

# **Violation of Operational Safety & Health Standards and Industrial Accidents in Bhilai Steel Plant**

**A Report to the Workers**

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**Loktantrik Ispat Evam Engineering Mazdoor Union,**

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**Chhattisgarh Mukti Morcha (Mazdoor Karyakarta Samiti)**

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## **Violation of Operational Safety & Health Standards and Industrial Accidents in Bhilai Steel Plant**

India is today the second largest producer of raw steel in the world, producing as much as 101 million tons of raw steel. The steel industry has grown rapidly almost three times during the last fifteen years. Has this rapid growth benefited the workers? Has it generated more employment, better employment and safe employment for the workers who produce steel which is the back bone of modern industrialisation? Unfortunately, the answer is a big **NO!**

This spectacular growth has been at the cost of the workers who are being ruthlessly exploited and at the cost of the tribal people who have been evicted from their lands to mine iron ore and set up steel plants. Every ton of steel produced in the country is steeped in the blood and tears of workers, dispossessed peasants and adivasis of India.

When the steel industry was being set up after Independence, they were to be not only the foundations of industrialisation of the country but also to set up models of safe and dignified employment and a vision of life of workers in future industrialised India. This promise has cruelly been belied by the history of the industry during the last few decades.

Three conjoint processes have been at work, namely massive reduction in the number of workers employed, contractualisation of the workforce rendering precarious the position of majority of the workers and forcible dispossession of the lands of the adivasis for mining operations.

The scant value being attached to the lives and health of the workers is evident in the callous attitude towards safety standards and protocols leading to accidents which maim and kill workers.

The recent ghastly accident in Bhilai Steel Plant on 9<sup>th</sup> October 2018, which killed fourteen workers and injured nine, is the most recent in this series.

The accident was caused by criminal negligence of the management in violating well established safety protocols relating to the de-blanking of the Coke Oven Gas Pipelines and providing grossly insufficient back up to contain the damages of accidents.

It is a matter of deep concern that accidents that occur on a daily basis involving contract workers engaged in the plant, go unreported, unattended and uncompensated. This also contributes to laxity in safety regulations and in the monitoring of overall occupational safety and health issues.

The present report goes into the short term and long term causes of this accident and seeks to situate it in the global context of the steel industry and makes some important recommendations for the workers' organisations.

We hope we have been able to articulate the concerns and the pain of the workers and their families who have suffered due to reasons not of their doing. We hope the different trade unions, civil society and the media give a sympathetic hearing to these voices and we hope the management takes heed to what they are doing to the workers who toil at the BSP plant and often pay with their life and limb.

# Murderous Industrial Accident in Bhilai Steel Plant on 9<sup>th</sup> October 2018

## 1.0 Introduction

On the 9<sup>th</sup> of October 2018, fourteen workers were burnt alive and another ten were seriously injured in a gruesome accident in the Energy Management Department of Bhilai Steel Plant (BSP). The accident occurred at Column no. C-50 during the process of deblanking in the Coke Oven Gas Pipeline. Coke Ovens produce coke and release Coke Oven Gas (CG) by heating coal in the absence of air. Coke is used in producing steel in blast furnaces and the gases are also used to produce heat in the furnaces and prepare other coal byproducts. This gas is not only very toxic (it contains high percentage of carbon monoxide) but is also highly flammable and explosive as it contains more than 50% of Hydrogen gas.<sup>1</sup> On the fateful day a team of 23 employees of the Energy Management Department (EMD) of the Bhilai Steel Plant (BSP) was engaged in de-blanking (removing the dummy plate inserted in the flange) a gas pipe of 1800 mm diameter at a height of about 40 feet from the ground. Blanking is done when a pipeline has to be temporarily closed for maintenance etc. by inserting a metal plate in pipe joints called flanges. De-blanking is the reverse process to open a pipeline and involves opening the joints of the flanges and removing the metal plate. It appears from the reports of the survivors of the accident that deblanking had been completed and packing of the flanges was being done prior to bolting them. It was during this process that there was a

sudden fire explosion, burning the workers in the vicinity. Since gas leak and fire hazard were expected in such a situation, a rescue team of 10 fire brigade personnel was also present there with all the firefighting equipment in a Snorkel lift cage. However, this team too got engulfed in the explosion leading to the death of five firemen. While some were burnt in the fire explosion others fell down from the height. Nine died on the spot and five died in the hospital.

### The Dead and the Injured

Those who died on the spot

1. Uday Pandey, 2. Ganesh Ram, 3. S. Akil Ahmed, 4. K.R. Dhruv, 5. Sanjay Chaudhary, all from EMD and 6. Vishwanath Rajput, 7. Malkham Prasad, 8. Indranmani Dubey, 9. Narendra Patel from the Fire Brigade Department

Those who died in hospital

10. Durgesh Rathore, 11. Dinesh Maurya, 12. D.K. Chauhan, 13. Satya Vijay from EMD, and 14. Narendra Patel from Fire Brigade

Injured Undergoing treatment

1. Ranjeet kumar, 2. T.N. Jaiswal, 3. Hemant Oraon, 4. Hemant Behra from EMD and 5. Lokendra Dhruv, 6. Kshatrapal Rana, 7. Vimal Kumar, 8. Sohan Mina, 9. Jitendra Mina from Fire Brigade.

<sup>1</sup> Details of the process of production of coke are attached in Appendix I

The BSP is owned and operated by a Government of India undertaking, Steel Authority of India Ltd. (SAIL). Two days later the then Union Minister of Steel and the then Chief Minister of Chhattisgarh visited Bhilai. Later addressing media persons at the hospital premises, the then Union Minister of Steel announced ex-gratia payment of Rs 30 lakh to family of each of the deceased employees, INR 15 lakh to the seriously injured employees and Rs. 2 lakh to employees with minor injuries. He also assured that all possible assistance would be provided to the families of the deceased persons. The Union Minister told media persons that apart from the internal enquiry committee constituted by SAIL that was announced a day before, another high-level Enquiry Committee comprising of experts from across the country to enquire into the actual causes of the incident would be constituted by the Ministry of Steel. Pending enquiry, CEO M Ravi was removed (sent on leave) and Mr. Pandiaraj, General Manager Safety Department and Mr. Dasha, Dy General Manager, Energy Management Department were suspended. Oddly enough, the person in charge of the Fire Brigade, who was also responsible in some measure for the death of the fire brigade workers, has not yet been implicated.<sup>2</sup>

Subsequently, a cash compensation of about Rs. 30 Lakhs was paid to the family of the workers who lost their lives and a promise was made to give appropriate employment to their next of kin. The relatives of one of the workers who was a

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<sup>2</sup> The initial FIR filed three days after the incident is included as an appendix to the report.

trainee, received the monetary compensation but was denied this compensatory employment.

The reports of the two official committees have not yet been made public.<sup>3</sup> An enquiry was also conducted by Hindustan Steel Employees Union (affiliated to Centre of Indian Trade Unions, CITU) Bhilai which released its report on 20<sup>th</sup> October 2018. This report filed within ten days of the incident, goes into the immediate causes of the accident and also draws attention to the absence of any duly constituted statutory safety committee. In view of the wider implications of this accident we also need to go into the larger questions related to industrial safety in BSP in particular and steel industry in general.

The Steel industry worldwide and in India in particular has seen major structural changes in the post globalization period. In India it has meant, among other things, the expansion of the private sector, intensive competition being faced by the state sector, outsourcing and contractualising of the work process within the plants. There has been a corresponding neglect of investment into safety protocols and procedures. Industrial accidents like the present one need to be studied in these contexts so that the working class can formulate appropriate demands and forge solidarities needed to get them implemented and also because appropriate policy and protocol changes can be

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<sup>3</sup> RTI applications have been filed in order to access these reports but the request to access them has not been granted. Appendix III has details of all RTI applications filed and their respective current status of each of these applications

instituted to avoid further gruesome accidents and casualties like the October 2018 one. A ‘fact finding team’ consisting of interested lawyers and social activists was constituted to study the accident in the context of these larger issues and prepare a report for public discussion and action. These included Advocate Nikita Sonawane, trade unionist Ashim Roy and social activist and researcher Sujata Gothoskar.

The objective was to look at this and such accidents a little more deeply and see if there are any linkages, any trends that can be discerned and if these point to some reasons why the situation is what it is and what can be done to change it for the better. The team was in Bhilai for three days from the 4<sup>th</sup> to the 6<sup>th</sup> of December 2018. It met several groups of workers in BSP and of the Fire Brigade department of the BSP, contract workers and relatives of contract workers who had been seriously injured or had died in other accidents in BSP.

## **2.0 Coke Ovens and Gas Pipes**

Coking is a process by which impurities in coal are removed so that pure carbon can be used in the blast furnace. It is done by a process of heating the coal at very high temperatures in the absence of air. This produces very hot coke which is cooled and transported to the blast furnaces; it also produces highly toxic and inflammable gas with high concentration of Hydrogen and carbon monoxide. This is called ‘Coke Oven Gas’ (CG gas) and can be used for producing electricity, heating the blast

furnaces and preparing other by-products of coal. The CG released in the process of coking travels at high pressure through vast networks of pipelines. These pipes are to be found at the top of the coking batteries at nearly forty feet height. These pipelines require maintenance from time to time. One of the maintenance operation involves blanking and de-blanking – which involves insertion (or removal) of a ‘dummy plate’ between flanges (joints in the pipe which are bolted) to stop the flow of gas from one pipe to another. Elaborate protocols govern the maintenance operations. These include suspension of CG flow through the pipes, water sealing them with what is called ‘U Seal’, then purging the pipes with nitrogen etc. and also precautions to prevent fire and use of gas masks in case of accidental leakage. Any possible causes of ignition including exposure to pressure difference, water jets, sparking, friction, electric bulbs are to be avoided for a specified distance. (Appendix: ‘Coke Oven Gas, its Characteristics and Safety Requirements’ Posted by Satyendra on Apr 29, 2015 in Ispat Digest).

## **3.0 Neglect of Safety and Misplaced Risk assessment**

An accident is said to have occurred when an unexpected event happens at a place and time not anticipated. Ironically the ‘accident’ of 9<sup>th</sup> October 2018 occurred precisely as could be anticipated at a time and place well known in advance. That leakage is likely to occur when de-blanking was being done is well known, and it is also well known that the leaked

gas would be toxic, inflammable and explosive. The management which ordered the deblanking process was well aware, well ahead of the possibility of accident and it appears to have somehow assumed that the likelihood of a fire explosion was nil and only prepared the team for handling toxic gas.

Hindustan Steel Employees Union enquiry report<sup>4</sup> indicates that most of the safety protocols were ignored. The report first of all points to major breach of protocol – the pipe lines had not been depressurized before the de-blanking process was begun. To quote the report, “The job was carried out in gas line under gas pressure, which is a gross negligence of safety on the part of concerned management, because working in gas line under gas pressure cannot be justified, if provision of isolating gas flow like U-seal, valves etc are there.” It seems that the management was keen not to disrupt production due to the de-blanking operation and hence decided to carry on the operation without completely stopping gas flow and depressurizing the pipes. Following the protocols would have meant disruption of production for about 2 to 3 hours. The next protocol action of purging the pipes with nitrogen gas was also not done.

From the workers’ accounts it appears that maintenance jobs were being undertaken without depressurizing the pipes in past. However, this was the first time that it involved a 1800mm pipe on the mainline. This should have involved conducting a proper risk assessment and taking all

possible precautions. It appears that the management turned out to have been quite reckless and unmindful of the danger to workers’ lives.

