

**ANALYSIS OF  
PETRONAS CARIGALI SDN BERHAD  
SARAWAK OPERATION (PCSB SKO) INJURIOUS  
ACCIDENTS**

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## ABSTRACT

ANALYSIS OF PETRONAS CARIGALI SDN BHD  
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Petronas Carigali Sdn Bhd Sarawak Operation and its contractors 1999 lost time injury frequency (LTIF) at 0.83 was considered better than the International Association of Oil and Gas Producer 1999 lost time injury frequency of 1.94. However the figure was higher if compared to other Malaysian oil and gas operators namely Sarawak Shell Berhad/Sabah Shell Petroleum Company and ESSO Production Malaysia Incorporated whose 1999 lost time injury frequencies were at 0.5 and 0.71 respectively. Petronas Carigali Sdn Bhd Sarawak Operation safety performance was affected by poor contractors safety performance.

The objectives of the analysis were to gauge effectiveness of the company and contractors Health, Safety and Environmental Management Systems (HSEMS), identify factors attributed to the injurious accidents and provide recommendations for improving the company overall HSE performance.



The method involved quantitative analysis of historical data of Petronas Carigali Sdn Bhd and its contractors' injurious accidents from 1996 to 1999. Frank E. Bird's incident ratio model was used as a comparison to gauge the effectiveness of the Health, Safety and Management Systems of company and contractors.

The finding of the analysis show that Petronas Carigali Sdn Bhd Sarawak Operation incident ratio was a reflection of the model Frank E. Bird's incident ratio and could be concluded that the company's Health, Safety and Environmental Management System (HSEMS) was effective (An audit carried out in 1999 show that the company was 74% compliance to its HSEMS). However contractors' incident ratio model was distorted with total recordable injury frequency of contractors higher than that of the company. Thus it can be deduced that the contractors HSEMS were ineffective.

The analysis highlighted that injurious accidents tend to happen at the initial period of work and after breaks. This demonstrated the importance of toolbox and pre-job meeting stressing hazards of the job and conditioning personnel to the allocated tasks. The numbers of injurious accidents tend to be high on weekends and peaked on Wednesday, indicating that personnel were off guard during the traditional rest period of Saturdays and Sundays. The increased in accidents on Wednesdays may be attributed to crew change schedule. However this cannot be confirmed due to lack of data on the crew change loading. The analysis disapproved the assumption that increase in activities resulted in increased number of accidents. Contractors' personnel were more prone to injurious accidents than company personnel.

Personnel subjected to injuries were mainly technicians and riggers<sup>1</sup> who were involved with lifting operations. The most common body parts injured were the hands, thumbs and fingers that totaled to 66% of overall injuries.

The recommendations made were for a compliance audit on company HSEMS. And an urgent training program on rigging and slinging for company and contractors' personnel. Lost time injuries incurred were mainly on rigging and slinging operations. It also stressed the importance of pre-job meeting and job hazard analyses which need to be carried out.

Further study is required on contractors' compliance to Occupational Safety and Health Act (OSHA), on the availability of Safety Policy and the presence of an organization and requirements to implement the Safety Policy.

#### Riggers<sup>1</sup>

Personnel who are involved with the physical manual work such as moving of equipment making use rig, winches and other lifting devices and the physical work in breaking of flanges and other manual operations, considered as a semi-skilled worker.

#### Wireline Crew<sup>2</sup>

Skilled personnel specially trained to work on well downhole subsurface equipment, and making use of steel slick line with tool attached at end of line operated by a hydraulic power pack.

# CHAPTER 1

## INTRODUCTION

### The Problem and its context

Petronas Carigali Sdn Bhd (PCSB) operations are governed by its Health, Safety Environment Management System (HSEMS). The company HSE objective is to achieve excellence in health, safety and environment in all aspects of its operations and to be an industry leader in HSE management and performance. The company HSE performance is measured using key performance indicator namely total lost time injury frequency (LTIF), total recordable injurious frequency (TRCF) and total injurious accident frequency (TIAF). Other indicators such as employee sickness index and marine pollution index are for health and environment matters

Table 1 shows PCSB Sarawak Operation and contractors safety performance (LTIF) from 1996 to 1999. PCSB Sarawak Operation safety performance has been commendable with no lost time injury incurred from 1996 to 1999. However contractors' safety performance has not shown any improvement from previous year. Contractor loss time injury frequency (LTIF) for 1999 was 1.82.

Table 1: PCSB SKO and contractors safety performance (LTIF).

Total Lost Time Injury Frequency (LTIF)	Year			
	1996	1997	1998	1999
PCSB SKO	0	0	0	0
Contractors	2.50	1.08	1.80	1.82

## Statement of the Problem

Petronas Carigali Sdn Bhd Sarawak Operation combined HSE performance is affected by poor contractors HSE performance. If left unchecked the combined HSE performance will deteriorate and affect its business operation. There is a need to understand the injurious accidents sustained by the company and contractors in order to improve the safety performance as a whole.

### Objectives

The objectives of carrying out analyses of the combined company and contractors injurious accidents are: -

- i. To check the effectiveness of PCSB Sarawak Operation and contractors HSE management systems.
- ii. To understand contributing factors attributed to injurious accidents, identify types of operations and categories of staff prone to injurious accidents.

## **Significance of study**

PCSB Sarawak Operations and contractors' HSE performances reporting are combined. As a prudent operator the company is accountable for its contractors HSE performance. Any incident that happens in company's facilities involving company or contractor personnel will have impact to PCSB Sarawak Operation either directly or indirectly. A poor HSE performance from the contractors will not only affect the company reputation and image but also its business. Failures in HSE performance are expensive, resulting in high operating cost, loss of revenue, tarnished image and lost business opportunities.

