changing attitudes and behaviours of management and employees, ensuring their involvement and providing required training and seminars for them help to strengthen and further promote a safety culture. The next Section discusses about human capacity building and its importance in relation to strengthen safety culture in raw rubber processing activity.

5. HUMAN CAPACITY BUILDING AND ITS IMPORTANCE TO STRENGTHEN THE SAFETY CULTURE IN RAW RUBBER PROCESSING SECTOR

Viewing human resources as human capital and beyond, the study argues that without human resources nothing can be accomplished, and without well-trained, well-developed, well-appreciated, and well-managed human resources, organizations can not establish the strong safety culture within it. As discussed in previous section, strengthening of the safety culture is about working with human of the organisation to change their attitudes, behaviours etc to improve to improve their situational awareness. Simply, it is to build their capacity towards strengthening the safety culture. The key words or concepts of capacity building with respect to the human aspects used in this section require some explanations.

According to Chapagain (2004, p.15), "capacity building is an approach to develop one's own potentiality in order to enhance his/her performance or output". He further stated that it is a response to the multi-dimensional such as organisational, intellectual, social, political, cultural, physical, financial etc. processes of change to bring intended outcome. The study by Farazmand, (2004) views capacity buildings mainly as an internal, local or domestic matter, where it directly relates to sustainable development and enhancement. Therefore, it is clear that the concept of capacity building is an essential component in development theory and practice, especially among various global, international and national originations such as World Bank, international donor agencies and civil societies (Pieterse and Donk, 2002). UNESCO (2006, p1), defines capacity building as 'process by which individuals, groups, organisations, institutions and societies increase their ability to perform (a) core functions, solve problems, define and achieve objectives and (b) understand and deal with development needs in a broad context and in a sustainable manner', adding that the focus of capacity building has changed from individual training to integration of individual capacities to institutions and systems. All these definitions and views on capacity building emphasise that capacity building is not a separate entity isolated from

organisation's vision and mission. Chapagain (2004) further stated that it is always associated with day to day action to fulfil organisation's vision and mission. It provides an opportunity to understand strengths, weaknesses, threats and opportunities towards a resilient future through identification of broader issues around sustainable development of a particular programme, project or process, including unique cultural, social and ecological characteristics (Boyd and Juhola, 2009). Thus, levels of capacity building vary based on discipline and on the context within which it is applied, whilst activities and interventions may occur within and across capacity building levels/ dimensions.

Human resource development (individual and team), organisational development (organizations and relationships) and institutional and legal framework development are the three most important, linked levels or components of capacity building (Franks, 1999; Low *et al.*, 2001; UNESCO, 2006). Organisational development addresses elaboration of management structures, processes and procedures within organisations and maintaining relationships with other organisations and sectors, such as public, private and community (Low *et al.*, 2001; LaFord *et al.*, 2002; UNESCO 2006). Aspects related to institutional and legal framework development include legal and regulatory changes to enable organisations, institutions and agencies at all levels, in all sectors, to enhance their capacities (Low *et al.*, 2001; UNESCO, 2006). Considering about the human resource development, it is the process of equipping individuals with understanding, skills and access to information, knowledge and training, enabling effective performance (Low *et al.*, 2001; LaFord *et al.*, 2002; UNESCO 2006).

In this study, capacity building is aimed towards capacitating the human resources (Human resource development) to become reflective practitioners where they able to strengthen the safety culture of raw rubber processing sector. Human capacity building in this study is therefore, refers to building and enhancing a cadre of highly qualified, highly able, and highly motivated human resources at all levels with required skills, knowledge and capabilities to strengthen the safety culture raw rubber processing sector. Such a capability enables organisation to not only cope with and manage ongoing current challenges of safety culture but also to act well beyond by performing through anticipation, effective visions, proactive knowledge and skills, and self-corrective organizational behaviour. As stated by Eade and Williams (1995 cited in Eade, 1997, p.23), "strengthening the human capacity to determine their own values, and priorities and to organise themselves to act on these, is the basis of development". Having identified the human capacity building as an important approach to strengthen the safety culture in raw rubber processing sector, next sections discuss how human capacity would be developed.