Not depressurizing the pipes effectively meant that the pipes contained toxic and inflammable gases when the flange bolts were opened. We are told that the pressure in the gas pipes was monitored from the Energy Centre and the possibility of local difference around the flange was overlooked. It seems that the deblanking operation of unfastening the flanges and removing the dummy plate was done and the workers were putting in place the ‘packing’ material in the flanges before tightening the bolts. At this point there was a sudden fire explosion. While it is premature to say exactly what may have caused the fire (a spark), quite clearly there was a sudden surge of explosive gas which alone can account for the fire explosion. Workers are categorical that all possible causes of sparking like wrist watches, mobile phones etc had been left on the ground before the deblanking process started. One possibility certainly was ignition caused by pressure difference when gas under low pressure encountered gas under high pressure. Another possibility could have been the use of chain block pulley for lifting the dummy plate instead of ‘max pulley’ (which has a lower probability of sparking or friction and can be operated from the ground). A third possibility is that hammering in of the packing material may have led to some sparking though it appears to be remote as the hammers used are usually made of rubber.

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<sup>4</sup> The report is attached at Appendix IV

Leakage of some amount of toxic CO gas is expected in such operations and workers are advised to use gas masks. From the accounts it appears that the management overlooked the possibility of fire explosion in its risk calculation. All preparations appear only to foresee poisonous gas leak. The workers were provided with gas masks but not fireproof overalls. The positioning of the Snorkel lift cage with the firefighters was too close to the location to enable removal of persons affected by gas poisoning but had not anticipated a fire burst which engulfed the fire brigade too and in the process destroyed the controls and hydraulic operation of the Snorkel lift. This rendered the fire brigade defenseless. In another serious neglect of safety protocol, the water supply to the fire fighters was limited and apparently exhausted within minutes. Once again it appears that only neutralization of poisonous gas was planned for and not any serious fire hazard. Hydrant pipes (and steam pipes) run along the gas pipes to supply water to extinguish fire in cases of emergencies. However, the fire brigade team does not seem to have been prepared to use this supply of water. It took much time before a fresh connection could be made and water pumped. Water should have been connected and the water pipes should have been kept at a distance of at least 30 metres. There was just one fire brigade van ready for action.

If the fire fighting team was rendered ineffective, the platform constructed for the operation was too narrow to accommodate the 23 workers who were on it. This too indicates that a fire explosion risk was not taken into account. When the fire broke out there was no place to run

and the only escape was by falling off forty feet below. Apparently many workers were chained to prevent a fall and this immobilized them at the time of the fire. They had not been trained to quickly unfasten the belts in cases of explosion or fire.



Quite clearly this was not an ‘accident’ in the sense that it was unforeseen or an improbable event; it was well known that de-blanking gas pipes involve a high probability of leakage of toxic gases and also fire and explosion. The ‘accident’ and the scale of fatalities was thus entirely preventable but for deliberate negligence by ignoring the risk of fire on the part of the management and the persons responsible for the de-blanking procedure in particular. The workers too bear a responsibility in agreeing to work under such circumstances of callous neglect. Many workers reported that the workers are goaded into such jeopardizing situations through a system devised by the management by which they are rewarded with ‘bravery awards’. This is obviously a despicable practice of encouraging and pressurizing workers to violate safety norms. Sadly and ironically some of the workers who lost their lives had been previously awarded thus.

Workers also talk about a very horrendous accident in January 1986, when 9 workers had been killed. The October 9<sup>th</sup> accident it was recalled was almost identical to the 1986 one. It is frightening that the management does not seem to want to learn from its mistakes.

### 3.1 Back up failures

If the safety norms were flouted, and protocols ignored, the rescue system with open vehicle approach to the site of accident and ambulances facilities too were lagging. It took hours to shift 23 persons to the hospital just because there was no approach for vehicles to reach the site of accident. The ambulances had to negotiate difficult passages to reach the spot every time. Further there was just one functional ambulance to ferry the injured workers one by one to the hospital, to begin with. Later on it was joined by other ambulances but they too were slowed down by lack of passage way to the site. It stands to reason that if an accident involving 23 persons was envisaged, then approaches to the site should have been properly cleared and kept open for ambulance transport and enough ambulances should have been pressed into service. This is what a worker had to say about this situation:

*“The BSP Sector 9 has just five Ambulances, and at any given time there are at the most two or three at the plant, sometimes only one. Because of this, we had to do several rounds between the accident site and the hospital. One ambulance could only take two injured*

*people, so we would go drop two, come back, pick another two up and then go back again. This went on for one and a half or two hours. If there were more ambulances, or if the management had bothered to quickly hire a few more private ones, more lives might’ve been saved, or at least some injuries might’ve been less severe.”* Another huge problem he said was that there was no proper approach to the site of the accident, that there was no place for the ambulance to park because the coke oven is beside the railway track. *“The first ambulance had to drive around in all directions for the first few minutes searching for the best approach to the site. We just didn’t know where to park. Finally, we found a spot and then we had to walk and carry bodies for a distance of about 150-200meters.”* The fact that such a high risk department with a highly combustible gas flowing at high pressure has no approach route for an ambulance to arrive in case of an accident is extremely telling about the commitment to safety that BSP has.

### 4.0 Accidents in BSP

The ‘accident’ of 9<sup>th</sup> October 2018 was not a rare exception but part of a long series of industrial accidents claiming lives and limbs of workers and also impacting production. The difference was that the fatalities on 9<sup>th</sup> October involved ‘regular and permanent’ workers while the previous accidents mainly involved contract workers towards whom the management showed no responsibility. Even the trade unions seem to have largely ignored them. In fact, most of them go unreported even to the management let alone to the larger public.

It should be kept in mind that when it comes to monitoring industrial safety, it is not just major accidents which cause stoppage of work and injury (including minor injuries) or fatality that need to be taken into account but also what are called near accidents or 'near miss', likelihood of accidents. In situations in which a plant subcontracts its work to a number of contractors it results in non-reporting of accidents and near accidents to the principal employer. Often accidents are ignored by the contractors and even the workers take them in their stride, due to lack of proper training and awareness, but largely because their jobs are at stake.

In the recent decades the BSP management has resorted to subcontracting on a very large scale and its implications for industrial safety and occupational health of the workers have not really been worked out. The contractors and subcontractors appear to be ignorant of safety issues, lack training or orientation, their main concern being cost-cutting at all cost. This has drastically compromised work safety in the BSP complex. Of course officially the BSP claims a commitment to orienting and training contractors and contract workers in issues of industrial safety; in actual practice this is not so. Let us listen to some remarks made by the workers during our investigation:

*“Very often work that requires technical expertise like operating a crane and other things are given to contract workers who are at the plant site for a few months at best. Some of them are actually agricultural workers who come in search*

*of work for two months in a year when farming activities are suspended. They are given no proper training and guidance, but made to work in units that require technical skill.”*

Another worker recalled an incident where a job to dismantle an old crane was outsourced to a contractor who brought in daily-wage unskilled workers for the task. *“Dismantling a crane is no small task;it requires an elaborate plan. However,with no training and technical knowledge, the contractor got daily wage workers to do the job who just began indiscriminately welding at various points. A wrong choice of spot led to a massive part of the crane to break off and fall on one of the workers who was welding.”* Such accidents that cost lives often go unreported and almost always go unaddressed even when reported. `If you talk to any of the 22000 or more contract workers in BSP, each one of them will tell you that their bodies are marked by hot metal that falls on them with persistent regularity’, one of the experienced workers in BSP added.

The fire brigade employees also recalled how safety issues, including safety training used to be taken much more seriously once upon a time. Over the last few decades, hardly any safety training has been carried out The number of employees in the fire brigade department has been reduced by more than 50%, from about 500 to around 200 now. Regular safety training and updation is a thing of the past. This reiterates the complete neglect of safety and the callous attitude to workers’ lives in the BSP.

#### 4.1 Serious accidents at BSP in the last three years

Here are some of the more serious accidents that have taken place in the last 3 years.

<b>Date</b>	<b>Name of workers</b>	<b>Category of the workers</b>	<b>Reasons of mortality/morbidity</b>
16/02/2015	Giridhar Yadav	Contract	Fell from height
10/09/2015	Tapan Nayak	Permanent	Fell from height
30/09/2015	Dhanesh Kumar	Contract	Fell from height
15/09/2015	D D James	Contract	Fell from height
14/12/2016	B B Ramta	CISF	Got crushed / cut by loco (look up)
23/02/2016	Basant Nandi	Contract	Got crushed (look up)
14/04/2016	Shakeel Ahmed	Contract	Fell from height
09/05/2016	Shatrughan Dubey	Contract	Burnt (90%) – small case study later in this report
18/07/2016	Rohit Kumar	Contract	Pillar fell on him
30/08/2016	Kamal Kumar	Contract	Truck crushed him
02/12/2016	Harilal Yadav	Contract	Cylinder fell on his head
10/12/2016	Satish Paudwal	Officer – Asst Manager	Machine fell on him; sustained internal injuries

(Source: *BSP me durghatana me ghayal afsar ki maut*, 10<sup>th</sup> December 2016)

There were many other incidents like these, where there were severe and serious injuries, but no fatalities. However, one needs to remember that every time a relatively small accident is neglected, that gives rise to and builds up to a major and serious accident. A cursory scanning of the newspaper reports over the last few years gives us a long list of such accidents:

- On the 12<sup>th</sup> of June 2014 and also on the 18<sup>th</sup> of June 2014, there were accidents at pump house no. 2, when motor no. 5 was being repaired. There was another accident at the same place. Hence 3 accidents in a row. (source: Nai Duniya, 19<sup>th</sup> June 2014)
- Again Nai Duniya reported on 16<sup>th</sup> October 2014 that there was a blast in the plate mill in the process of capital repair, while lighting the gas torch. 3 contract workers, Vijay, Virendra and Dandasi, who were working with contractor Mssrs. Gopal, were seriously burnt. The newspaper reports that their condition was said to be 'serious'. (source: Nai Duniya, 16<sup>th</sup> October 2014)
- On 13<sup>th</sup> February 2015, there was an accident in pump house 2, where Panchram Sonavani was seriously injured. He had suffered a serious head injury and was admitted to the sector 9 hospital. This accident had occurred due to the system of manual handling of the cooling pipe, which is a hazardous process and should have been replaced by an automatic system. (source: Nai Duniya, 15<sup>th</sup> February 2015)
- On 30<sup>th</sup> March 2015, 7 ton iron weight fell on Sudhir Tikariya in the Foundry shop. His hand was cut off and had to be amputated. In fact, workers had protested after this incident, when the BSP CEO did not turn up when he was actually supposed to inspect the accident site. (source: Nai Duniya, 2<sup>nd</sup> April 2015)
- On 15<sup>th</sup> June 2016, there was a gas leak and 1 officer and 6 workers had to be admitted to the hospital. This occurred in the Steel Molting shop 2, while maintenance work was going on and there was a greater quantity of gas in the gas monitor and was above the safety limit. (source: Nav Bharat Times, 17<sup>th</sup> June 2016)

In the year 2014, there was a very serious accident as well. Nav Bharat Times reports on 13<sup>th</sup> June 2014 that poisonous gas was released and 6 people died and 34 people were injured, of whom 12 were said to be serious. (source: Nav BharatTimes, 13<sup>th</sup> June 2014). Each new accident brings back painful and horrible memories of past accidents and underlines the precariousness of life in the public sector undertaking called the Bhilai Steel Plant!

In August 2018, 3 contract workers (Toranmal, Jayram and Kamal Kumar) were burnt alive as the valve of the coke oven battery no. 5 in the HPLA pump house ruptured and hot ammonia gushed out which caused severe burns to contract workers. The Nai Duniya report (21/08/2018) comments that there was 'no impact on production'.

Even after the 9<sup>th</sup> October 2018 explosion, accidents have continued to happen, despite the serious media and public gaze. In the 1<sup>st</sup> shift on the 31<sup>st</sup> of October 2018, the same month, 180 ton ladle got punctured and hot liquid metal gushed out on to the floor. It was only because of the presence of mind of workers that the situation was saved. (Nai Duniya, 1<sup>st</sup> November 2018). According to media reports, investigation into the last accident also reveals another aspect of BSP – the machinery is about 6 decades old and so are most machine-parts. This indicates another level of neglect. While negligence in safety issues is evident, so is the non-investment in the machinery and an attempt to merely run down the company and its infrastructure.

