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Coal Mining: A Study on the Health and Safety Assessment of Worker in India

[1]Dr. Vinod M Kapse, [2]Dr. Niyati Shukla, [3]Mr.Narendra Pratap Singh, [4]Dr. Smita Singh, [5]Dr Swarupanjali Padhi,

[1]Professor & Director, Department of Electrical and Communication Engineering, Noida Institute of Engineering & Technology, Greater Noida Uttar Pradesh, India

[2]Assistant Professor, Department of Master in Business Administration, Noida Institute of Engineering & Technology, Greater Noida Uttar Pradesh, India

[3]Assistant Professor, Department of Master in Business Administration, Noida Institute of Engineering & Technology, Greater Noida Uttar Pradesh, India

[4]Assistant Professor, Department of Master in Business Administration, Noida Institute of Engineering & Technology, Greater Noida Uttar Pradesh, India

[5]Assistant Professor, Department of Pharmacy, Noida Institute of Engineering & Technology, (Pharmacy Institute), Greater Noida Uttar Pradesh, India

Email Id- [1]director@niet.co.in, [2]niyati@niet.co.in,
[3]Narendra.ps@niet.co.in, [4]smita.singh@niet.co.in, [5]swarupanjali.pharmacy@niet.co.in,

ABSTRACT: Coal mining exposes workers to a variety of internal, operative, and industrial risks that are linked to the safety and health of the works sometimes risks. Since this safety is indeed a top concern for all coal industries, as it is one of its key mission and vision statements. Coal businesses seek well-safe working practices that form the foundation of all safety procedures. The mining sector is passing through a period of uncertainty. It is being created due to volatility in the prices of natural goods, economic uncertainty, more restrictions, declining earnings, and changes in future demand. This has forced mining corporations to rethink their plans, implement new business models, and seek innovative technology that can effectively increase efficiency while remaining impactful and safe. The transition to the coal sector will require a financially viable power business. To create and implement innovative technologies in safety and health operations, to protect workers and technology. This article analyses various aspects of the health and safety-related coal mining sector for the further development of strategies to decrease the health concerns faced by mining workers.

Keywords: Coal Mining, Health, Policy, Safety, Workers.

INTRODUCTION

Coal is a plentiful source of fuel with a low cost of production and conversion into usable energy. However, the production and use of coal have an impact on the environment. Coal mining has always been one of our current social top hazardous occupations. Mines workers are still working in an intrinsically dangerous workplace. Coal workers have very poor health and have a shorter life expectancy than others. The Indian government expects a massive increase in coal-fired production capacity[1]. If these ideas were to materialize, a massive increase in imported coal would be necessary, although it is not clear whether they are practical. Coal resources are extremely limited and cannot be generated in a short period. One of the energy and material resources is coal [2]. It is responsible for one-third of the main use of energy. Coal resources are used relatively unevenly around the world. China's coal reserves are more abundant in the north, less abundant in the southeast, more abundant in the northwest, and far less abundant in the east [3]. The allocation of coal reserves is quite different from the areas that consume them. The allocation of coal reserves is uneven from the point of view of both the central administrative regions. Once fossil fuel reserves are depleted, the cost per unit will rise, humanity will be unable to search for a comprehensive alternative to coal, production sources will be unable to change over time, and the industry will enter a severe recession[4].

The sole purpose of this research paper is to analyze safety and health along with an analysis of hazard risks and hazards [5]. To establish a study plan that involves significant safety risks produces realistic results that can be related to the task, and maintains the best quality of scientific investigation, due implementation was used [6]. The primary goal of the Indian coal strategy should be to enhance the financial performance of the company by establishing a free-market environment. In 2020, global demand for coal fell by 4%, the steepest reduction since World War II, but losses were still concentrated in the first few weeks of the year. Consumption surpassed pre-COVID levels at the end of 2020, fuelled by rapidly recovering markets in Asia, and a particularly chilly December. The fourth quarter of 2019 saw a 3.5 percent increase in coal use, leading to a rebound in CO2 emissions[7]. Coal consumption in different regions in 2020 is shown in Table 1.