5.1. EXPECTED CAPACITY LEVELS: ASSESSING SAFETY CULTURE

Capacity gaps in this study show the differences between expected capacity levels and current level or else areas to be improved in order to move from its current safety culture maturity level to its desired future state or next safety culture maturity levels. Identification of desired capacity levels in terms of safety is an important task to be done at the early stage of the study. Accordingly, expected capacity levels in terms of safety culture was developed based on the literature discussed in Section 3.2 as elements of safety culture describe how the safety culture is comprised of and what sort of characteristics should be there to be a strong safety culture. Also, Fleming (2001) argues that an organisation's or installation's level of maturity is determined on the basis of their maturity on these elements. However, these elements (refer Figure 1) are at a fairly high level where they need to be expressed in more measurable terms. These are called as benchmark or indicators of expected capacity level in terms of safety. Each of these elements of safety culture is expressed in several safety culture indicators or as expected capacity levels in terms of safety as shown in Table 2.

Table 2: Expected capacity levels: Safety culture assessment

Element	Expected capacity levels	Author/year
Psychological Aspects		
Management concern	<ul style="list-style-type: none"> ▪ Management's decision making with respect to safety ▪ Management's provision of adequate resources ▪ Developing safety policies ▪ Assigning safety responsibilities to personnel ▪ Importance of safety meeting 	Cooper (2000) Piers et al. (2009) Sukadarin et al. (2012) Piyadarshani et al. (2013)
Perception of importance of safety (Values/ beliefs/ perceptions)	<ul style="list-style-type: none"> ▪ Importance of safety issues ▪ Employees' concern for safety ▪ Importance of safety for business continuity 	Piers et al. (2009) Sukadarin et al. (2012) Piyadarshani et al. (2013)
Prioritization of safety (Values/ beliefs/ perceptions)	<ul style="list-style-type: none"> ▪ Priority of safety over profit and performance ▪ Investment of money and effort to improve safety 	Sukadarin et al. (2012) Mills (2001)
Behavioural Aspects		
Employee behaviour with respect to safety	<ul style="list-style-type: none"> ▪ Prevention of accidents and incidents by employees/ Attention to safety protection by workers ▪ Unnecessary risk taking ▪ Maintaining close supervision of workers 	Cheng et al. (2004) Jannadi (1996)
Job satisfaction	<ul style="list-style-type: none"> ▪ Appreciation of work ▪ Acquirement of colleagues' respect by safe record 	Molenaar et al. (2009).
Adequate equipment	<ul style="list-style-type: none"> ▪ Access to equipment ▪ Condition of equipment 	Sawacha et al. (1999)
Safety training	<p>Awareness of job induced risk</p> <ul style="list-style-type: none"> ▪ Awareness by management and employees of own risk on the job ▪ Awareness by management and employees of others' risk induced by the job <p>Educating workers and supervisors in developing good safety habits</p> <p>Emergency training</p>	Garza (1988) Nishgaki (1994) Jannadi (1996) Davies and Tomasin (1999)
Adaptability	<p>Pro-activity to prevent occurrences</p> <ul style="list-style-type: none"> ▪ Occurrences not the only input for safety improvement ▪ Autonomous searching of safety issues by employees <p>Actions with respect to occurrences</p> <ul style="list-style-type: none"> ▪ Actions upon reporting safety issues, incidents or accidents ▪ Follow-up of the improvements implemented <p>Employee input</p> <ul style="list-style-type: none"> ▪ Encouragement of employees to suggest improvements ▪ Assignment of right persons to solve problems 	Piers et al. (2009)
Organisational Aspects		
Regulations, codes and standards	Establishing safety management system with adherence to legislation codes and standard	Piyadarshani et al. (2013)
Reporting procedures	<p>Safety issues reporting system</p> <ul style="list-style-type: none"> ▪ Perception of importance of safety issues reporting system ▪ Encouragement to report safety issues <p>Willingness to use the reporting system</p> <ul style="list-style-type: none"> ▪ Willingness to report minor incidents ▪ Possibility for anonymous reporting <p>Consequences of safety reports</p> <ul style="list-style-type: none"> ▪ Appreciation of employees reporting safety issues ▪ Satisfaction with the way safety reports are dealt with 	Piers et al. (2009) Gilbert et al. (2012)
Safety evaluation	<p>Perception of evaluation</p> <ul style="list-style-type: none"> ▪ Fair judgment after safety occurrences 	Piers et al. (2009)