### Case-Study 1

**Ravi Kumar Jangde** (53 years): I had been working in BSP for over 10 years in the blast furnace. I have gate-passes of different contractors as the contractors keep changing, but I worked continuously. We are paid by the contractor. They do not give us pay-slips. We just have to sign on the registers. They cut the Provident Fund money off and on. The workers are made to sign on muster rolls or blank cheques which reflect that minimum wage is being paid.

I worked 30 days a month. Only on Sundays do we get overtime payment. If we are absent for 1 day, our wages for two days are deducted. In the blast furnace where I worked there are 15 contract workers. Even if I worked for

26 days, they show I worked for only 16 days and pay accordingly. They have given us neither bonus nor any allowance.

Though I was supposed to be employed by the contractor, in reality it is the Foreman who is a BSP employee who supervises my work and gives me instructions. They paid me less than minimum wages – Rs. 280/- per day. Towards the last few months of my employment before the accident, I was being paid Rs.220 (They should have given Rs. 380+ 88.40 per day.) We get wages in cash and not in our bank accounts. The only proof of employment is the gate pass. We have never been paid anything (bonus other monetary/non-monetary benefits) except our wages.

I was working on furnace no. 1 in the BSP plant. In that blast furnace, there are no permanent employees. I had gone for the 2<sup>nd</sup> shift at 2 pm on the 17<sup>th</sup> of August 2018. I had completed working on the 2<sup>nd</sup> shift. The 3<sup>rd</sup> shift worker had not come, so the contractor told me to work another shift also. The accident occurred in the 3<sup>rd</sup> shift at 3 am. I had already worked 13 hours by then.

While I was working I had to pull at a hose pipe. While I was doing that, there was a sudden shower of hot molten iron. The presence of water caused the blast. This is because there was water in the ladle, which should not have been there. My whole body was burning. I ran to the room where we workers – both

permanent and contract – take rest. The supervisor came running. I got up, poured water on myself and tore my clothes that were burning. I went down to where the ambulance was standing. I went there alone. I was very desperate, burning and suffering. The ambulance person called my home and informed them. They took me to the hospital. No one else accompanied me to the hospital. The contractor came to the hospital later. The officer had also come and said he will see what can be done. The entire treatment was completed.

They give me half payment now. The foreman (BSP worker) called me and due to my relations with him and on his insistence, I was paid Rs.4200/-. The following month I was paid Rs. 4800 and this month I have been paid Rs. 5000. This they will give me till the doctor says I am unfit. Once the doctor says I am fit, they will stop the money and they will not take me back to work as I will find it very difficult to do that sort of work now. Employees of BSP who were burnt in the recent accident have been paid Rs. 30 lakhs as compensation. I suffered higher degree of burns but did not get anything.

No FIR was filed. I have my hospital discharge paper. The contractor has a record of the accident. We also have medical records of the accident.

They have now stopped paying for my medicines. They give my daughter the list of medicines and prescription and ask her to buy the medicines. When the

union intervened, they began paying for the medicine. No officers visited me at the hospital.

I have received nothing except for the half payment in cash. This amount is paid by the contractor and not the principal employer (BSP). I have no receipt of the payment and barring this I have not received any other amount. The company did not give any compensation. Nor did they give employment to my children.

We do not know what will happen to me, my family, my children once they declare me to be fit, when the half payment of the wages will also stop.

## Case Study 2

**Shatrughan Dubey:** Shatrughan Dubey worked at BSP for 25 years and then with Hindustan Steelwork Construction Limited (HSCL, a public sector company which takes care of construction and maintenance jobs mainly through contractors). Despite the outsourcing to HSCL and subsequently to labour contractors, it is evident that the principal employer is BSP. The accident took place at HSCL on 8<sup>th</sup> May, 2016. Dubey worked at the Bhilai spark centre, but entered the plant using HSCL gate pass.

He was about 40 years old. He met with an accident in which he was badly burnt and died in the hospital. He was hospitalized for a day. He was on night

duty at the time of the incident...The hospital expenses were paid for by the contractor. The wife who is a cancer patient, talks of her plight since then:

“We were informed by his co-workers about the accident. When he was at the hospital, he was talking but did not say much because of the severe burns. The accident took place on a Saturday and he passed away on Sunday. He was healthy before this accident; never suffered from any ailment.

“We were asked by the contractor to apply for insurance owing to which we received Rs. 5 lakhs. We only received the insurance amount and nothing from the contractor or the principal employer. We were not told anything about getting another job. They said that we will not get a job at BSP, but with contractors. We were not provided anything in writing. My son was employed as a contract labourer for a few days and then fired after being accused of theft. My son was 19 and daughter 21 at the time of their father’s death.

I asked the company to employ my son because my daughter would be married off. We make our ends meet with the pension amount. The State government has a policy through which 85% of the salary is given as pension. We did not receive anything from the principal employer. We had withdrawn the PF amount when he had been unemployed for a year. It got used up.”

## 5.0 Failure to constitute Departmental Safety Committees

These real experiences of workers are in stark contrast to the claims of SAIL and BSP management. As per SAIL’s annual report for 2017-18, it employed more persons on contractual or casual basis than permanent workers. 65,152 regular workers to 66,186 on temporary/ contractual/ casual basis. The report also states that all of them have been given safety and skill up-gradation training in the last year. As per the Factories Act, 1948, all safety provisions apply equally to contract workers and permanent workers as the Act defines a worker to mean “ a person employed, directly *or by or through an agency (including a contractor) with or without knowledge of the principal employer, whether for remuneration or not*, in any manufacturing process, or in cleaning any part of the machinery or premises used for manufacturing process or in any kind of work incidental to, or connected with, the manufacturing process, or the subject of the manufacturing process...”. (section 2(l)). However, the employment of contract workers is so precarious and vulnerable that these provisions are routinely ignored and they are in no position to fight for implementation of even these statutory rights.

One of the main lapses on the part of the management in BSP appears to be the

failure to constitute the statutory Safety Committee. As per section 41-G of the Factories Act, 1948, in every factory where there is a hazardous process, the management *must* set up a safety Committee with equal number of representatives from the management and the workmen. However, according to the Hindustan Steel Karmachari Union Report no committee has been in place for the last two years. It says, “Like (all) other departments, Statutory Safety Committee with workers elected representatives has not been formed in EMD and Fire Brigade department also. (It needs mention that there were no safety committees for more than 31 months. Thereafter Mr. T.B. Singh, the then E/D (Works) published a list of safety committees of 26 departments without workers’ elected representatives on 15/02/2018 which has been declared illegal by the Factory Inspector, Mr. K.K. Dwivedi.” Not constituting departmental safety committees for such a long period and trying to constitute committees without duly elected representatives of workers is a serious lapse on the part of the management. Apparently departmental safety committees were not constituted because the management was trying to get its own people on them and hence there was a dispute. According to some workers some trade unions want their representative to be nominated to the committee rather than elect workers’ representative through the election process. This had resulted in a stalemate and hence

the absence of a safety committee. Not constituting safety committees is a gross violation of statutory provisions and the management is squarely responsible for not breaking the deadlocks and constitute the committees.

Safety committees play a crucial role in ensuring compliance with safety protocols and presence of workers with shop floor experience is vital in its functioning. In fact, many of the security lapses which resulted in the 9<sup>th</sup> October and other accidents could have been avoided had workers’ advice on these matters been heeded. Therefore, not constituting safety committees is a gross violation of statutory provisions and the management is squarely responsible for not breaking the deadlocks and not constituting the committees.

This is in stark contrast to the tall claims made by the National Steel Policy 2017<sup>5</sup>, according to which the ‘Ministry of Steel will continuously monitor the safety performance of all its steel companies including those in private sector through periodic reviews. Necessary efforts will be made to encourage the development of clearly defined safety standards and goals to become a zero accident workplace. It will coordinate with steel companies to ensure that on the job trainings on maintaining a safe workplace are provided to employees of the steel companies’.

<sup>5</sup> <https://steel.gov.in/sites/default/files/draft-national-steel-policy-2017.pdf>

The Centre for Science and Environment in its report ‘Why are lives so cheap in Indian steel plants?’ (Down to Earth, 2012,) highlighted the poor conditions in steel plants. It concludes that ‘poor maintenance and security in old aged plants mostly leads to such accidents.’ It also highlights that it's mostly untrained contract workers who are made to work in these hazardous areas which permanent employees and management prefer to avoid. These contract workers are not given any safety training, or adequate personal protection equipment or any health and safety support. Liability is not taken by the management but left on the contractor. The report further states that Bhilai Steel plant scored less than 15 per cent in safety, health and environment. Despite having a number of fatalities every year, BSP like many other plants have been awarded for best safety practices and some of them have received OHSAS 18001 certificates for following international standards in occupational health and safety.

The irony lies in the fact that most Occupational Health and safety agreements mandate worker participation in identifying risk factors and working out preventive and safety measures. For example the ILO Guidelines on occupational safety and health management systems ILO-OSH 2001, categorically requires workers’ participation and specifically states, *‘The employer should ensure, .. the establishment and efficient functioning of a safety and health committee and the recognition of workers’ safety and health representatives...’* (3.2.4.). Likewise, the US guidelines on

occupational safety are even more categorical:

*“Workers have much to gain from a successful safety and health program and the most to lose if the program fails. Workers often know the most about their jobs and any potential hazards.*

*A safety and health program will be ineffective without meaningful participation of workers and (if applicable) their representatives in establishing and operating the program.*

*“Worker participation means that all workers, including contractors, subcontractors, and temporary staffing agency workers:*

- Have opportunities to participate throughout program design and implementation.*
- Have access to information they need to participate effectively in the program.*
- Are encouraged to participate in the program and feel comfortable reporting safety and health concerns.”*

(OSHA Safety and Health Program Management Draft Guidelines, Nov 2015 p. 8)

The inclusion of contractors, subcontractors and temporary workers is significant as it is a policy recognition of subcontracting of work and multiple employer worksites. Presence of multiple employers on a worksite makes occupational safety a very complicated matter, and the new guidelines squarely address the issue. The

Draft Guidelines further elaborates the matter thus:

*“Today, workers of more than one employer work alongside or interact with each other at worksites. Typically, some workers are employed by a host employer (which may be an owner or general contractor) and others by a contractor, subcontractor, or temporary staffing agency. In these settings, employers must establish mechanisms to coordinate their efforts and communicate information to ensure that all workers on site and their representatives can participate in efforts to prevent and control injuries and illnesses, and that workers are afforded equal protection against hazards.”*

Absence of any form of worker participation in setting up departmental safety committees and absence of any committee at all is thus a grave violation of occupational safety concerns and norms. This constitutes a violation of the Factories Act, 1948 & International Conventions on OHSAS and seriously compromises occupational safety. The management should be held criminally liable for such violations.

### **5.1 Rewarding Recklessness**

Not only does the management of BSP neglect safety norms and protocols, but also actively promotes violation of these by awarding workers who flout the norms and demonstrate bravado. Workers are made to work without adequate safety precautions and under hazardous

conditions and are rewarded and awarded for it.

Awards are usually given at two levels – the National awards such as the Shram Ratna and the Vishwakarma Award, and more local awards such as the Shram Shiromani Award. According to workers, awards of the latter kind have been introduced because of a shortage of manpower – to encourage jobs to be completed by fewer people, and are usually given for steps taken by workers to increase productivity or efficiency of some or the other aspect of the production process. Any innovative step that leads to a cut in production costs or something that saves time are generally regarded as award-worthy. Awards of the former kind are also given for similar reasons – to workers who have initiated something that has led to an increase in productivity. However, the procedure to grant these awards requires nomination from superiors and a chain of approvals. So while risk-taking and bravery are not awarded directly, workers tell us that it is often an unspoken practice that those willing to take risks for the sake of cost-cutting and increased productivity, inevitably involving the compromise of safety norms and procedures, are assured that their names would be forwarded for such awards to the higher authorities. It is in this way that a culture of awards serves to create and nurture unsafe practices.

