

PETRONAS TECHNICAL STANDARDS

HEALTH, SAFETY AND ENVIRONMENT

BEHAVIOURAL SAFETY (GUIDELINE)

PTS 60.2111

FEBRUARY 2007



1. PREFACE

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2. INTRODUCTION

2.1 Objectives of the PTS Behavioural Safety Guideline

This PTS regarding Behavioural Safety has been written to:

- Provide a guideline and framework for the application of Behavioural Safety principles, approaches, and processes at PETRONAS' Holding Company Units / Operating Units (HCU / OPU).
- Provide a reference for HCU / OPU's management in the implementation and sustainability of a Behavioural Safety program.
- Show how Behavioural Safety integrates with other components of the PETRONAS Health, Safety and Environmental Management System (HSE MS).

This PTS should be used as a source document by all personnel who have responsibility for developing, implementing and sustaining such program. It can serve as a guide for those in charge of budgeting for the financial and human resources of a Behavioural Safety program.

This PTS is not intended as a static set of rules, but as a set of guidelines which are likely to evolve over time. Users are invited to comment on the PTS to the PETRONAS Corporate HSE department and to suggest changes or add additional material which they consider would be useful for inclusion in future revisions.

The reader should take note on the Implementation Strategies mentioned in Chapter 6 which reinforces the principles that each OPU should develop and maintain their own Behavioural Safety program. Any Behavioural Safety program should not be implemented as a "one shoe fits all" program, but rather as a customised program to suit the principles stated in this guideline as well as the conditions / circumstances of the OPU.

2.2 PETRONAS HSE Policy

The PETRONAS policy on Health, Safety and Environment (HSE) states that:

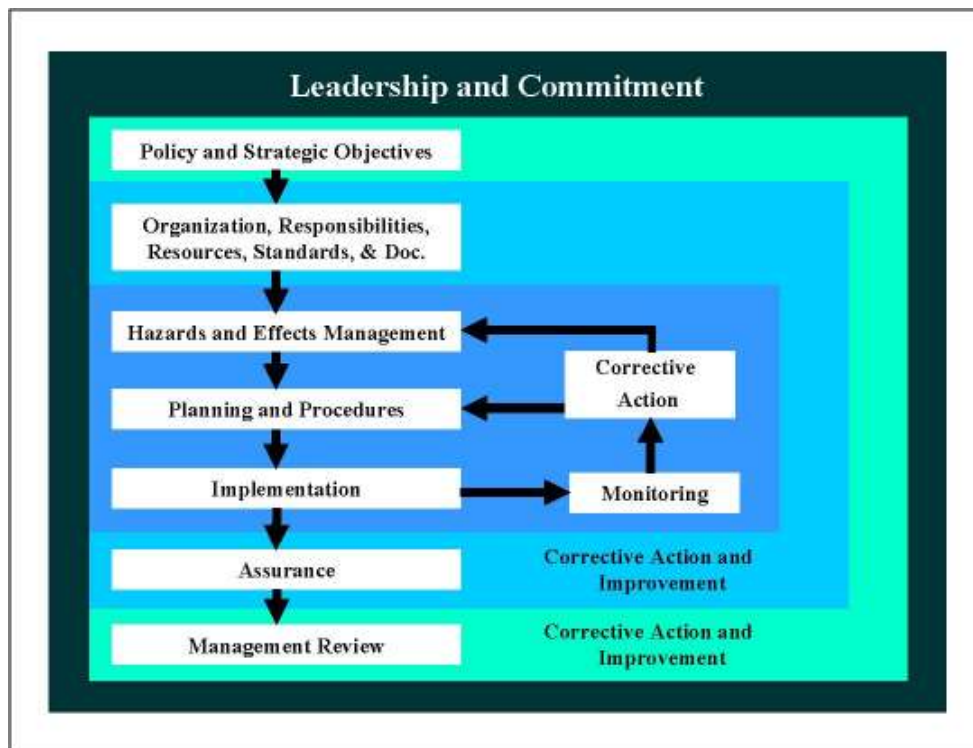
- PETRONAS is committed to Health, Safety and Environment excellence in all its activities wherever it operates.
- PETRONAS shall take reasonable and practicable steps to prevent and eliminate the risk of injuries, occupational illnesses and damage to properties.
- PETRONAS shall take proactive steps towards conservation of the environment.
- PETRONAS shall ensure that the facilities it designs, builds and operates, the products it manufactures and the services it provides are in accordance with appropriate legal requirements and industry best practices.
- PETRONAS shall provide the necessary resources and organisation, and where appropriate, engage with key stakeholders on relevant Health, Safety and Environment matters.