	<ul style="list-style-type: none"> ▪ Clarity of evaluation system Evaluation of safety related behaviours <ul style="list-style-type: none"> ▪ Clear distinction between acceptable and unacceptable behaviour ▪ Consequences of reporting safety issue Passing of responsibility <ul style="list-style-type: none"> ▪ Acknowledgement of own errors by management ▪ Looking for scapegoat after safety occurrences 	
Information sharing, communication and feedback systems	Availability of information <ul style="list-style-type: none"> ▪ Availability of work related information ▪ Clarity of instructions Communication of work related information <ul style="list-style-type: none"> ▪ Communication between different teams/units ▪ Clarity about who shall communicate which work related information to whom Communication of safety related information <ul style="list-style-type: none"> ▪ Communication of safety issues to all employees ▪ Information of employees of changes affecting safety ▪ Conducting safety meetings for supervisors Information exchange about safety issues <ul style="list-style-type: none"> ▪ Talking about safety issues amongst employees ▪ Review of events 	Piers <i>et al.</i> (2009) Molenaar <i>et al.</i> (2009) Hinze and Rabound (1998)

6. CAPACITY BUILDING APPROACHES TO SAFETY

Crisp *et al.* (2000), discuss two approaches of a top-down organisational approach and bottom-up organisational approach to capacity building. Emphasis in a top-down organisational approach is placed on policies or practices. Generally, senior management develops a top-down driven strategy on safety as part of an organisation's overall strategy for business or other mission. Safety management system is one of the key aspects, which includes safety performance measurement - both proactive and reactive, risk assessment and control, Human Resource Management (HRM) and safety culture (Glendon and Stanton, 2000). Safety culture comprises attitudes, behaviours, norms and values, personal responsibilities as well as such HR features as training and development. These factors contribute to human interventions.

This is common approach used by many of the organisations to establish safety within their workplace. However, safety and health in the raw rubber processing sector has been a neglected subject, though this sector is still a major foreign exchange contributor to the national economy in Sri Lanka. The literature findings further revealed that majority of health and safety issues have arisen due to human aspect (refer Section 4.2). Therefore, it requires analysis of these human behaviours to identify human development areas and develops their capacities accordingly to tackle this problem. Simply, it requires an operational approach. A bottom-up organisational approach can be used on this perspective as it is an operational approach where it addresses provision of skills, knowledge to staff and capacity building of workers and managers to proactively remediate issues (David, 2013). Further, as stated by Crisp *et al.* (2000), a bottom-up organisational approach is mainly focused on organisational and human capacity building. In this context, the bottom-up approach is used as an overall human capacity building approach with its immense scope (refer Section 6).

7. DEVELOPING THE CONCEPTUAL FRAMEWORK

By incorporating the main concepts discussed in above sections; elements of safety culture, human capacity building approaches and their relationships, the conceptual framework pertaining to this study is drafted as shown in Figure 2.