Many workers complained that this culture has resulted in flouting norms in the name of bravery and manliness. It appears that the management consciously cultivates such ‘masculinity’ among the workers who are made to care little for safety norms.

### **6.0 Decline of Safety Training**

Contrary to the claims of SAIL that all workers including contract workers have been adequately trained in safety norms, the workers assert that the management has not been conducting training of workers. ‘Bhilai Watch’ reports that BSP had celebrated the Suraksha Jagrukata Saptaha (Safety Awareness Week) in March 2018, with a ‘quiz’ on safety instead of any serious drill or training on safety issues. The fire department workers most closely involved in handling safety issues were categorical about this point. They recalled how safety issues, including safety training used to be taken much more seriously once upon a time. “Over the last few decades, there is hardly any safety training at all. The number of employees in the fire brigade department has been reduced by more than 50%, from about 500 to around 200 now. Regular safety training and updation is a thing of the past.”

Occupational Health and Safety protocols emphasise the importance of constant training:

Education and training means that employers, managers, supervisors, and workers:

- Have the knowledge and skills needed to work safely and avoid creating hazards that could place themselves or others at risk.

- Demonstrate awareness and understanding of workplace hazards and how to identify report, and control them.

- Receive specialized training when their work involves unique hazards.

In addition, all workers are to receive specialized training when they are assigned specific roles in managing or operating the safety and health program.

### **7.0 Steel Industry in the era of Globalisation**

While this episode has its own immediate reasons and consequences, it is actually a part of a larger process of change in the BSP. The BSP is a major public sector undertaking set up with dual objective of building a national steel manufacturing facility and at the same time setting norms of industrial relations and employment. In recent decades its position has changed radically with increasing privatization of the steel sector. The BSP has also been facing stiff international competition and is susceptible to international market pressures. As a result, it has moved away from its initial objective of being a pace setter in quality employment, and a ‘socialist employer’. Casualisation of labour, sub contracting and laxity in safety and health issue are now very much a part of BSP strategies just as in any private sector undertaking for profit.

The steel industry in India has grown by leaps and bounds during the last twenty years. Today (2018) it is ranked as the second largest producer of steel in the world (after China). It produces over 101 million tons of crude steel. Just 12 years before in 2005 it produced only 38 million tons (source: World Steel in Figures 2018, and 2006, World Steel Association). India is however, not a major exporter of steel as it consumes most of the steel produced. However, this should not delude us to believe that India is major consumer of steel. In actual fact India ranks rather low in real per capita steel consumption with about 65 kilograms per person per year compared to China which consumes 522 kg of steel or South Africa which consumes 82 kg per head or Brazil which consumes 91 kg per head. (Per capita consumption of steel is said to be an indicator of the level of industrialization in a country.)

Nevertheless, the growth of Indian steel industry and Indian steel companies like Mittal, Tata and SAIL has been phenomenal over the last two decades. Mittal, both before and after the acquisition of Arcelor, remains the world's top Steel producer and Tata Steel ranks 10<sup>th</sup> with a production of 25 mt and SAIL ranks 25<sup>th</sup> with a production of 15 mt. Such phenomenal growth has not been accompanied by any corresponding increase in employment. On the contrary this growth has been achieved by displacing labour on an unprecedented scale the world over. A ton of steel which was produced by ten persons in 1980 in the USA is now produced by just one person. In South Korea, Posco employs

29,648 people to produce 28 million tons. It is has been difficult to get data about the number of persons employed in the steel sector in India as official figures do not cover contract and casual workers. As per the official data, India employs about 3,83,000 persons every day in the Iron and Steel industry. But this includes rolling mills etc which use steel and not just ore smelting and steel making. While it is difficult to get a precise comparative picture of the progress of casualization over the last decade, we can get an idea of the current position from the information provided by the Union Minister of Steel in the Parliament in 2012:

Plant	Executive	Non-Ex	Contract Labour	Total
Bhilai Steel Plant	3767	25350	28377	57494
Rourkela Steel Plant	2211	15814	19029	37054
Bokaro Steel Plant	2708	16856	8973	28537
IISCO Steel Plant	979	7577	13748	22304
Durgapur Steel Plant	1645	10713	6900	19258
Visvesvaraya Iron & Steel Plant	228	816	1077	2121
Alloy Steel Plant	290	1110	640	2040
Salem Steel Plant	322	1019	203	1544
<b>Total</b>	<b>12150</b>	<b>79255</b>	<b>78947</b>	<b>170352</b>

That year, in 2012, SAIL produced about 13.5 mt of crude steel, that it employed 1.3 workers per ton, quite close to the US and Korean standards mentioned above.

It is also evident from this table that currently the ratio of a regular worker to contract workers is about 1:1. In some of the larger plants like Bhilai, Rourkela, IISCO, there are more contract workers to regular workers. Of course we do not know have the figure for contract workers has been arrived at and if all categories of workers who needed to be included have indeed been included or not. This process of contractualisation in many ways reflects the growing privatization of the steel industry, the handing over of work previously done in the public sector to private contractors. It also implies that the BSP is withdrawing from its previous role of providing 'decent or standard employment' guaranteeing workers minimum wages, social security and taking care of their housing, health, safety, educational and cultural needs.

By the late 1980s, the company had around 65,000 employees on its direct payroll, in worker grades, almost all of them male. By January 2011 this was down to 31,500, a reduction accomplished through voluntary retirement and natural attrition, without forced redundancies or significant investment in labour-saving technology. Output has been maintained – indeed enhanced – largely by the deployment of much cheaper contract labour in the least skilled, but most physically taxing tasks. The progress of reduction of the total labour force and

contractualisation can be gauged from the fact that in 1958, the production was around 1 million tons per year with a workforce of 66,000 - all of them were permanent. Today BSP produces seven times more steel with 25,000 regular and 28,000 contract workers. This has been made possible by both a degree of technological transformation and the super exploitation of the contract workers who are forced to work at lower wages for longer hours, without any social security etc. This in effect has produced a divide within the BSP workforce, the regular workers enjoying high wages and social security while the contract workers don't even get minimum wages and little access to social security of any kind. However, the recent 'accident', where all the workers who died and were seriously injured were permanent workers, indicates that this callous attitude to workers, the gross neglect in the quality of work, the exploitative relationships and criminal neglect of safety standards have severely hurt permanent workers too.

Anthropologist Jonathan Parry has documented the progress of contractualisation of labour in BSP has this to say of the contract workers: 'Most are unskilled; and many of the most tedious, grueling and unpleasant tasks which used to be performed by BSP workers are now done by contract labour who over the past five years have been the victims of the vast majority of fatal accidents in the plant.' 'While inside the plant all BSP workers are men, a high proportion of unskilled contract workers are women. But whether male or female, the vast majority are Chhattisgarhis, while the contractors

are overwhelmingly outsiders.’ The ethnic and gender profile of the workers is different and also the division of work and exposure to risk, between them.

According to workers who have been working at the BSP for several decades, ‘Around the year 1979-80, the BSP management had begun to use the contract labour system. However, in that period there were around less than 5000 contract workers engaged in construction work. These contract workers had access to medical and other facilities like the permanent workers. However, in the last 20 years, the BSP management has completely stopped recruiting permanent workers. Between the years 2000 and 2007 hardly has any permanent worker been recruited. In the last 10 years, may be just about 3000 permanent workers have been recruited. At this point in time, BSP has more than 50% contract workers. Contract workers are deployed in each department. They are neither paid minimum wages nor do they get any safety equipment. Production has increased tremendously and the number of workers has reduced.’

While the practice of subcontracting has serious implications for conditions of work and remuneration and social security, its implications for occupational safety and health have not attracted enough attention. The existence of a large number of autonomous contractors and subcontractors complicates decisions relating to safety. It requires careful planning and coordination with multitude of contractors who may have little background in such matters and may even consider these to be an unnecessary burden on their already

narrow profit margins. These subcontractors recruit unskilled agricultural workers or poor peasants who are not even given safety gears let alone training in such matters. This has resulted in a large number of accidents in which the contract workers are the victims. As can be seen from the case studies of accidents involving contract workers, affected workers are left to fend for themselves as the contractors or the principal employer refuses to take any responsibility for them.

It is ironical that even as India is vying for the top position in steel production in the world, it is adopting such a callous approach towards the workers who are engaged in the production process.

## **7.1 Industrial accidents in Steel industry and globalization**

**7.1.1 The Qinghe Special Steel Corporation disaster, China:** China the leading producer of steel in the world today, demonstrates some of the problems we have listed above. In the post globalization period, the steel sector in China was privatized and this is said to have led to neglect of safety norms on a large scale leading to a spurt in accidents. The **Qinghe Special Steel Corporation disaster** was an industrial disaster that occurred on April 18, 2007, in Qinghe District, Tieling, Liaoning, China. Thirty-two people were killed and six were injured when a ladle used to transport molten steel separated from an overhead rail in the Qinghe Special Steel Corporation factory. This is said to be the worst accident in China since 1949.

A subsequent investigation by the Chinese authorities found that the plant had been lacking all the major safety features and was severely below regulation benchmarks, with the direct cause of the accident being attributed to inappropriate use of substandard equipment. The investigation also concluded that the various other safety failings at the facility were contributing factors. The report went on to criticize safety standards all throughout the Chinese steel industry.

The report goes on to say that the accident highlights poor working conditions and safety measures in the Chinese steel industry, "Some firms cannot adapt to the demands of rapid expansion and ignore safety... Safety inspection is not in place, leading to multiple accidents." and concluding "Work safety conditions in the metallurgy sector are extremely grim."

Let us turn to similar situations emerging in the erstwhile socialist block countries like the Czech republic. New World Resources N.V. announced two fatalities resulting from an accident in April 2009 at the Svoboda coking plant of OKK, its wholly owned coke producer in Ostrava, Czech Republic, when an ammonium hydroxide tank exploded on the premises. At the time of the accident, the tank containing a small amount of ammonium hydroxide had been taken out of service and employees of a specialised subcontractor to OKK were performing maintenance works on piping insulation.

**7.1.2 Bulgarian steel industry too reported accidents of this kind:** In January 2004, a major industrial accident occurred at Kremikovtzi, Bulgaria's largest iron and steel plant, with three workers killed and 22 more hospitalised. An investigation subsequently highlighted major health and safety problems at the site. The tragedy focused attention on the widespread failure by companies to implement health and safety legislation, with trade unions calling for new measures to ensure the law's effective application.

Kremikovtzi is Bulgaria's largest plant involved in the extraction and primary processing of ferrous metals. The facility is situated on a site of 15 square kilometres east of the capital Sofia. Before privatisation, the company had more than 15,000 employees, but after a series of structural changes there are now 7,950 workers. A number of allied and maintenance activities are organised as separate enterprises (i.e. subcontracted).

Kremikovtzi is regarded as having various inherited and new problems, notable old equipment and technologies and considerable investment shortages caused by old company debts. The plant is one of the main sources of environmental problems in the region. The working conditions at the plant are reported to be one of the main factors causing tension between management and employees, and have been raised by trade unions.