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Table 1: Representing the Coal Consumption in Different Regions in 2020

Region	Quarter 1 (Q1 %)	Quarter 2 (Q2 %)	Quarter 3 (Q3%)	Quarter 4 (Q4%)
United States	-30.7	- 25.8	-11.4	-7.8
European Union	-24.9	-31.9	-11.7	-3.8
India	-2.8	-27.8	-0.1	6.3
China	-11.0	4.3	2.8	5.4
World	-10.9	-7.3	-0.4	3.7

From 2021, worldwide coal demand is projected to return to the original decade trend, with losses in advanced economies offset by growth in some emerging economies. Coal production in top countries around the world is shown in Figure 1.

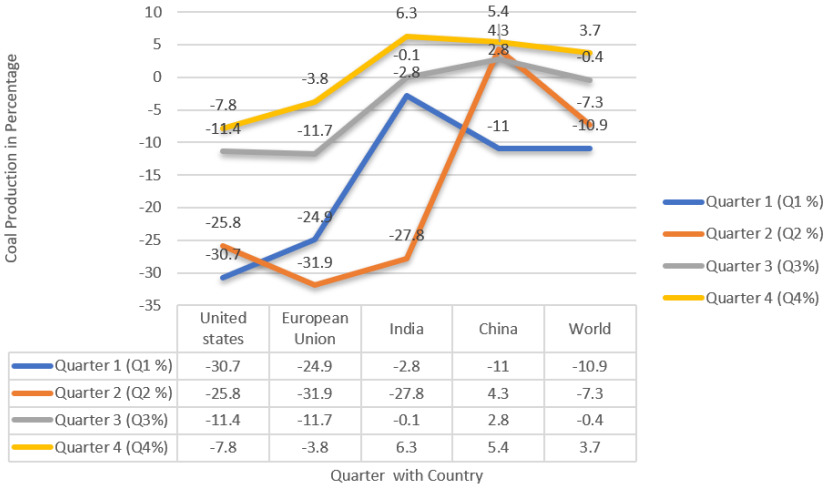

Figure 1: Coal Production in Different Countries in COVID-19 First Wave Year (2021)

In 2021, coal production was struggling to keep up with rising demand, particularly in the first half of the year, pushing stock levels up and pushing up prices. Domestic initiatives to increase production and eliminate coal shortages were quickly implemented in India and China, where power cuts and idle industries led to coal shortages. This was aided by the information system in the nation's firms in the manufacturing sector [8]. India is highly dependent on the coal sector for completing commercial and non-commercial needs. The production of coal in India from 2011 is shown in Table 2.

Table 2: Representing the Raw Coal Production in India

Year	Production (Million Tonnes)
2010-2011	532.69
2011-2012	539.95
2012-2013	556.4
2013-2014	565.77
2014-2015	609.18
2015-2016	639.23
2016-2017	657.87
2017-2018	675.40
2018-2019	728.72
2019-2020	730.87
2020-2021	716.08

According to a statement by the government coal department, India is looking to expand domestic coal production to 1.2 billion metric tonnes by upcoming year to cut imports and close the need imbalance. India needs about a 75 percent increase in coal products to meet its targets. India is now mining around 716.08 million metric tons of coal in 2020-2021[1]. Information on coal production from 2011 is shown in Figure 2.