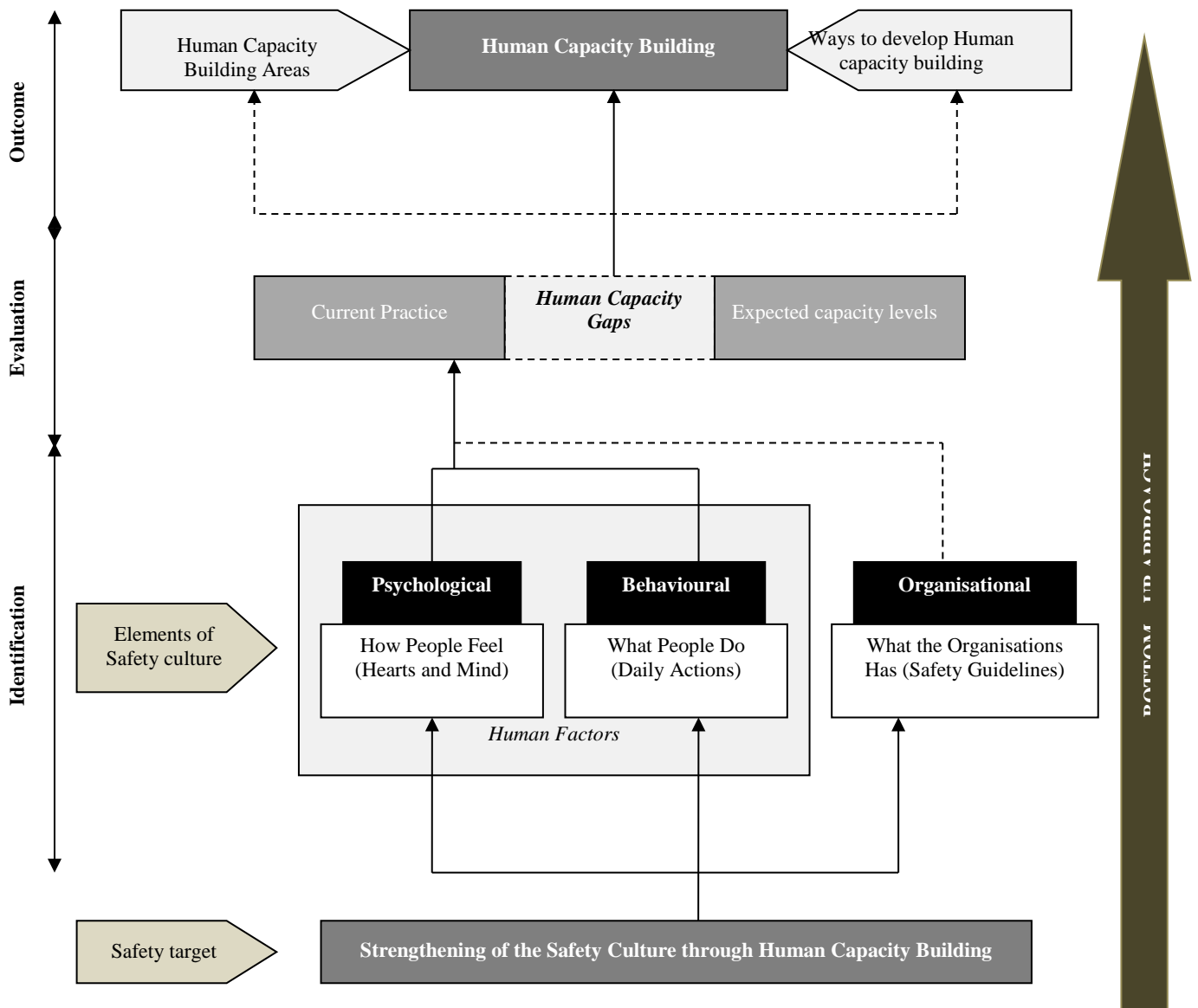


Figure 2: Conceptual Framework

Building and sustaining capacity requires organizational capacity as well as the expertise of individuals (Grisso *et al.*, 1995; Rist, 1995). As stated by Glendon and Stanton (2000), in a bottom up approach the driver may be a safety target or specific objective, such as accident prevention. In this study, it would be the 'strengthening the safety culture'. Safety culture comprises with three elements namely; organisational, behavioural and psychological factors as discussed in Section 3.2. In order to understand better how human interaction with tasks might lead to failings related to safety culture, both behavioural and psychological aspects should be analysed. However, organisational aspects cannot be neglected at this level as it influence on human aspects and it guides human on what they 'should' do in relation to safety. The identification of human failings will also help to identify human capacity gaps. Then, respective personnel should identify human capacity building areas that might have prevented the human error, or which could be implemented to prevent or reduce the likelihood of that error, are indicated. Simply, they should identify steps need to be taken in order to move from its current safety culture maturity level to its desired, future state or next safety culture maturity levels. These could be further training or changes to existing training, changes in procedures, changes in management or organisational policy.

8. CONCLUSIONS AND WAY FORWARD

This literature review aimed at developing a conceptual framework for strengthening the safety culture in raw rubber processing activity through human capacity building by bringing in literal arguments. Since health and safety concerns in raw rubber processing environment have always been and continue to be of the utmost importance, creating a positive safety culture is very important. Research findings revealed that creating a strong safety culture is about more than removing hazards and institutionalizing safety procedures. It is about working with people of the organisation to change their attitudes, behaviours and thoughts, and improve their situational awareness within the dynamics of today's world. Also, literature findings disclosed that safety culture is mainly focus on the way people think and behave. Therefore, this highlights the importance of developing of human capacity in strengthening safety culture.

A conceptual framework developed at the end of the literature review will be for strengthening the safety culture in raw rubber processing activity through human capacity building (refer Figure 2). Further, research proposed related this work could be developing methodological frameworks to gather empirical findings to test the validity of the conceptual framework.

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