At about 16.30 on 10 January 2004, the operator of monitoring equipment at Kremikovtzi's water-power department reported that the pressure in the water pipeline supplying the blast furnace's gas-purifying machinery was falling. A breakdown team was sent to the scene and started repairs to the pipeline, though without coordinating its action with the operational management of the blast furnace and the firm's 'gas-rescue' service. At about 17.00, gases from the blast furnace, containing a high level of carbon monoxide, started to escape from the broken pipe. Twelve firefighters were sent in, without being given sufficient information on the concentration of carbon monoxide. More gases then started leaking due to a rapid decrease in the water level and the elimination of the machinery's 'water barrier'. As a result of this series of human errors, the noxious gases killed three people, including one firefighter. Another 22 suffered various levels of poisoning and were hospitalised.

An investigation of the circumstances and the reasons for the accident drew several important conclusions. First, the gas escape could have been stopped if there had been good coordination between the actions of the breakdown team, the specialists at the blast furnace and the gas-rescue service. There were two spare water pipelines that could have supplied water for the gas-purifying machinery and maintained a sufficient water barrier. With regard to the situation after the gas escaped, the investigation found that,

- the rescue unit's actions and equipment (including breathing equipment) was inadequate;
- the parts of the blast furnace where there was a danger of gas leaks did not have an automatic warning system;
- there were serious gaps in the education and training of the main technical workers responsible for the gas-purifying system;
- the necessary technical inspections of the condition of the firefighters' breathing equipment had not been undertaken; and
- important labour inspectorate instructions on technical supervision and internal communications, as well as on equipment to cool and purify blast furnace gases had not been implemented.

The investigation concluded that:

- important legal provisions had been only formally implemented.
- the risk evaluation was formal and imperfect;
- the management ignored points raised by trade unions;
- there was a lack of reliable information, communication and coordination systems; and
- there was a lack of coordination between various services and the external companies working at the site.

Following its investigation of the reasons for the accident, the labour inspectorate imposed a fine on 16 officers of the

company. The inquest continues and a criminal prosecution of officers may follow. At the request of trade unions, the company's executive director imposed disciplinary penalties, including the dismissal of employees who had violated health and safety instructions. The labour inspectorate has issued more than 20 instructions to address legal violations and omissions in the organisation and management of health and safety activities at the site.

At the initiative of the Confederation of Independent Trade Unions in Bulgaria (CITUB), a number of extraordinary joint meetings have been held, involving trade union leaders, company management and the Kremikovtzi working conditions committee. CITUB also insisted on a special meeting of the National Working Conditions Council to discuss the tragedy. A number of concrete actions at national level were discussed at this meeting, aimed at the real implementation of the health and safety and working conditions legislation. These include:

- stronger control of high-risk production activities;
- increasing the capacity of the chief labour inspectorate;
- development of a special labour inspection law;
- enforcing a differentiated employer's insurance contribution for work accidents and occupational illnesses by 1 January 2005;
- the introduction of economic incentives (eg tax and credit relief) to stimulate investments in improving working conditions;

- the introduction of special obligatory work accident insurance for particularly high-risk occupations and activities; and
- improving the training of working conditions committees and groups, managers and company officers, and trade union officials working in the field of health and safety at work.

In the context of the Kremikovtzi tragedy, a number of conclusions can be drawn with regard to the general state of working conditions in Bulgarian enterprises. The Bulgarian legislation in the field of health and safety and working conditions has been following the EU norms and criteria, but its implementation is taking time.

The harmonisation of Bulgarian legislation with EU norms has put enterprises in a difficult situation. They are largely technologically undeveloped, their equipment is old; there are financing and investment deficits and a lack of economic incentives for investment in working conditions and the innovation of production as a whole. Companies' markets have become narrower and there is a lack of markets for whole branches of activity. This has been accompanied by mass redundancies, 'groundless' restructuring and the elimination of whole areas of production. Strict cost-saving regimes have been introduced which have affected heating, air-conditioning and cleaning equipment, lighting installations and other equipment that have a direct effect on working conditions. Unfortunately, nowadays the working conditions in many Bulgarian enterprises have been

downgraded. The new health and safety legislation provided for a six-year period for its application by enterprises and workplaces, but during this period they have not been able to do so.

**7.1.3 Belgium (Arcelor Mittal Plant Accident):** About a year before the BSP gas fire explosion, a similar accident took place in Ghent plant of Arcelor Mittal company. On November 20, 2017 an explosion took place in the by-products zone of the coke plant. The accident resulted in one fatality and two injured.

## **7.2 Need for larger solidarities and consultations on Occupational Safety and Health**

Some of these reports indicate similar conditions prevailing in the steel industry across the world and workers facing the consequences. It is thus becoming imperative that workers and trade unions across the countries engage in consultation with each other and identify issues for concerted solidarity action and advocacy.

## **8.0 Legal Provisions**

Several legislations have been formulated in order to ensure the health and safety of workers. This section will encapsulate various legal provisions that further the objective of occupational health and safety.

The Factories Act, 1948 aims to provide adequate measures to promote the health, safety and welfare of workers employed at a factory. The Act was amended in 1987 in the aftermath of the Bhopal gas tragedy to make provisions for health and safety measures to be undertaken by factories involving hazardous processes. Amendments were made to several sections of the principal Act. In addition to this, Section IVA was added to the Act which provided for specific provisions to be made in case of hazardous processes, and Schedule I of the Act categorically lists coal (including coke) industries as industries involving hazardous processes.

Section 41B mandates the compulsory disclosure of information by the occupier of every factory involving a hazardous process regarding ‘dangers, including health hazards and the measures to overcome such hazards arising from the exposure to or handling of the materials or substances in the manufacture, transportation, storage and other processes, to the workers employed in the factory, the Chief Inspector, the local authority within whose jurisdiction the factory is situated and the general public in the vicinity’. The factory owner is also mandated to formulate a detailed policy with respect to health and an on-site emergency plan and detailed disaster control measures for his/her factory

As per Section 41G the occupier, in every factory where a hazardous process takes place, or where hazardous substances are used or handled, is required to set up a Safety Committee consisting of equal number of representatives of workers and

management to promote cooperation between the workers and the management in maintaining proper safety and health at work and to review periodically the measures taken in that regard.

The Employee's Compensation Act, 1923, (amended in 2017) was passed with the aim of providing compensation to workers and their dependents in case of injury and accident (including certain occupational diseases) arising out of and in the course of employment and resulting in disablement or death. The term 'workman' is defined very broadly to include even contract workers while excluding members of the armed forces and casual employees like domestic servants.

Section 4 of the Act makes provision for calculating the amount of compensation where death results from the injury an amount equal to fifty per cent of the monthly wages of the deceased workman multiplied by the relevant factor; or an amount one lakh twenty thousand rupees whichever is more. The relevant factor is calculated in accordance with the age of the workman at the time when the compensation becomes due multiplied with the factor as determined by Schedule IV<sup>6</sup> of the Act. In cases where permanent total disablement results from the injury an amount equal to sixty per cent of the monthly wages of the injured workman multiplied by the relevant factor; or an amount of one lakh forty thousand rupees whichever is more is owed to the workman. It is noteworthy that the

calculation is to be based on what is termed as the 'cost to institution' and not the actual 'wages in hand'. This section was amended in 2009 to increase the amount of compensation in case of death and permanent total disablement.

Section 12 of the Act categorically makes the principal employer liable for injury or death of a contract worker: "the principal shall be liable to pay to any employee employed in the execution of the work any compensation which he would have been liable to pay if that employee had been immediately employed by him." However, it also provides that the calculation of the compensation amount shall be determined by the pay the employee receives from the contractor and not the amount paid by the principal employer to its own employees for similar work.

*The Contract Labour (Abolition and Regulation) Act, 1970 was passed with the aim of regulating the employment of contract labour in certain establishments and abolishing its usage in others. The underlying aim of this legislation was to deal with the abuses of the contract labour system.*

*According to Chapter V of the Act if the contractor fails to provide facilities such as a canteen, restrooms first aid facilities etc. to the contract worker within the time prescribed, such amenities shall be provided by the principal employer. . The liability of ensuring the health, safety and welfare of the contract labour, therefore, lies with the principal employer. As per*

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<sup>6</sup> Contract Labour (Regulation and Abolition) Act, 1970, [http://labour.bih.nic.in/acts/contract\\_labour\\_regulation\\_and\\_abolition\\_act\\_1970.pdf](http://labour.bih.nic.in/acts/contract_labour_regulation_and_abolition_act_1970.pdf),

*Section 21 of the Act, this also applies in the case of non payment of wages by the contractor.*

### **8.1 International Protocols**

The International Labour Organisation (ILO) has formulated several protocols to address the issue of Occupational Health and Safety. India has not ratified most of these protocols barring one. The Prevention of Major Industrial Accidents Convention, 1993 is perhaps the only convention pertaining to health and safety that India has ratified. The Convention came into being in order to ‘prevent major accidents, minimize the risks of major accidents and minimize the effects of major accidents’

It defines hazardous substance as ‘a substance or mixture of substances which by virtue of chemical, physical or toxicological properties, either singly or in combination, constitutes a hazard’ and the term **major hazard installation** means one which produces, processes, handles, uses, disposes of or stores, either permanently or temporarily, one or more hazardous substances or categories of substances in quantities which exceed the threshold quantity. The term **major accident** means a sudden occurrence - such as a major emission, fire or explosion - in the course of an activity within a major hazard installation, involving one or more hazardous substances and leading to a serious danger to workers, the public or the environment, whether immediate or delayed.

**Article 9 of the Convention requires employers** in respect of each major hazard installation employers to establish and maintain a documented system of major hazard control which includes provisions for:

- the identification and analysis of hazards and the assessment of risks including consideration of possible interactions between substances;
- technical measures, including design, safety systems, construction, choice of chemicals, operation, maintenance and systematic inspection of the installation;
- organizational measures, including training and instruction of personnel, the provision of equipment in order to ensure their safety, staffing levels, hours of work, definition of responsibilities, and controls on outside contractors and temporary workers on the site of the installation;
- formulate emergency plans and procedures,
- undertake measures to limit the consequences of a major accident;
- organize consultation with workers and their representatives;
- undertake measure to improve the system, including measures for gathering information and analysing accidents and near misses. The lessons so learnt shall be discussed with the workers and their representatives and shall be recorded in accordance with national law and practice.

## 9.0 Main Findings & Recommendations

### 9.1 Findings

1. The accident of 9<sup>th</sup> October 2018 was the result of gross violation of safety precautions mandated for any de-blanking operation and misplaced risk assessment which ignored the possibility of fire and explosion hazard during this operation.

- The deblanking operation was commissioned without depressurizing the gas pipes, without use of water seal or nitrogen purging, which led to the sudden explosion.
- The risk assessment does not seem to have taken into account the possibility of fire and sudden explosion and focused instead only on leakage of toxic gases. This resulted in the team not being adequately prepared for fire/explosion hazard.
- The fire brigade was placed too close to the site of operation as a result of which it got engulfed in the fire explosion and its equipment was rendered dysfunctional.

2. Given the fact that the risky nature of the operation was well known, the preparations for it in terms of fire brigade preparedness and ambulance preparedness were woefully and criminally inadequate and inappropriate.

- The fire brigade did not have access to continuous water supply, and the number of fire personnel at the site was inadequate
- There was no proper road access to the accident site which delayed the deployment of ambulances leading to delay in initial treatment of the victims.
- The number of ambulances was highly inadequate which meant that only about two workers could be taken to hospital at a time. This too caused fatal delay in treatment.

3. A large number of fatal and non-fatal accidents have been regularly occurring in the Bhilai Steel Plant involving contract workers, but these have gone unreported and the affected workers have not been

given proper medical attention or compensated for loss of limb or life.

4. Serious lapses in the Occupational Safety and Health matters have been brought to our notice, which include not constituting statutory committees, not training the contract workers in safety issues or giving them protective equipment, overall laxity in training and safety drills.

- Statutory safety committees (at both departmental and plant level) with the participation of worker's representatives (including representatives of contract workers) have not been in existence for the last several years.
- Sub-contractors and contract workers have not been given safety training or equipment and are not involved in safety drills.
- More and more untrained contract workers are being engaged in regular operations greatly increasing the risk of accidents and exposure to hazards.