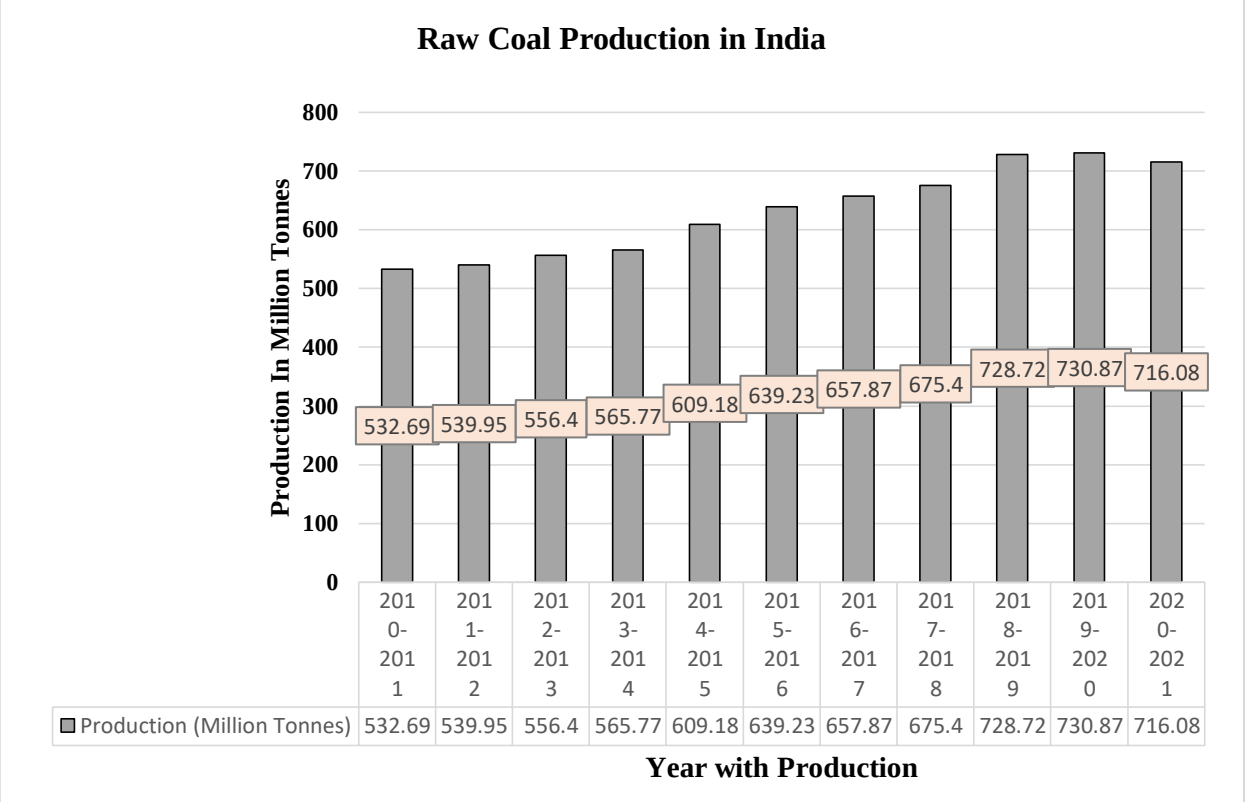

Figure 2: Illustrating the Raw coal production in India from 2011.

1.1. SWOT Analysis

Advancement in the operational efficiency of mining businesses. The mining industry eventually requires an organizational change to recoup its overhead costs to worldwide norms[9]. SWOT analysis of the coal mining sector is shown in Figure 3.

Strengths • Minerals resources availability • Integrated planning • Global Policies • Sustainability • Cost Savings	**Weakness** • Business interruption • Worker salary • Employee's health and safety • Current innovation defects • Risk Management
Opportunities • Focus on innovation related to natural resources • Health and Safety improvement • Local joint ventures • Capability development • Technology development	**Threats** • Energy and waste wastage • Environmental Hazards • Unstable economy • Commodity volatility • Natural disaster • Transportation and Infrastructure

Figure 3: SWOT analysis of the coal mining sector

There are risks involved when performing in the mining sector, although not all of them are immediately related to the physical nature of the profession and its hazards. There are indeed obvious employment risks, but living near mines can also bring about a wide range of environmental health concerns and hazards. Effective techniques can be used to control and manage the health risks associated with coal mining[10]. Various gas realized from coal mining is shown in Figure 4.