- PETRONAS shall ensure that contingency plans are in place to deal with emergencies.
- PETRONAS shall ensure continual improvement in its Health, Safety and Environment management and performance, leveraging on people, process and technology.
- PETRONAS requires all its employees and contractors to strictly adhere to this policy at all times.

The Behavioural Safety program addresses, either directly or indirectly, each item of the HSE policy, and as such, plays a significant supportive role in ensuring that this policy is practised by all OPU's in PETRONAS.

2.3 Link to the PETRONAS HSE Management System

This PTS has been designed and written so as to link back and support the higher level document; the PETRONAS Health, Safety and Environment MS (PTS 60.0101 : HSE MS). The table below illustrates the elements of The PETRONAS HSE MS and their interactions.



Due to the nature of Behavioural Safety, this program will have a significant influence on most aspects of the PETRONAS HSE MS. This is because Behavioural Safety deals primarily with the HSE Culture, attitudes and behaviours of people at all levels in the organisation. As such it is likely to have an impact on all other aspects of the HSE MS which will be influenced by the HSE culture, attitudes and behaviours of management and employees.

For example, in Element 1 of the HSE MS, “**Leadership and Commitment**”, fulfilling certain roles and activities as leaders in the Behavioural Safety program management will provide the catalyst,

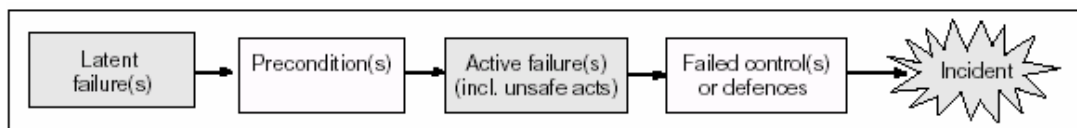
incentive and structure for leaders to accomplish their roles in line with this element. Eventual changes in the culture will require management to adjust their management style to suit and facilitate the changes in employees' attitudes and behaviours towards HSE.

Element 4 “**Hazard and Effects Management Process**” requires that a process of “Identifying, Assessing, Controlling and Recovery” of work should be applied to past, current and new activities, operations, products and services. The Behavioural Safety program provides a structure wherein current and future hazards and behavioural risks are identified, assessed and controlled by all employees on an ongoing basis. Behavioural Safety also provides an opportunity for the upgrading of employees skills in the identification, assessment and controlling of risks (risk competence).

The **Tripod Incident Causation Model** is broadly applied in PETRONAS. More specifically, the Tripod-BETA Incident Analysis investigation is utilised. This theory is based on the premise that accidents are nearly always events that have a number of causes. Active failures, e.g. unsafe acts, do not occur in isolation but are influenced by external factors - the preconditions. These factors themselves originate from failures elsewhere in the business - Latent Failures. Latent failures often originate in decisions or actions taken by planners, designers or managers remote in time and location from the front line of operations, where most accidents occur.

This is not an entirely new concept; other accident causation theories have identified 'immediate causes' and 'underlying causes' as accident elements. What Tripod does is to connect these causes to show that latent failures can actually encourage active failures as well as magnify their consequences.

The Tripod causation model:

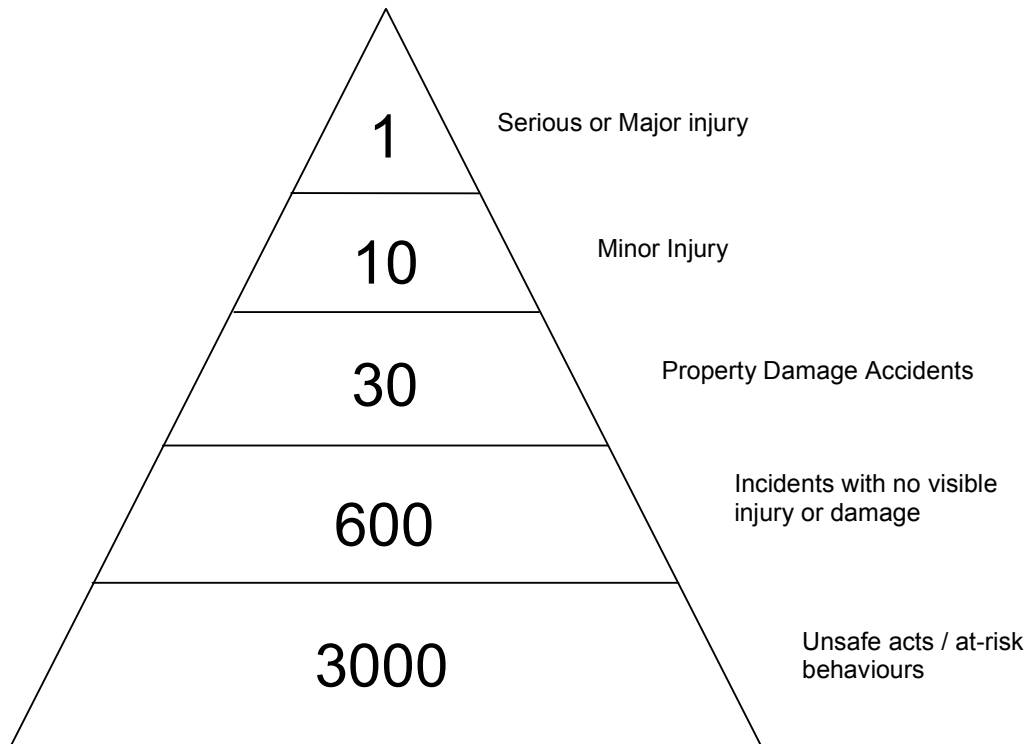


All identified failures should be addressed, but addressing the active failures may only have a localised effect. Latent failures have a more widespread influence on the safety of an operation. Measures to prevent latent failures are likely to have the greatest impact in accident prevention.

The broader Behavioural Safety program (incorporating both Behavioural and Cognitive approaches – see Chapter 5 for details in this regard) focuses specifically on reducing the Latent and Active failures, especially as they relate to behaviours. Behavioural Safety looks beyond active behaviours, and provides two sources of information which deals with the latent failures:

- What is the underlying reason for the behaviours – this assists in determining the latent failures.
- What the trends are in unsafe acts which will assist in determining the latent failures.

The “triangle” or “pyramid” view of accident causation (using the empirical research of Frank Bird in 1969) asserts that there is a ratio of 1:10:30:600 as regards the level of seriousness of accidents / incidents. This has been expanded by some to include a fifth level of “unsafe acts or at-risk behaviours”, demonstrating that if we can reduce the unsafe acts or behaviours, we can reduce the number of injuries and property damages.



The diagram above illustrates the relationship between behaviours and incidents / accidents. Behaviours are leading indicators of incidents / accidents and thus proactively we should address them in order to improve and enhance the HSE Culture of the organisation.

AMENDMENT RECORD SHEET

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4. BEHAVIOURAL SAFETY

4.1 Objective of Behavioural Safety

In simple terms, the overall objective of a Behavioural Safety program is to reduce the level of risk exposure of the operation by focussing on the attitudes and behaviours or acts of all employees, and creating a more positive HSE culture.

There are however a number of specific areas of focus when defining Behavioural Safety and the objectives of the Behavioural Safety program.

Behavioural Safety (Behavioural Safety) and Behaviour Based Safety (BBS) - these are two different concepts, and caution should be applied when using these concepts.

Behavioural Safety can be defined as the group of activities and processes designed to address the behaviours as they relate to HSE. This includes those processes which would follow both the behaviourist and cognitive approach to behavioural motivation or change (see Chapter 5 for more details on approaches).

Behaviour Based Safety (BBS) is a narrower approach that focuses primarily on the behaviourists approach to behavioural change. This is supported by E. Scott Geller who states that the behaviour based approach starts by identifying observable behaviours targeted for change and the environmental conditions that can be manipulated to influence the target behaviour(s) in desired directions.

At PETRONAS, the broader concept of Behavioural Safety is to be applied.

A more specific objective of Behavioural Safety is to focus on what is the means by which a lower level of risk exposure can be achieved. Behavioural Safety works from the premise that a more positive HSE Culture will create a safer work environment, and therefore reduce the overall risk exposure.

The **HSE culture** is the aggregate or collection of beliefs, values, attitudes and behaviours regarding safety, health and environment held by all in the organisation. It is how employees perceive the way things are and should be done and extends beyond the physical arrangements for HSE, such as HSE systems, procedures, visions, goals and policy statements. It happens informally in the smallest work team, out of the view of the managers and the supervisors. Changing the culture therefore means changing the mindset of employees, which in turn means changing the behaviours of the employees and management.