5. Charge-sheeting of the responsible officials for criminal negligence

leading to loss of life, causing grievous injury and loss of equipment has not still been done, six months after the incident, opening the possibility of letting them off the hook.

## **9.2 Recommendations and Demands that the workers may advance**

1. A Judicial Enquiry should be instituted into the causes of this accident and going into the overall issues of Occupational Safety and Health practices in the BSP.
2. Prosecution of the management / concerned officers under section 92 of the Factories Act, 1948, for contravention of the provisions of the Act, and the Chief Inspector of Factories to file a complaint for the same before the appropriate Presidency Magistrate / magistrate of the first class as per section 105 of the Factories Act, 1948. Those responsible for accident should be prosecuted for causing death and injury due to criminal negligence.
3. Increasing the compensation amount: Presently the compensation amount is a meagre Rs. 30 Lakh, which if invested in Fixed Deposits will yield less than Rs. 16,500/ per month. This is being paid as compensation for workers who on an average earn not less than Rs. 60,000/ a month. Either the company should pay the spouse (till death or remarriage) and children (till they are 18 years of

- age) or dependent parents an amount at least half to two thirds of the normal salary of the worker or a lump sum which can earn them a similar interest. (This should also be subjected to a minimum threshold in case of workers who are not paid a decent family wage.)
4. The Management of BSP should take immediate steps to set up safety committees at department level and the plant level and should include representatives of the workers (preferably through election) and also representatives of contractors and contract workers. This should be monitored by the Chief Inspector under the Factories Act.
  5. Participation of the unions and workers' involvement in building a robust safety system and culture should be institutionalised and strictly followed.
  6. High Risk practices like De-blanking while the pipe has gas under pressure should be put an end to immediately. The Safety Committees should regularly meet to assess the risk factors in different operations and suggest appropriate measures before embarking on them. International OSH standards for steel industry should be strictly adhered to.
  7. When undertaking any known risky operation adequate arrangements should be made for handling accidental fall outs (fire, explosion, leakage of toxic gas, fall of heavy bodies from height, etc) with fire brigades, water supply, ambulances, etc ready at hand.
  8. Appropriate safety gear for each job should be provided and such gear should be decided in consultation with workers engaged in different kinds of work in each department.
  9. There has to be adequate investment in upgradation of infrastructure and machinery that aids workers in their tasks and appropriate tools should be made available to work with the new machinery.
  10. The procedures for awarding distinguished workers should be made transparent and streamlined so that they do not goad workers do not have to 'please' the managers by ignoring safety norms or taking undue risks.
  11. All workers including contract workers and workers under outsourced projects should be given adequate skill-training as well as training in safety procedures.
  12. The permanent, non-permanent, contract and trainee workers should be given the same safety equipment and the same safety training – as per the Factories Act, 1948.
  13. For anyone working on the plant site (under any contract or outsourced project) the provisions of the Factories Act, 1948, under which the principal employer is responsible for the safety of workers should be strictly implemented with

BSP taking full responsibility itself. (In case of accidents similar treatment and compensation should be given to affected contract workers – which indeed is provided for both under the Factories Act, 1948, & the Workmen's Compensation Act, 1923.).

14. All accidents and potential accidents should be duly reported and studied to enhance safety and occupational health in the plant. Accidents suffered by contract workers and temporary or trainee workers should which are currently not reported should also be taken into strict account.
15. Every minor accident too should be recorded, registered and investigated as it has been shown that a series of minor accidents gives rise to major accidents.
16. During our interviews workers were unanimous that contractualisation of work, introduction of contract workers into perennial work including machine operating is a major reason for decline of safety standards in Bhilai Steel Plant. This is also corroborated by experience of other steel plants in the country and in China. This is an additional reason why the legal provisions relating to regulation and abolition of contract labour should be strictly implemented.
17. Some steps also need to be taken at the state and national level. State level Occupational Safety and Health

Committees should be formed with adequate and wide representation of workers, trade unions and other worker's organisations. This Committee should lay down safety norms for all industries and monitor their implementation.

18. The Union ministry of industries, Govt of India or national safety council should come out with operational guidelines on safety systems and standards in the Steel industry in general and SAIL plants in particular in consultation with trade unions and safety committees.
19. Legal loopholes which enable managements to discriminate against contract and temporary workers and trainees or 'apprentices' in cases of accidents, injuries and occupation related illness.
20. Trade unions and workers' organisations for their part need to take up safety and occupational health issues seriously by:
  - Setting up safety and health cells to monitor strict implementation of safety protocols and identify problem areas.
  - Take up the cause of contract and temporary workers and also trainees and ensure that they have equal right to safe work, social security and accident compensations.
  - Conduct awareness among workers to resist pressures to violate safety norms.

- Coordinate with safety committees of trade unions in other steel plants in India and abroad, study safety systems and conditions of work and exchange information and take solidarity actions.

## Appendix I – Coke Oven Gas, its Characteristics and Safety Requirements

Posted by [Satyendra](#) on Apr 29, 2015 in [Ispat Digest](#) | [0 comments](#)

Coke oven gas (CO gas) is a byproduct gas produced during the production of metallurgical coke in a byproduct coke oven battery, where metallurgical coal is carbonized by heating it in absence of air. During carbonization the volatile matter in the coal is vaporized and driven off. This volatile matter leaves the coke oven chambers as hot, raw coke oven gas. After leaving the coke oven chambers, the raw coke oven gas is cooled which results in a liquid condensate stream and a gas stream. These two streams are processed in the byproduct plant to recover byproduct coal chemicals and to condition the raw coke oven gas so that it can be used as a fuel gas. The main emphasis of a modern byproduct plant is to treat the raw coke oven gas sufficiently so that it can be used as a clean, environmentally friendly fuel. Raw coke oven gas after treatment in the byproduct plant is called clean coke oven gas or simply coke oven gas.

The evolved coke oven gas leaves the coke oven chambers at high temperatures approaching 1100 deg C. This hot gas is immediately quenched by direct contact with a spray of aqueous liquor (flushing liquor). The resulting cooled gas is water saturated and has a temperature of around 80 deg C. This gas is collected in the coke oven battery gas collecting main. From the gas collecting main the raw coke oven gas flows into the suction main. The amount of flushing liquor sprayed into the hot gas leaving the oven chambers is far more than is required for cooling, and the remaining unevaporated flushing liquor provides a liquid stream in the gas collecting main that serves to flush away condensed tar and other compounds. This stream of flushing liquor flows under gravity into the suction main along with the raw coke oven gas. The raw coke oven gas and the flushing liquor are separated using a drain pot (the down comer) in the suction main. The flushing liquor and the raw coke oven gas then flow separately to the byproduct plant for treatment.

### Composition of coke oven gas

The chemical composition of the raw coke oven gas is given in Tab 1.

**Tab 1 Composition of raw coke oven gas**

Chemical name	CAS number	EC number	% Volume
Hydrogen	1333-74-0	215-605-	52-59

		7	
Methane	74-82-8	200-812-7	26-33
Nitrogen	7727-37-9	231-783-9	1.9-5.7
Carbon monoxide	630-08-0	211-128-3	4.5-7.0
Ethylene	74-85-1	200-815-3	2.0-2.8
Carbon dioxide	124-38-9	204-696-9	1.4-2.1
Hydrogen sulfide	04-06-83	231-977-3	0.4-1.2
Hydrogen cyanide	74-90-8	200-821-6	0-1.2
Ethane	74-84-0	200-814-8	0.7-1.1
Ammonia	7664-41-7	231-635-3	0-1.1
Benzene	71-43-2	200-753-7	0-1.0
Carbon disulfide	75-15-0	200-843-6	0-0.3
Toluene	108-88-3	203-625-9	0.1-0.2

CAS- Chemical Abstract Service, EC- European Community

The chemical composition of the clean coke oven gas is given in Tab 2.

**Tab 2 Composition of clean coke oven gas**

<b>Chemical name</b>	<b>CAS number</b>	<b>EC number</b>	<b>% Volume</b>
Hydrogen	1333-74-0	215-605-7	42-65
Methane	74-82-8	200-812-7	17-34
Nitrogen	7727-37-9	231-783-9	1.2-18
Carbon monoxide	630-08-0	211-128-3	4.6-7.5
Carbon dioxide	124-38-9	204-696-9	0.2-3.5
Ethane	74-84-0	200-814-8	0.1 ?

			2.9	
Oxygen	7782-44-2	231-956-9	0-2.6	
Ethylene	74-85-1	200-815-3	0.1 2.5	?
Benzene	71-43-2	200-753-7	0 ?	0.4
CAS- Chemical Abstract Service, EC-European Community				

Typical compositions of the raw CO gas and the clean CO gas is shown in Fig 1.

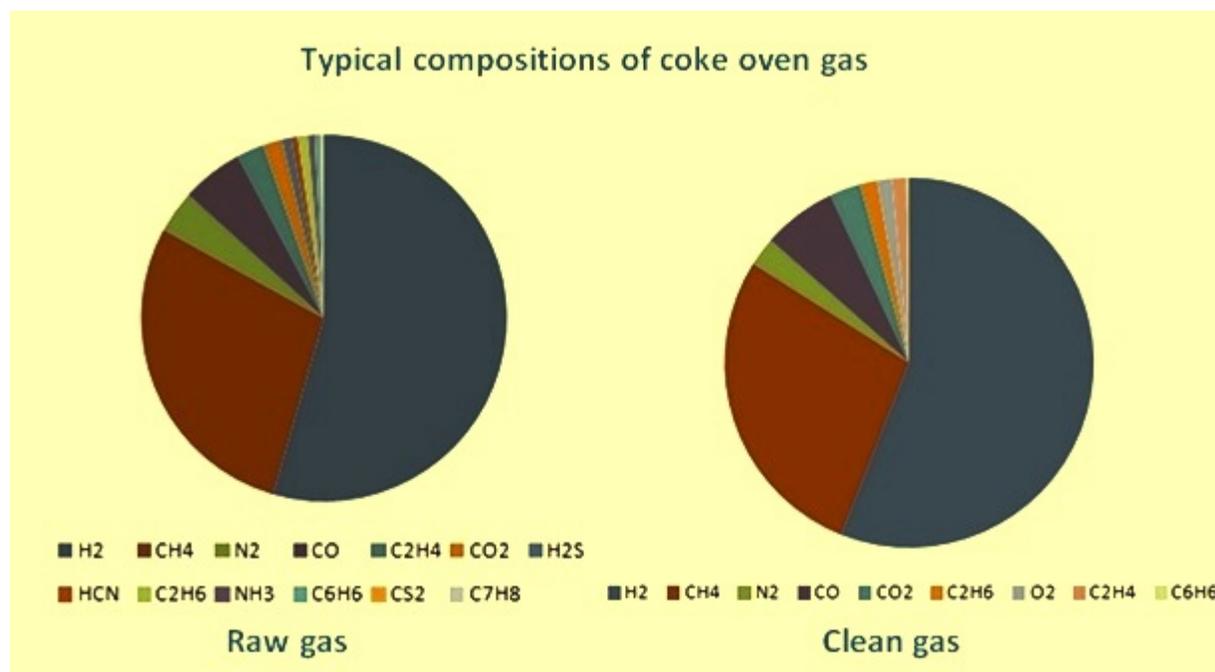


Fig 1 Typical composition of coke oven gas

### Characteristics of coke oven gas

Raw coke oven gas has a yellowish brown colour and an organic odor. It is a flammable gas with lower explosive limit of 4 % and upper flammability limit of 75 %. Its vapour density is 0.39 (air=1) and relative density is 0.589.

Raw coke oven gas is a flammable material with a flash point of less than 60 deg C. The gas contains toxic chemicals as given in Tab 3.