Common Name	Gas	Health Effects
After damp	Blasting by-products	Respiratory irritant
Black damp	Oxygen deficiency	Lung cancer, respiratory irritant
Stink damp	Hydrogen sulphide	Acute respiratory depression, eye, nose through infection
White damp	Carbon monoxide	Chemical asphyxiation
Fire damp	Methane	Simple asphyxiation, flammable, explosive
Same	Diesel engine exhaust	Respiratory irritant, lung cancer

Figure 4: Illustrating the Gases Release from the Coal Mine Sector

Workers in mining towns face a variety of hazards. The potential for damage from falling objects, malfunctioning machinery, or roof collapse has always existed, and it has never really been a safe or healthy setting. Even though workplace health and safety has greatly improved over the past 20-30 years, the risks are still considerable compared to other occupations[11]. Health hazards faced by the worker are shown in Figure 5.

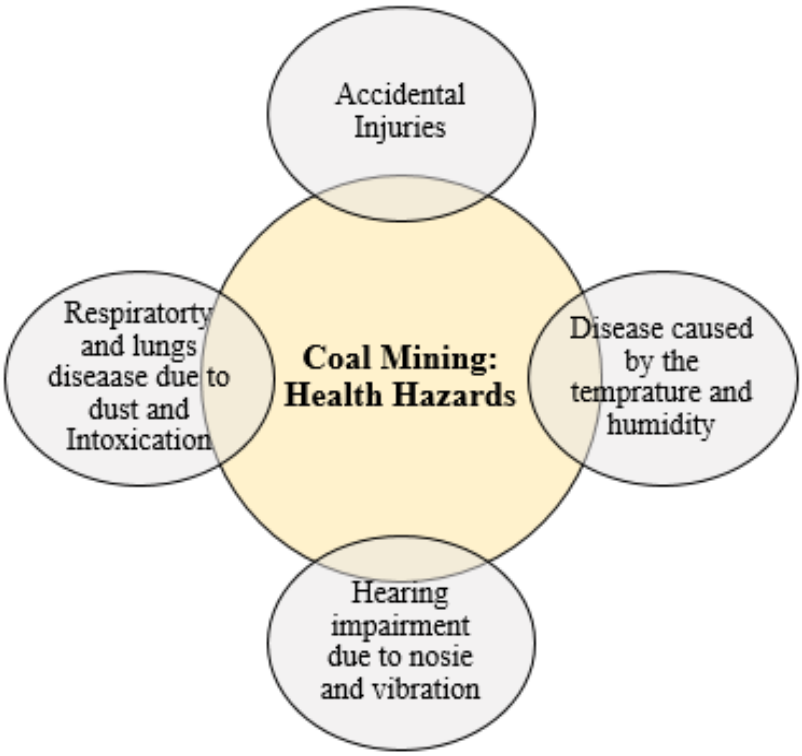

Figure 5: Representing the Various Health hazards Associated with Coal Mining

There are serious negative health and safety consequences at every stage of coal consumption (mines, processing, burning, and disposal management). Lymphoma, coronary disease, respiratory disease, kidney problems, mental problems, poor birth outcomes, and delayed infant maturation are some of the health consequences. Working in the mining sector is a dangerous profession[12]. A worker died in an accident at a coal mine in Orissa earlier in the year.

Another coal mine tragedy in Chhattisgarh. India has some of the largest dangerous mines in the world, and officials are scrambling to enforce safety standards. If you are considering a career in the mines. Some management level Issue in the coal sector related to safety management is shown in Figure 6.

