CHAPTER 5.
CONCLUSION AND CONTRIBUTION

The chapter concludes current research work and noticeable contributions are mentioned in this section. Recommendations of the research and the benefits in implementing research finding to all stakeholders of business are given in this section. Also, scope for future research was outlined at the end of this chapter.

5.1 SUMMARY

Oil and Gas (Upstream- construction, Operation and maintenance of Drilling, production and associated facilities) activities are involved with high safety risks. Low probability high impact incidents continued to cause significant human loss, environmental damage and asset losses. Several factors involved in accident causation in Oil& Gas. However, the nature of operations adding additional risks such as failure to identify the specific hazards at work place, age and experience of the personnel involved in the Operations, shift work patterns and other environmental conditions are key components in accident occurring in Oil& Gas Upstream operations. The industry continued to follow the accident occurring theory of Heinrich (1:30:300). However, from the research analysis the Industry to consider further more casual factors of accident occurring.

Human attitudes are having direct relation with serious accidents. Therefore a systematic and consistent behavioural interventions restrain the personnel from “at risk behaviours”.
Fatal injuries in Oil & Gas Upstream could be minimised and achieve “zero accident” level by consistently practicing the basic safety lifesaving behaviours.

Oil and Gas Organisation to encourage promoting hazards identification by each individual and emphasis on ensuring effective barriers for each task.

Though many accident analysis models are in use, the detailed analysis of barriers and its specific failures are having significant importance in understanding the causes of the accidents. The bow-tie method of identifying the barriers and evaluating their effectiveness and BSCAT integration of further analysing the barriers are the advanced techniques helps the Oil & Gas Upstream accident analysis.

5.2 CONCLUSION AND NOTICEABLE CONTRIBUTIONS

5.2.1 Patterns of Accidents in Oil & Gas

Low probability high impact incidents are causing loss of human, environment and assets in Oil & Gas Upstream Industry. Failure to identify the weaknesses in the safety barriers are the most likely causes of the accidents.

There is a difference in accident patterns that are occurring in Oil and Gas Upstream when interpreting the Heinrich theory of accident occurring. Heinrich in his theory might have not considered the Oil & Gas work environment with different kind of hazards and risks. Therefore Oil & Gas Upstream industry to consider that accident patterns are different and infuse their safety management systems accordingly for prevention of accidents.
5.2.2 Accident Patterns in Cairn India

The accident patterns are similar to other Oil & Gas Upstream Industry. However, the patterns are differed from the Heinrich theory of accident occurring. Drilling activity is the major contributors for serious accidents occurring in Cairn India. This could be attributed to aligning various contractors for the local environmental conditions and lack of compliance to basic safety controls. Type of accidents surfaced from fall from height, caught between, slip & trip, Struck by category which are same as other Oil and Gas Upstream industry type of accidents.

Personnel between age group of 20-30 years found to be vulnerable for work place injuries. Hence the Oil and Gas (Upstream) facilities to recognise the risk prior to deployment of such group of personnel and also to consider to instil behavioural motivation processes to prevent work place injuries.

5.2.3 Inherent Risk Factors including Human Attitudes

Personnel coming under line of fire, failure to identify hazards at work place, improper lifting, lack of skill and lack of supervisory competency are major factors found in accidents patterns. This inference results in detailed understanding of accident patterns in Oil & Gas Upstream Industry.

Therefore Oil & Gas Up stream industries to focus on inherent risk factors in prevention of work place injuries.
5.2.4 Methodologies of Accident Root-cause analysis

After verifying various accident analysis models, it is important to identify the barriers that have failed and lead to an accident which results in human injury. It is further important to identify strength and weakness of each barrier. The bow-tie method coupled with BSCAT analysis of accident occurring is having advantage in analysis of accidents in Oil & Gas Upstream Industry.

5.3 ADVANTAGES

Following advantages are expected from the implementation of research recommendations.

- Understanding about the underlining cause of major accidents occurrence. Oil and Gas Operations to recognise low probability and high impact incidents are associated with human behaviours. Therefore identification of weak links including human factors will reduce the probability of accidents.
- Re interpretation of Heinrich theory of accident theory of accident occurrence prompting to recognise accident occurrence in Oil & Gas Upstream are different pattern.
- As drilling activity related accident are more, controls to be reemphasised to minimise the accidents.
- As the age group of 20-30 years found vulnerable for accidents, specific human risk controls measures could be incorporated much before allowing the personnel to work at Oil and Gas Upstream. It will contribute in elimination or prevention of accidents.
- Attitudes are directly related to accident occurring.
- Consistent behavioural interventions preventing the work place injuries. Therefore, if the Oil & Gas Upstream adopts necessary intervention methods it can reduce the work place injuries.
- Failure of human factor quotient to be considered in analysing the accidents.
Using the attitude barrier model (ABM) provides opportunity to incorporate human factor including fatigue, age factor, experience of the person and other work environmental conditions.

Considering the advantages listed in the previous section (5.7.1, 5.7.2, 5.7.3 and 5.7.4) the work place injuries significantly be reduced.

This research inference greatly helps in reduction of accidents in Oil & Gas Upstream industry and thus helps in sustainable business.