Tab 3 Toxic elements in raw CO gas

Chemical name	Max % by Weight
---------------	-----------------

Ethylene	2.8
Hydrogen sulfide	1.2
Hydrogen cyanide	1.2
Ammonia	1.1
Benzene	1
Carbon disulfide	0.3
Toluene	0.2

Clean coke oven gas is a colourless gas with an odor characteristics of hydrogen sulphide and hydrocarbons. It has a lower explosive limit of 4.4 % and upper explosive limit of 34 %. Its vapour density is 0.36 (air=1). The density of CO gas at standard temperature and pressure is in the range of 0.45 to 0.50 Kg/Cum.

The clean coke oven gas contains toxic chemicals as given in Tab 4.

**Tab 4 Toxic elements in raw CO gas**

<b>Chemical name</b>	<b>Max % by Weight</b>
Ethylene	2.5
Benzene	0.4

CO gas has a calorific value ranging between 4000 to 4600 Kcal/N Cum. It has a theoretical flame temperature of 1982 deg C. It has a rate of flame propagation which allows its actual flame temperature to be close to its theoretical flame temperature.

When exposed at high concentration, CO gas act as a simple asphyxiant. It displaces oxygen and cause rapid suffocation by showing symptoms of oxygen deprivation. It may cause heart problems with prolonged or repeated exposures. CO gas causes damage to the heart through prolonged or repeated exposures. The gas is harmful if inhaled. In case of inhaled, the affected person is to be removed to fresh air and is to be kept comfortable for breathing. CO gas can also cause eye irritation.

In case of a leaking gas fire (both for raw and clean CO gas), it should not be extinguished unless leak is stopped safely or the fire is immediately impacting the human life. All ignition sources are to be eliminated if safe to do so. The fire is to

be extinguished with foam, carbon dioxide, dry powder or water fog, once leak is stopped. A solid stream of water is not to be used since it may scatter and spread the fire.

There are special protective equipment and precautions for fighting the CO gas fires. Self contained respiratory protection and full protective clothing are to be worn when fumes and/or smoke from fire are present. Firefighters are to wear full face piece self contained breathing apparatus and chemical protective clothing with thermal protection. Direct water stream scatters and spreads flames and, therefore, are not to be used. The area is to be evacuated. The pressurized gas cylinders are to be removed from the immediate vicinity. The containers exposed to flames are to be cooled with water until well after the fire is out. The valve is to be closed if no risk is involved. It is necessary not to extinguish a leaking gas fire unless leak can be stopped. If leak cannot be stopped and no danger to surrounding area, then the fire is allowed to burn out. Fighting of the fire is to be carried out from a protected location. The buildup of vapours or gases to explosive concentrations is to be prevented.

Analytical data indicate that volatile HAP (Hazardous Air Pollutants) collectively comprises much less than 1 % by volume of CO gas after conventional treatment of raw CO gas in a byproduct plant. Hence the CO gas combustion in well maintained operated combustion units such as process heaters, and boiler etc, results in very low levels of HAP emissions. The filterable particulate matter (PM) emissions from the combustion of CO gas are typically low. HAP metal emissions from CO gas are not significant.

### **Safety requirement for the CO gas**

The following are the safety requirements for the CO gas.

1. No person is allowed to work in or go to the area where CO gas is present, if the carbon monoxide content in that area is more than 50 ppm then gas mask is to be used.
2. On line monitoring system with alarm for carbon monoxide concentration is to be provided in the areas around equipment/process handling CO gas. Performance of on-line monitoring system is to be checked once in a month for its proper operation and records are to be maintained.
3. Either non sparking tools or grease coated tools are to be used while working on charged CO gas pipelines and gas handling system.
4. No person is allowed to work on charged system (where there is possibility of presence of CO gas) without gas masks.
5. Proper escape route and scaffolding is to be provided while working on charged CO gas system at height.

6. The welding current is not to exceed 100 A while welding on charged CO gas system.
7. Cutting or welding jobs are not to be allowed on isolated system without analysis and written clearance of the competent authority. It is to be done only by trained welders in the presence of a competent gas safety man. A minimum level of 20 % oxygen shall be ensured.
8. Proper electrical jumpers are to be provided between flanges and equipments before a gap is created between them.
9. Platform and adjoining structures are to be covered with asbestos/fire resistant clothes while blanking and de-blanking and the person working is not to be allowed to wear nylon or other synthetic fabric/garments.
10. Fire fighting machinery is to be kept in attendance at the place of work in charged CO gas system.
11. Lime water is to be poured after loosening the bolts of flanges in CO gas lines/equipments at the time of blanking or de-blanking or opening the manhole covers.
12. The deposits in CO gas lines and associated equipments are to be kept wet either by steam or by water, after the system has been isolated and opened to atmosphere.
13. Cutting in CO gas lines and associated equipments is to be carried out after cleaning of the deposits. In case, it is not possible, deposit is to be kept wet and a running steam hose is to be kept in readiness to prevent a fire. Also, ingress of fresh air is to be prevented.
14. All jobs within a radius of 40 m which could be a source of fire/ignition are to be stopped and unauthorized persons are not to be allowed to remain in the area during the shutting down of the gas system.
15. Wherever necessary, lighting in enclosed area is to be done with portable spark proof electric lamp of 24 V or explosion proof fittings. All pipelines/systems are to be checked for leakage after completion of repair job. The leakages are to be detected by soap solution and all leakages shall be rectified before charging the system.
16. Blanking/de-blanking jobs on gas lines are not to be taken up at the time of extreme bad weather conditions when the possibility of thundering/lightening exists.
17. Drain pots and other auxiliaries of gas lines shall be inspected for proper operation at least once a month and records are to be maintained.
18. Purging steam/gas is to be used through a detachable hose. Permanent connections are to be blanked after purging requirements are over.
19. There must not be any discontinuity in blanking/ de-blanking. Once started it shall be completed at a stretch.
20. Testing of leaks of running mains of CO gas is to be done only by soap water.

21. Persons required to work in gaseous atmosphere shall be trained in first aid and methods of giving artificial respiration.
22. Water seal/ valves are to be installed above ground level.

## Appendix II – FIR filed on 12<sup>th</sup> October 2018

N.C.R.B(एन.सी.आर.बी)  
I.I.F.-1(एकीकृत जाँच फॉर्म-1)

**FIRST INFORMATION REPORT**  
(Under Section 154 Cr.P.C.)  
प्रथम सूचना रिपोर्ट  
(धारा 154 दंड प्रक्रिया संहिता के तहत)

1. District(जिला): दुर्ग P.S.(थाना): भिलाई भट्टी Year(वर्ष): 2018  
FIR No.(प्र.सू.रि.सं.): 33325010180146 System Date and Time(सिस्टम दिनांक और समय): 2018-10-12 14:45:31.0  
Original Date and Time(वास्तविक दिनांक और समय): 2018-10-12 14:45:31.0
2. Acts(अधिनियम) Section(धाराएँ)  
भा दं सं 1860 287  
भा दं सं 1860 304-A  
भा दं सं 1860 337  
भा दं सं 1860 34
3. (a) Occurrence of offence(अपराध की घटना):  
1. Day(दिन): Date From(दिनांक से): 2018-10-09 Date To(दिनांक तक): 2018-10-09  
Time Period (समय अवधि): Time From(समय से): 10:30:00 Time To(समय तक): 12:00:00  
(b) Information received at P.S.(थाना जहाँ सूचना प्राप्त हुई): Date(दिनांक): 2018-10-12 Time(समय): 14:45:00  
(c) General Diary Reference(रोजनामचा संदर्भ): Entry No.(प्रविष्टि सं.): 002 Time(समय): 14:45:02
4. Type of Information (सूचना का प्रकार): मौखिक
5. Place of Occurrence(घटनास्थल):  
(a) Direction and distance from P.S.(थाना से दूरी और दिशा): दक्षिण - पूर्व 3 किमी Beat No.(बीट सं.):  
(b) Address (पता): कोक ओव्हन बैटरी नम्बर 11 के पीछे गैस पाइप लाइन, C 50 भिलाई इस्पात संयंत्र भिलाई  
(c) In case, outside the limit of this Police Station, then(यदि थाना सीमा के बाहर है तो):  
Name of P.S.(थाना का नाम): District(State)(जिला (राज्य)):
6. Complainant/Informant (शिकायतकर्ता/सूचनाकर्ता):  
(a) Name (नाम): शासन की ओर से निरीक्षक प्रमिला मण्डावी  
(b) Father's Name (पिता का नाम):  
(c) Date/Year of Birth(जन्म तिथि / वर्ष): (d) Nationality(राष्ट्रीयता): भारत  
(e) UID No.(यू आईडी सं.):  
(f) Passport No.(पासपोर्ट सं.): Date of Issue(जारी करने की तिथि):  
Place of Issue(जारी करने की स्थान):  
(g) Occupation(व्यवसाय): पुलिस अधिकारी  
(h) Address(पता):  
Address Type(पता का प्रकार): Address(पता):  
आवासीय वर्तमान पता ,थाना भिलाई भट्टी, भिलाई भट्टी, दुर्ग, छत्तीसगढ़, भारत  
(i) Phone Number (दूरभाष सं.): Mobile(मोबाइल सं.):
7. Details of known/suspected/unknown accused with full particulars(जात /संदिग्ध /अज्ञात अभियुक्त का पुरे विवरण सहित वर्णन):  
Name(नाम) Alias(उपनाम) Relative's Name(रिश्तेदार का नाम) Present Address(वर्तमान पता)  
पी के दास कार्यपालक निदेशक संकार्य Works  
जी.एस. व्ही.सुब्रमणियम जनरल मैनेजर कोक ओव्हन  
श्री नवीन उप महाप्रबंधक ऊर्जा विभाग  
पी. पण्ड्या राजा प्रबंधक सुरक्षा एवं अग्नि विभाग एवं अन्य सम्बन्धित
8. Reasons for delay in reporting by the complainant/Informant(शिकायतकर्ता/सूचनाकर्ता द्वारा रिपोर्ट देरी से दर्ज कराने के कारण):  
मर्ग जाँच पर से
9. Particulars of properties of interest(संबंधित सम्पत्ति का विवरण):  
Property Category(सम्पत्ति श्रेणी) Property Type(सम्पत्ति का प्रकार) Description(विवरण) Value(In Rs/-)(मूल्य (रु में))

10. Total value of property stolen (In Rs/-)(चोरी हुई सम्पत्ति का कुल मूल्य(₹ में )): 0

11. Inquest Report/U.D.case No., If any(मृत्यु समीक्षा रिपोर्ट /यू.डी.प्रकरण सं., यदि कोई हो )

S.No.(क्र.सं.):

UIDB Number(यू.डी.प्रकरण सं.):