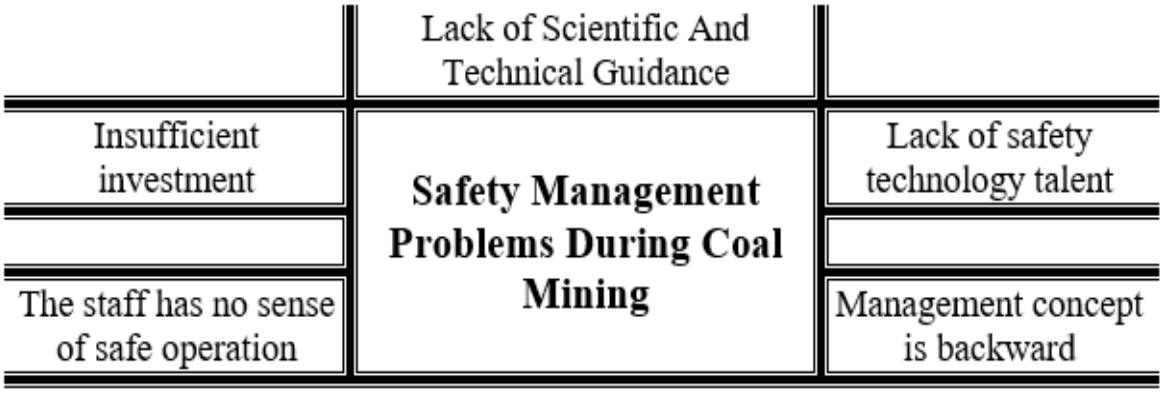

Figure 6: Illustrating the Safety Challenges in the Coal Sector

2. LITERATURE REVIEW

Hazardous work environment, mining has long been considered the most dangerous industry coal mining, on the other hand, seems riskier than open-cast mining. In addition to the high incidence of accidents, coal mining tops the list of hazardous jobs; everywhere data was kept, the potential for a major disaster involving many deaths is significant. In India, which is undergoing rapid industrialization, occupational studies must strike a balance between understanding modern occupational hazards and health concerns related to traditional industries such as agriculture and forests. To tackle the problem, strategies such as current worker health legislation, implementation machinery at the quasi-level, health care professional development, the need for epidemiological data, and collective action were addressed[13].

Mining activities are businesses with a high level of risk. Health issues are common in today's coal, which not only puts people and property at risk but also hinders the progress of the sector. Enhancing safety practices in the mining process can significantly reduce the incidence of incidents in the coal mining process. To successfully enhance the health of mining sites, not only must the firm do an excellent job, but workers must also develop their awareness of safety. Lastly, society and authorities need to encourage coal mine safety. This will have a direct impact on the growth of coal companies as well as on safety training. Safety concerns in everyday production must be strictly managed, and safety accidents must be controlled and prevented by using the most sophisticated management tools and procedures. The only way to ensure the long-term viability of coal mining businesses is to ensure their safety[14].

In safety production, it is unquestionably necessary to immediately improve technicians' workplace practices and safety equipment. However, the purpose to which the death is challenged is the individual, and it is essentially up to an individual to operate safety institutions and prevent and prevent accidents. According to accident assessment, coal mine accidents happen regularly, with the primary justification being the interpersonal aspect. As a result, it is important to consider how and where to enhance the safety of mining sites in Asia by strengthening security practices at the individual level, through motivating means to protect people from their stress and blame. Be inspired, foster positivity, and lead the conservation production[15].

3. DISCUSSION

With mining towns and coal-fired power utilities shutting down, workers and people living in coal-fired reactors will be exposed to the potentially hazardous elements inside coal dust and ash. Since severe respiratory diseases are degenerative disorders, the incidence is projected to continue to rise soon, especially in developing countries such as India. The coal mining process extracts various harmful gases and small practices [16]that are harmful to health as well as to the environment as shown in Figure 7.