## **Assumptions**

The assumptions made on this analysis are:

- i. PCSB Sarawak Operation and its contractors reported all injurious accidents.
- ii. Same standard of assessments were made by the medical practitioners in the classification of injurious accident i.e. in determining first aids, medical treatment case, restricted work case or lost time injuries.

## Scope and Limitations

The analysis is only confined to injurious accidents sustained by company and contractors staff at work places either onshore or off-shore.

Anomalies in the information extracted from the monthly incident summary (Appendix A) were checked against incident investigation reports (Appendix B). These incident investigation reports were generated within twenty-four hours of accidents.

Other aspects of accidents on health, environment which do not result in injurious accidents are not analyzed. Similarly near misses and other non-injurious accidents are not analyzed but used in the report.

The injurious accident analysis is based on data compiled over four year period from 1996 to 1999.

## Petronas Carigali Sdn Bhd Sarawak Operation

### Background

PETRONAS Carigali Sdn Bhd (PCSB) is a wholly owned subsidiary of PETRONAS ((PETROLIAM NASIONAL BERHAD). The Company is incorporated on 11 May 1978. PCSB was formed to augment the exploration and development activities of foreign of oil companies and through its participation, to enhance the pace of development of the upstream sector in the country. The headquarters of PCSB is in Kuala Lumpur, where the Managing Director's office, Exploration Division, Development Division and the Commercial Division are located. In Malaysia PCSB operates in three regions namely: -

- Sarawak Operations (SKO)
- Peninsular Malaysia Operations (PMO)
- Sabah Operations (SBO)

PCSB SKO is the operator of Baram Delta Fields (Appendix C) under a Joint Operating Agreement with Sarawak Shell Berhad. The Production Sharing Contract (PSC) between PETRONAS and PCSB/Sarawak Shell Berhad was signed with Petronas in 1987. The fields are located offshore Miri, Sarawak, consisting of Baram, Baronia, Betty, Bokor, Tukai, Siwa, West Lutong, Bakau fields. Fairley Baram field is saddling the border between Sarawak and Brunei. The fields are grouped under two Assets namely Northern and Southern Assets, managed by two Asset Managers. Daily oil production from the field's averaged 100,000 bbls/day piped to an onshore oil terminal located at Lutong town. Gas produced is for

domestic consumption amounting to 23 mmscf/day and exports to a Liquefied Natural gas Plant in Bintulu averaged at 90 mmscf/day.

The Baram Delta fields are old fields, some dating back as far as 1967. The facilities in Baram Delta are one of Malaysia's oldest and most prolific oil-producing areas.

PCSB took over the operatorship of this oil-producing area from Sarawak Shell Berhad (SSB) on 1<sup>st</sup> April 1988. The Production Sharing Contract (PSC) was signed in March 1989 between PETRONAS, PCSB and SSB. The PSC is effective from 1<sup>st</sup> April 1988 to 31<sup>st</sup> March 2003.

Operation and Maintenance of the offshore and onshore facilities are carried out both by PCSB and Contractors. The facilities and equipments maintenance are either on condition based or time based to ensure facilities' technical integrity and equipment availability. Contractors provided services and manpower requirement covering a wide spectrum of services ranging from catering, logistic, surface maintenance, subsurface maintenance and workshop activities. Some of the activities such as rigging, painting and blasting are considered high risks.



## Definition of Terms

i. Baram Delta Fields

Oil and Gas Fields located offshore Sarawak, one of Malaysia's oldest oil Producing fields.

ii. Lost Time Injury (LTI)

A work related injury or illness that renders the injured person unable to perform his/her normal duties, on any day immediately following the day of accidents.

iii. Restricted Work Case (RWC)

A work related injury or illness which requires the person to be treated by doctor and is declared fit to return to do part of his normal work on restricted or light duties on the day immediately following the accident/injury

iv. Medical Treatment Case (MTC).

A work related injury or illness that involves neither lost of workdays nor restricted workdays but which requires the injured to be treated by or under the specific orders of a physician.

v. First Aid (FA)

A work related injury or illness which requires minor treatment or subsequent observation of minor scratches, cuts, burns, splinters and so forth which do not ordinarily require medical care even though such treatment is provided by a physician or registered professional personnel, and the injured is able to resume his normal job function immediately after treatment.

vi. Lost Time Injury Frequency (LTIF)

$$\text{LTIF} = \frac{\text{Total no of LTIs}}{\text{Total manhours worked}} \times 1,000,000$$

vii. Total Recordable Case Frequency (TRCF)

$$\text{TRCF} = \frac{\text{Total no. of recordable injurious accidents}}{\text{Total manhours worked}} \times 1,000,000$$

## List of Abbreviation Used

FA	-First Aid
LTI	-Lost Time Injuries
MTC	-Medical Treatment Case
PETRONAS	-Petroleum Nasional Malaysia
PCSB	-Petronas Carigali Sdn.Bhd
PSC	-Production sharing Contract
RWC	-Restricted Work Case
SSB	-Sarawak Shell Berhad
SSPC	-Sabah Shell Petroleum Company
SIPM	-Shell Internationale Petroleum Maatschappij
SKO	-Sarawak Operation
TRCF	-Total Recordable Case Frequency
O&G Producer	-International Association of Oil & Gas Producer
EPMI	-Esso Production Malaysia Incorporated

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