This cultural (mindset and behavioural) change seeks to have a workforce that:

- Will want to work safely (be motivated)
- Will know how to work safely (be skilled to do so)
- Will believe it is possible to work safely (be convinced)
- Will see and judge risks competently (have risk skills)

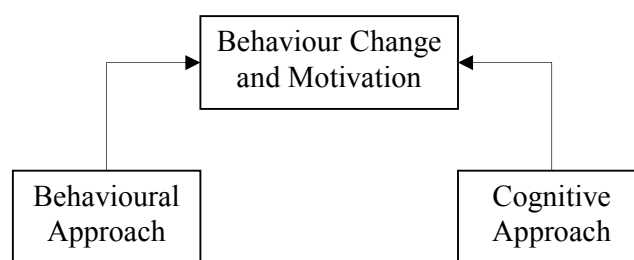
In many respects, this requires a fundamental shift of paradigms from the traditional approach of managing HSE which involves the following:

- To move from a prescriptive, highly regulated to a self regulatory regime
- From failure orientated to achievement orientated
- From outcome focussed to behaviour focussed
- From top down control to bottom up involvement
- From rugged individualism to interdependent teamwork
- From a piecemeal to a systems approach
- From fault finding to fact finding
- From reactive to proactive
- From quick fix to continuous improvement
- From safety as a priority to safety as a value

5. BEHAVIOURAL SAFETY PRINCIPLES

5.1 Behavioural Change and Motivation

There are a number of theories and approaches on how to best create a more positive HSE culture and thus a safer work environment. Most of these can be placed into one of two fundamental approaches to changing and / or motivating behaviour i.e. The Behavioural Approach and the Cognitive Approach.



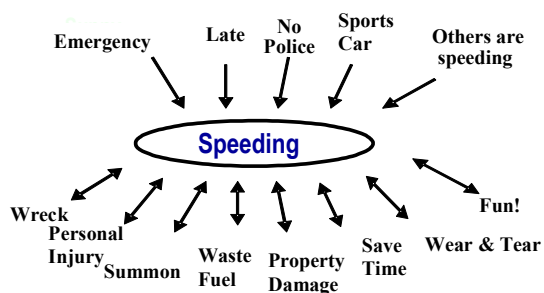
The Behavioural Approach in essence focuses on changing the behaviour, and thereby over a period of time, supporting people to think differently. This approach based primarily on B.F. Skinner's research, suggests that if we target the behaviour and manipulate the environmental conditions that precede and / or follow the behaviour, we can achieve the desired behavioural change. This approach argues that behaviours can be objectively measured and this is the simpler and the most efficient manner to change behaviours.

The ABC Model below is typically applied in this approach. In this example, the targeted behaviour (B) is speeding. The Antecedents / Activators (A) are those conditions or circumstances that direct the behaviour and influence what the behaviour will be. The resulting Consequences (C), whether positive or negative, will influence whether there is likely to be a repetition of the behaviour or not.

**Activators /
Antecedents**
Guide or direct behaviour

Behaviours
Observable actions

Consequences
*Motivate the future
occurrence of the behaviour*



The Cognitive Approach on the other hand believes that a sustainable change and motivation of behaviour can only be achieved if we address the fundamental cognitive processes (of the mind) of people. This approach highlights the complexity of people's ultimate behaviour. Attitudes are a primary driver of behaviour. To achieve effective change these attitudes (and values and beliefs) need to be addressed. This is best done by increasing the level of understanding, through proper dialogue, and training.

Risk Competence plays a significant role in this approach. The approach believes that no workplace can ever be made risk-free. Therefore, the focus should be that employees become competent to identify and assess / analyse risks and act appropriately. This approach specifically targets the complacency factor, which is a natural result if people perceive their work environments and procedures to be 'safe'.

It is important to note that the most effective Behavioural Safety programs combine both approaches to achieve the desired behavioural change. OPU should ensure that no single approach is overly applied, although it will from time to time be necessary to rely more on one approach than the other, depending on the circumstance (see further discussion in chapter 6's Factors Affecting the Implementation Strategy).

5.2 Principles Associated with Behavioural Safety

While OPU are encouraged to customise their own Behavioural Safety programs to suit their specific business and operational needs, there are a number of fundamental principles that should be applied with any Behavioural Safety program implemented in PETRONAS. The purpose of these principles is to guide those implementing the program to ensure there is a level of consistency.