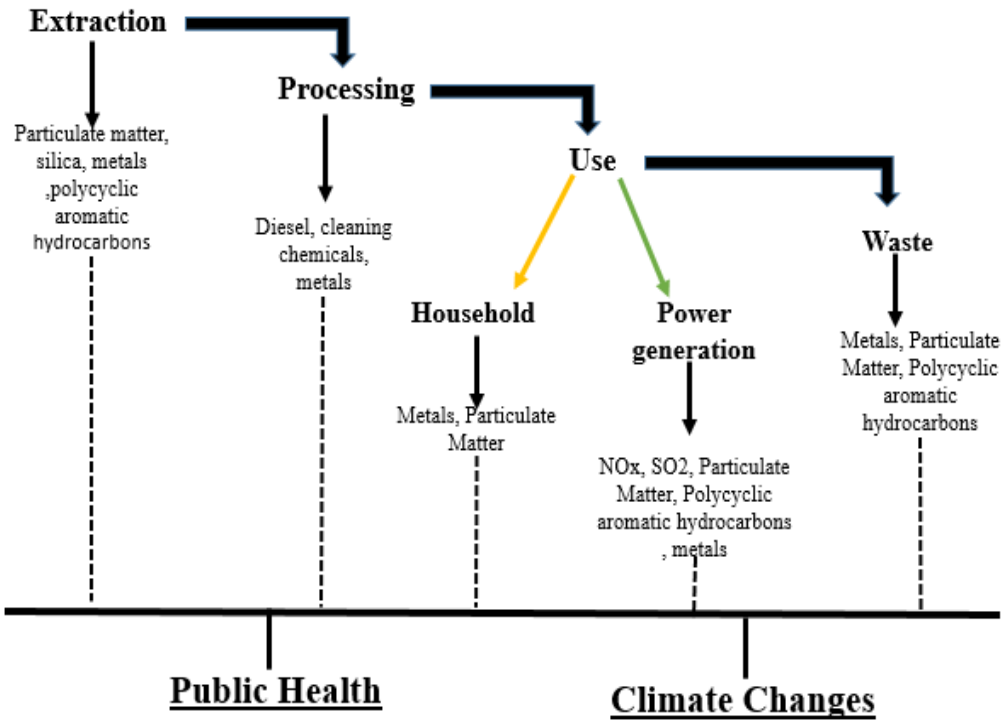

Figure 7: Harmful Effects of Gas and Extracts on Public Health and Climate

The variations and links of hazards and risks were examined and found to address difficulties in coal mine safety management in India and risk control pressures in coal mines based on the underlying cause of the disaster. Then, to improve coal mine safety management, a system based on threat, covert risk, and immediate response is devised[17]. Some coal mine safety is shown in Figure 8.

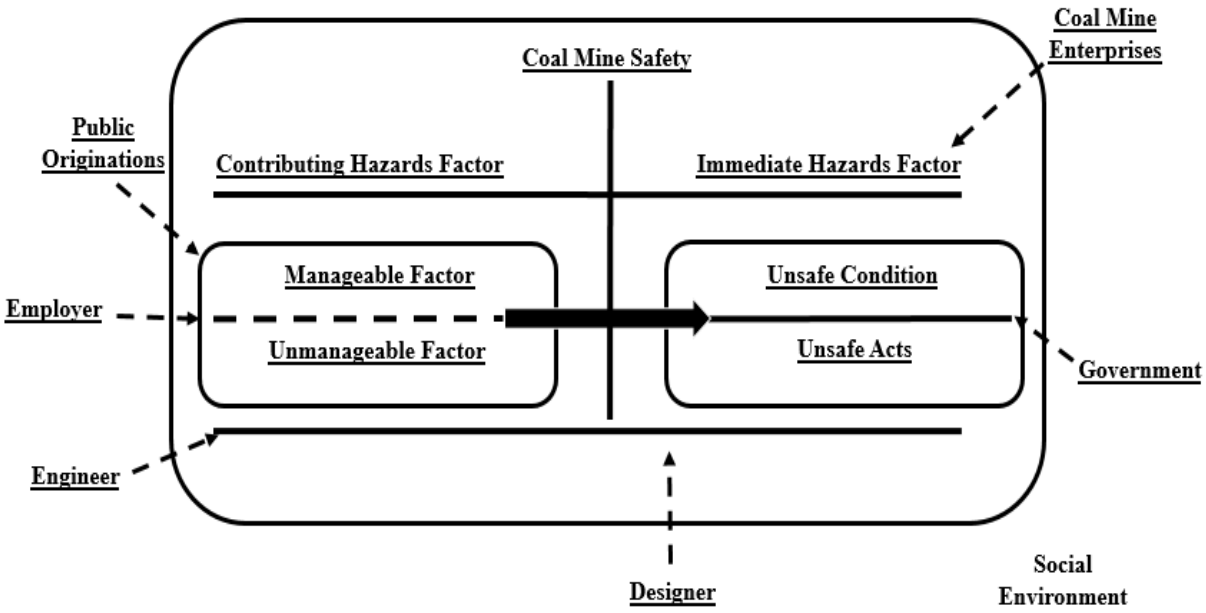

Figure 8: Illustrating the Coal mine safety factors

Even though India has public and private mines, the group has been responsible for most of the mining exploitation and exploration. This is in line with India's overall economic policies before the globalization of the mining industry[18]. Varies of acts and policies are enlisted in Figure 9.

