ANALYSIS OF ACCIDENTS OF UNDERGROUND MINES IN INDIA, US AND THE AUSTRALIA (1990-2015)

ABSTRACT

Mining, without even a second thought, is a hazardous career to pursue. But why is it hazardous? Because of the risks associated with it. So, to know the percentage and reason for this profession to be called hazardous, this paper has come up with the analysis of the cause of fatal accidents in the underground mines of India, Australia, and the US. For the risk analysis, the real injury data has been collected for the underground mines of the respective countries for the year 1992-2015. It can be concluded that the annual accidents ("Number of Fatal Injuries) occurrence in the Indian mines is so high as compared to Australia that it calls for a proper deployment of support system, accurate supervision, organizing educational programs and to have a deep focus on elements of safety management.

INTRODUCTION

Mining is particularly a hazardous profession. Moreover, the mining engineers who work in underground mines are more vulnerable at risking their lives as compared to those who work in surface mines, construction stones' mines, etc. Surface mines can also be hazardous places to work with approximately 5.800 non-fatal injuries a year (MHSA, 2006-2015). But overall, the risk of underground mines is double that of surface mines. These risks are associated with injuries. These injuries can be both fatal and non-fatal depending upon the severity of the situation. These could be a result of many factors such as:

- Presence of toxic gases and fumes,
- Fires and explosives,
- Slips and Falls,
- Restricted working space,
- Lack of proper ventilation,
- Collapsing of mines stopes,
- Mining-induced seismicity,
- Flooding

Miners are at risk of developing lungs related diseases such as Pneumoconiosis, lung cancer, etc because of the regular exposure to airborne respiratory dust and toxic fumes. These Dust explosions can even trap miners underground.
In this paper, the analysis of fatal injuries has been carried out by using data analysis and data visualization concept in Jupyter notebook(Python Programming Language) and it has been tried to analyze the reason of the differences between the death rates and how to mitigate these issues with the help of present technologies.

DATA ANALYSIS AND DATA VISUALISATION USING PYTHON LIBRARIES:

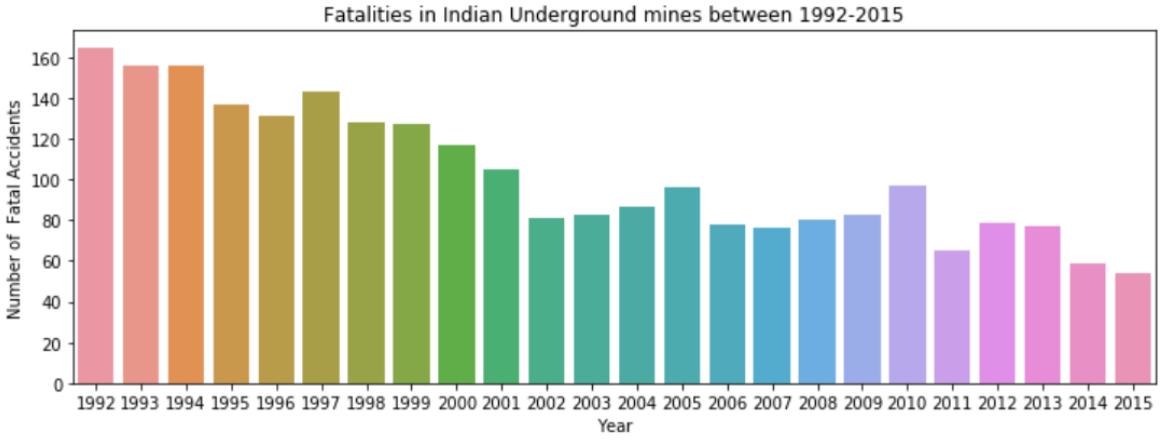

FIG. 1

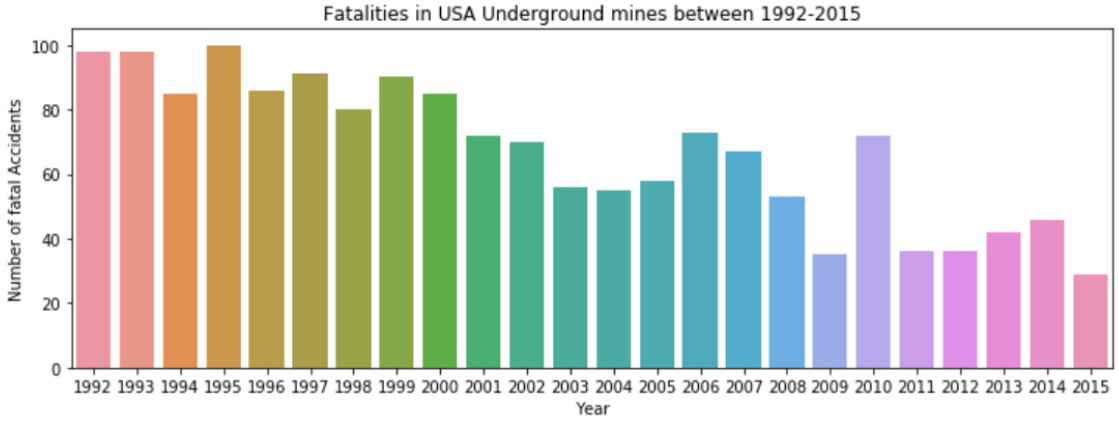

FIG. 2

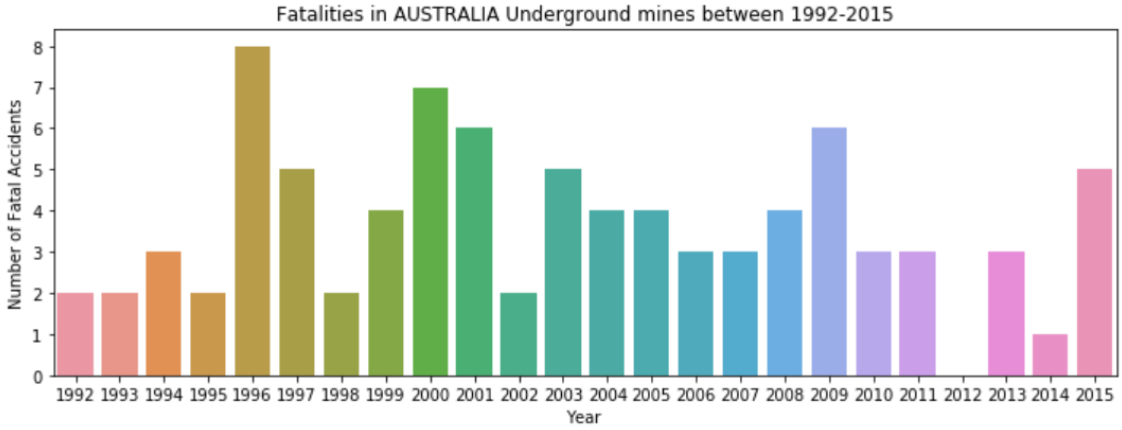

FIG. 3

Conclusion from the above three plots:

- The average no of fatal accidents in India is 103 whereas the maximum is 165.
- The average no of fatal accidents in USA is 68 whereas the maximum is 100.
- But The average no of fatal accidents in Australia is only 4 whereas the maximum is 8.

From this , one question may arise that what are the reasons which is creating this difference and moreover the curiosity lies with the statistics of Australia's data and how they have operated their mines so efficiently .

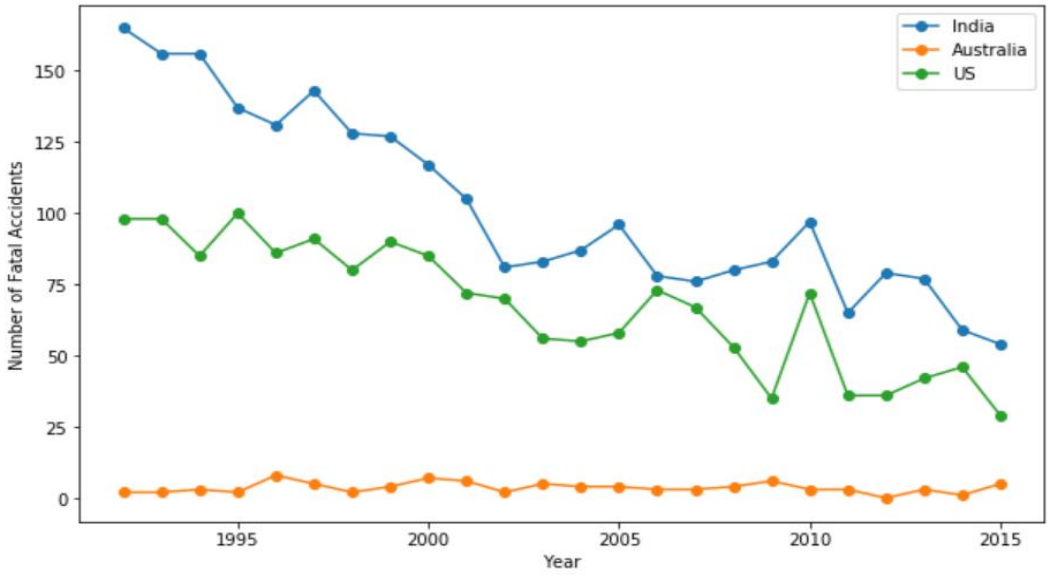

FIG. 4

1. From the above statistics, it is clear that no. of accidents in Indian underground mines is most and in Australian mines is least over a whole period of 25 years (1990-2015).

2. The data shows that in both Indian and US underground mines, the accidents are decreasing with time while in case of Australia , it is somewhat constant.

3.One of the reason behind the very less no. of accidents in Australia could be a better risk management policy and less of no. of operating underground mines.

There could be many more reasons for this drastic difference and a deep study of this will be done and covered in risk management policy and implementation of safety measures.