Following is a list of these principles:

- To increase the levels of risk awareness and risk competence of all employees
- Behavioural Safety is a positive program
- Feedback and open / accurate communication regarding safety is encouraged
- Behavioural Safety is a "bottom-up" program (with management involvement and commitment)
- Wherever possible, minimise paperwork and keep the process simple.

5.3 Communication

The communication process represents an integral and pervasive "glue" for any Behavioural Safety program. By definition, the program seeks to elevate the level and effectiveness of communication about safety and risk-taking behaviours. It is through communication that employees at all levels openly and objectively discuss beliefs, attitudes and behaviours and in this manner mould the safety values that are practiced in the organization. At an informal level, the nature of the communications between employees about safety will be an indicator of the effectiveness of the Behavioural Safety program.

6. IMPLEMENTATION STRATEGIES

6.1 Introduction

While the actual content of the Behavioural Safety program plays a significant role in the ultimate effectiveness of the program, the implementation strategies will have an impact on the effectiveness of the program. Some aspects of the Behavioural Safety strategies are mentioned below:

6.1.1 Positive Approach

Behavioural Safety intends to move safety from a failure orientated discipline to an achievement orientated discipline. Behavioural Safety focuses on encouraging people to maintain and recognise safe behaviours. It works on the principle that people are more motivated by achieving success. Basically the paradigm shift should be from trying to catch people doing things wrong / unsafely to catching people doing things right / safely. While Behavioural Safety also looks at addressing at-risk behaviours, this is secondary to the principle of focussing on the positive. It however requires that there is accurate feedback of behaviour, thus promoting an open, transparent HSE Culture.

6.1.2 Flexibility

The Behavioural Safety program should fit the circumstances and character of the organisation. A technical standard is necessary and relevant to provide some fundamental guidelines regarding the principles and processes applied, but it is a requirement that the program is customised and specially adapted to suit the nature and conditions prevalent at the OPU at the time. This is necessary as the HSE Culture differs between the various OPUs. Accordingly the application of the Behavioural Safety program should be adjusted to suit the OPU's specific business and operational needs.

6.1.3 Quality vs. Quantity

The need for quality when applying Behavioural Safety processes is a contentious but an important one in the implementation of a Behavioural Safety program.

There is a school of thought proclaiming that it is more important to get people to simply apply the processes (e.g. Self Observations, Risk Assessments, Peer Observations etc.) so that they can become accustomed to the Behavioural Safety processes. The drive here is to get people to do as many as possible, as opposed to ensuring higher quality, but less, activities. This approach proclaims that while people are doing observations they change behaviours and habits and new attitudes are formed.

While this approach has some merit in the short term, the intention should be to change behaviours permanently and not allow people to be only "going through the motions". One could easily compromise one area of concern for another, rather than apply the concerted safety effort in all

areas, and do fewer observations properly all the time. The concern might already be present if the number of observations is Key Performance Indicator (KPI) linked. While focussing on the number of observations is an important measure, it is of little value in the medium to longer term if the quality is compromised.

6.2 Factors Affecting the Implementation Strategy

A number of factors should be considered when deciding on the implementation strategy. These factors will determine the level of complexity associated with the implementation. The lower the complexity, the easier and quicker the implementation is going to be. Conversely, the greater the complexity the greater is the challenge for the implementation to gain optimal effectiveness. It is recommended that a Behavioural Safety Specialist be retained to assist in determining the implementation strategy of the Behavioural Safety program. The factors affecting the implementation strategy are:



6.2.1 The Size of the Organisation – number of employees:

Larger organisations usually have a greater level of complexity in their organisation structure, which makes it more difficult to implement a Behavioural Safety program simultaneously across all departments. For this reason, it could be beneficial to apply a phased implementation of the Behavioural Safety program for various departments. As one department has successfully implemented the program, another department can start while utilising learning from the earlier department. Likewise, it could be beneficial to implement the various Behavioural Safety processes in a phased manner, starting with those processes which are deemed to be easier, and in so doing, increase comfort and confidence levels, and gradually implement the more complex processes.

6.2.2 Commodity Produced:

The variation of commodities produced and services provided under the PETRONAS banner ranges the entire spectrum of upstream, midstream and downstream activities. Depending on the nature of the commodity or service, varying cultures are likely to exist in the various industry groups, which will have an impact on the nature and timing of the implementation strategy.