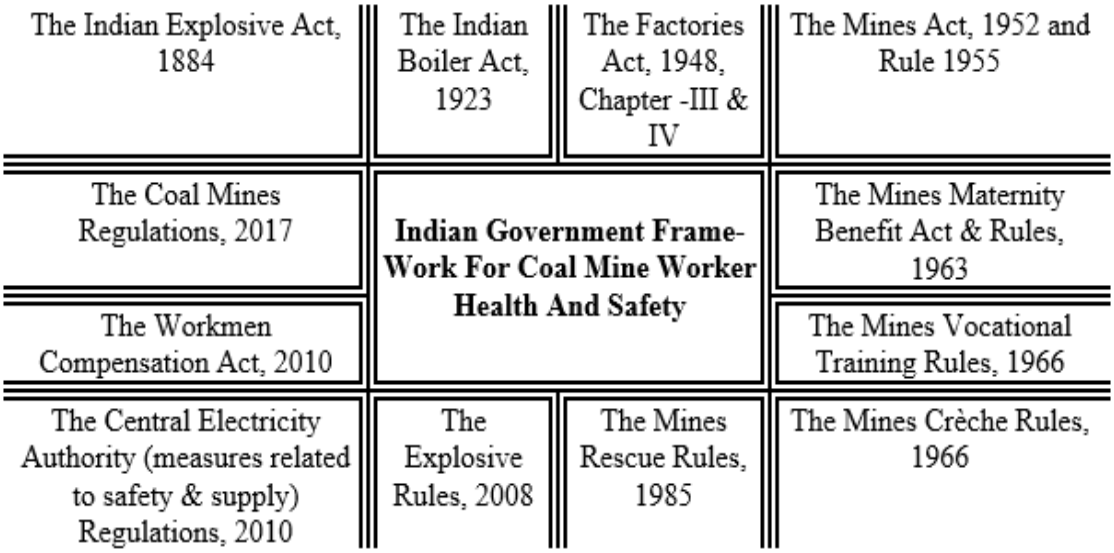

Figure 9: Act and policy related to coal mining associated worker health and safety

Coal mining is a tightly controlled business worldwide due to the existence of several structural, technical, and hazardous dangers. Today's coal mine safety law is one of the most extensive and ubiquitous legal frameworks for guaranteeing workplace safety and health. These safety and health laws must be followed at all times[19]. Measure steps that need to be taken by the government for enhancing the safety of the worker are shown in Figure 10.

Figure 10: Initiatives need to be taken by the government for the health and safety of coal town workers

In a coal mine, dust inhalation and persistent methane poisoning are serious health risks. Overhead or coal mine mining are two types of activities. Because of the higher dust levels in a low boil, coal miners are exposed to more coal dust than the general public[20] As a result, deep coal miners are most vulnerable to coal dust.

4. CONCLUSION

Most of the daily wage laborers like coal workers are generally illiterate. Most coal miners are unaware of their rights in terms of safety and health along with the health risks while working in the mines. As businesses strive to generate profits, daily wagering has now become the perfect scapegoat for extortion. India is under international pressure to announce a September 2020 deadline for phasing out coal use, following China's announcement of halting coal use. Coal is a major part of the carbon cycle, a source of carbon that contributes to global warming. Even though this is doubtful to happen in the future. India is yet to come up with a proper strategy to deal with fly ash produced by coal power plants that use Indian coal. Carbon capture technologies such as the Integrative Gasifier Combination Cycle, which converts coal to gas, are available, but they are expensive and must be modified to meet Indian coal norms. Despite being one of the wealthiest sectors in India, many mining businesses not only downsize employees but also violate employee health and safety, making it one of the most dangerous environments to work in. Even though many mines are controlled by the central and state governments, India's mining sector has a terrible reputation for credibility. Trade unions, on the other hand, argue that attempts to privatize mines may further reduce safety requirements, jeopardizing the livelihoods of workers.

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