12. First Information contents(प्रथम सूचना तथ्य):

मे थाणा भिलाई भट्ठी मे निरीक्षक के पद पर कार्यरत हूँ थाणा भिलाई भट्ठी के (1) मर्ग क्रं. 42/2018 मृतक सैय्यद अकील अहमद (2) मर्ग क्रं. 43/2018 मृतक अजात सम्भावित नाम विश्वनाथ राजपूत (3) मर्ग क्रं. 44/2018 मृतक मलखम प्रसाद , (4) मर्ग क्रं. 45/2018 मृतक इन्द्रमन दुबे , (5) मर्ग क्रं. 46/2018 मृतक देवनारायण तारम, (6) मर्ग क्रं. 47/2018 मृतक गणेश राम, (7) मर्ग क्रं. 48/2018 मृतक संजय चौधरी, (8) मर्ग क्रं. 49/2018 मृतक केशोराम , (9) मर्ग क्रं.50 /2018 मृतक उदय पाण्डेय, (10) मर्ग क्रं. 51/2018 मृतक डी.के. चौहान (11) मर्ग क्रं. 52/2018 मृतक दिनेश कुमार मौर्य (12) मर्ग क्रं. 53/2018 मृतक दुर्गेश सिंह राठौर (13) मर्ग क्रं. 54/2018 मृतक सत्य विजय की भिलाई इस्पात संयंत्र भिलाई मे कार्य के दौरान मृत्यु होने के सम्बन्ध मे तथा अन्य कर्मचारी (1) जितेन्द्र कुमार (2) सोहन लाल (3) टी.एन. जायसवाल (4) रंजीत कुमार (5) लोकेन्द्र (6) शुकांत (7) छत्रपाल राणा (8) दिनेश बोमनिया (9) हेमन्त कुर्र (10) नरेन्द्र कुमार (11) विमल के कार्य के दौरान अचानक लगी आग से झुलस कर घायल होने , इलाज हेतु सेक्टर 09 B.S.P.अस्पताल भिलाई मे भर्ती होकर इलाज कराने के सम्बन्ध मे जाँच किया जाँच मे पाया कि दिनांक 09/10/18 को समय सुबह 10:30 से 12:00 बजे के मध्य भिलाई इस्पात संयंत्र भिलाई के केम्पस के कोक ओवहन गैस पाइप लाइन कालम नम्बर C - 50 पर स्थित गैस पाइप मे बने फ्लेन्ज ज्वाइंट (Flange Joint) मे डीब्लैकिंग की कार्यवाही उपरोक्त मृतको एवं घायलो के द्वारा की जा रही थी , कि डीब्लैकिंग की कार्यवाही करने के दौरान अचानक गैस पाइप लाइन मे भरी हुई कोक ओवहन गैस मे आग लग गई जिससे विस्फोटक आवाज करते हुए आग की लपटे बाहर आई , जिसकी चपेट मे आकर वहां कार्यरत उपरोक्त कर्मचारी प्रभावित हुए जिससे कुल 09 कर्मचारियो की घटना स्थल पर ही मृत्यु हुई एवं 14 कर्मचारी गंभीर रूप से जलकर दुर्घटनाग्रस्त हुए । घायल कर्मचारियो का इलाज जारी था कि इलाज के दौरान मर्ग क्रं. 51/2018 मृतक डी.के. चौहान , मर्ग क्रं. 52/2018 मृतक दिनेश कुमार मौर्य ,मर्ग क्रं. 53/2018 मृतक दुर्गेश सिंह राठौर , मर्ग क्रं. 54/2018 मृतक सत्य विजय कुल 04 कर्मचारियो की मृत्यु और हो गई उपरोक्त मृतको के पोस्ट मार्टम रिपोर्ट मे मृतको की मृत्यु जलने से होने की पुष्टि की गई है तथा उपरोक्त कुल 11 कर्मचारी वर्तमान मे इलाजरत है । घटना के सम्बन्ध मे प्रत्यक्षदर्शी गवाहो के कथन एवं उपसंचालक औद्योगिक स्वास्थ्य एवं सुरक्षा के द्वारा की गई प्राथमिक जाँच रिपोर्ट एवं अन्य दस्तावेज जाँच प्रोटोकाल , उर्जा प्रबंधन विभाग भिलाई इस्पात संयंत्र भिलाई द्वारा फायर ब्रिगेड को दिया गया सूचना पत्र एवं कोक ओवहन गैस नेटवर्क का प्रोफाइल आदि उपलब्ध दस्तावेजो के तथा मृतको के पोस्ट मार्टम रिपोर्ट के अवलोकन से पाया गया कि घटना दिनांक 09/10/2018 को समय सुबह 10:30 से 12:00 बजे मध्य डीब्लैकिंग कार्यवाही के दौरान कोक ओवहन गैस पाइप लाइन मे मौजूद ज्वलनशील गैस को पूरी तरह पाइप लाइन से निकाले बगैर गैस पाइप के फ्लेन्ज ज्वाइंट को खोलकर MS प्लेट को निकाल कर सुरक्षा के मानको को ध्यान मे न रखकर पूर्णतः असुरक्षित तरीके से ऐसा कार्य करने का निर्णय लिया गया जहां अत्यधिक ज्वलन शील गैस मौजूद है एवं उक्त गैस पाइप लाइन मे थोड़ी मात्रा मे भी गैस रहने से थोड़ी ही घर्षण मे भी त्वरित भयावह आग लगने की पूर्ण सम्भावना थी । इस प्रकार भिलाई इस्पात संयंत्र भिलाई के उर्जा प्रबंधन विभाग के अधिकारियो (1) कार्यपालक निदेशक (संकार्य) ( Works) पी.के.दास (2) जनरल मैनेजर कोक ओवहन जी.एस.व्ही. सुब्रमणियम कारखाना प्रबंधक (3) उप महाप्रबंधक उर्जा विभाग श्री नवीन (4) प्रबंधक सुरक्षा एवं अग्नि विभाग पी.पण्ड्या राजा एवं अन्य सम्बन्धित अधिकारियो द्वारा लापरवाही से कार्य कराने के परिणामस्वरूप कुल 13 कर्मचारियो की मृत्यु हो गई एवं 11 कर्मचारियो गंभीर रूप से झुलसकर वर्तमान मे इलाजरत है उपरोक्त सम्बन्धित अधिकारी पी.के. दास , जी.एस.व्ही. सुब्रमणियम, श्री नवीन , पी.पण्ड्या राजा द्वारा अपने कर्तव्यो के निर्वहन मे सुरक्षा के मानको को अनदेखा कर सम्भावित खतरों का आकलन किये बगैर अपने कार्यों मे लापरवाही बरत कर अपराध घटित किया गया है । जिससे घटना स्थल पर कार्यरत 13 कर्मचारियो की मृत्यु हुई है एवं 11 कर्मचारीगण गंभीर रूप से झुलसकर इलाजरत है उपरोक्त सम्बन्धित अधिकारीगण द्वारा अपराध धारा 287, 337,304ए, 34 भा.द.वि. के तहत अपराध घटित करना पाये जाने से पंजीबद्ध कर विवेचना मे लिया गया । उपरोक्त मर्ग क्रं. 42/18, 43/18, 44/18, 45/18, 46/18, 47/18, 48/18, 49/18, 50/18, 51/18, 52/18, 53/18 एवं 54/18 की मर्ग इंटिमेशन की मूलप्रति प्रथम सूचना पत्र मे संलग्न की गई ।

13. Action taken: Since the above information reveals commission of offence(s) u/s as mentioned at Item No.2

(की गयी कार्यवाही: चूंकि उपरोक्त जानकारी से पता चलता है कि अपराध करने का तरीका मद सं.2 में उल्लेख धारा के तहत है।)

(1) Registered the case and took up the investigation

(प्रकरण दर्ज किया गया और जाँच के लिए लिया गया):

(2) Directed (Name of I.O.)(जाँच अधिकारी का नाम):

Rank(पद):

No.(सं.): to take up the investigation(को जाँच अपने पास में लेने के लिए निर्देश दिया गया)or(या) :

(3) Refused investigation due to(जाँच के लिए):

or(के कारण इंकार किया या):

(4) Transferred to P.S.(थाना):

District(जिला):

Attachment to Item 7 of First Information Report(प्रथम सूचना रिपोर्ट के मद 7 संलग्नक):

Physical features, deformities and other details of the suspect/accused:(If known / seen)

संदिग्ध /अभियुक्त की शारीरिक विशेषताएँ , विकृतियाँ और अन्य विवरण :(यदि जात /देखा गया)

S.No.(क्र.सं.)	Sex(लिंग)	Date/Year of Birth (जन्म तिथि /वर्ष)	Build (बनावट)	Height(cms.) (कद (से.मी.))	Complexion (रंग)	Identification Mark(s) (पहचान चिन्ह)
	पुरुष	1973				
	पुरुष	1968				
Deformities/Peculiarities (विकृतिया/विशिष्टताए)	Teeth (दांत)	Hair (बाल)	Eyes (आँखे)	Habit(s) (आदतें)	Dress Habit(s) (पहनावा)	
Language/Dialect (भाषा /बोली)	Place Of Burn Mark (जले का निशान )	Place Of Leucoderma (सफ़ेद धब्बे)	Place Of Mole (मस्सा)	Place Of Scar (घाव)	Place Of Tatto (गुदे का निशान)	Others(अन्य)

These fields will be entered only if complainant/informant gives any one or more particulars about the suspect/accused.

(यह क्षेत्र तभी दर्ज किए जाएँगे यदि शिकायतकर्ता/सूचनाकर्ता संदिग्ध /अभियुक्त के बारे में कोई एक या उससे अधिक जानकारी देता है।)

Disclaimer- This is a system generated copy of original F.I.R.

### Appendix III – RTI application status table

S.No	Authority	Date	Subject	Response
1	Ministry of Steel	22.11.18	Copy of HPC report of accident at BSP in October 2018	Report cannot be provided as still under examination by Ministry
2	SAIL	22.11.18	Copy of HPC report of accident at BSP in October 2018	Report cannot be provided as still under examination by Ministry
3	Ministry of Steel	04.12.18	Appeal against Rejection	No Response
4	Ministry of Steel	04.12.18	Standard Operating and Maintenance Procedures , Safe Commissioning Procedure etc. implemented after BSP accident of 2014+ Training procedures and manuals + Safety Management Practices	Information not available (R4)
5	Ministry of Steel	11.02.19	Appeal against rejection – application should have been forwarded to authority in possession of information	No Response
6	Rashtriya Ispat Nigam Limited	04.12.18	Standard Operating and Maintenance Procedures , Safe Commissioning Procedure etc. implemented after BSP accident of 2014+ Training procedures and manuals + Safety Management Practices	SOP, SMP and Occupational Health and Safety are prepared department wise and activity wise and are made available to employees through intranet portal. Voluminous and can't be sent, however can be viewed during inspection. <b>Note: We can use this response and seek inspection at RINL.</b>  Safe Commissioning operations of Plant units are carried out after setting up review procedure including risk assessment by external 3 <sup>rd</sup> party. Procedure description in attached Response (R6)

7	Ministry of Steel	04.12.18	Copy of report of HPC constituted to inquire about the cause of gas leakage in Bhilai Steel Plant on June 12, 2014	Information not available (R7)
8	Ministry of Steel	11.02.18	Appeal against rejection – should have been forwarded to the correct authority	No response
9	SAIL	04.12.18	SMP and SOP for coke oven and gas pipeline at BSP	SOP for coke oven does not exist and is never made. Coke Oven is a general department name on which SOP is not made (R9)
10	SAIL	11.02.18	SOP and SMP for Energy Management Department	No Response

# Appendix IV – Enquiry Report by Hindustan Steel Employees Union



हिन्दुस्तान स्टील एम्पलाईज़ यूनियन (सीटू), भिलाई  
Hindustan Steel Employees Union (Affiliated to CITU & SWFI)

Reg. No. - RYP 135

Office : Qr. No. - 1-A, St.- 16, Sector- 4, BHILAI (C.G.)

email id - hseubhilai@gmail.com

website address - www.hseubhilai.webs.com

S P. Dey, President

Mob. 9407986567

D.V.S. Reddy, Gen. Secretary

Mob. 9407986570

Rel.: HSEU/18/158

Date: 20/10/18..

To,  
The CEO,  
Bhilai Steel Plant, Bhilai

**Sub : Report on the disaster of 9<sup>th</sup> October 2018.**

Sir,

The unfortunate disaster of 9<sup>th</sup> October 2018 has moved the entire Bhilai collective. There is a general feeling that the unilateral and arbitrary behaviour of BSP management regarding safety and other related issues has led to such a pathetic incident in the series of fatal accidents.

The huge anger among the workers of Bhilai Steel Plant as well as the local population may any time burst out if the pending issues related to safety are not addressed with all sincerity.

We are submitting a copy of the report prepared by Safety Sub-committee of our Union on the unfortunate incident of 9<sup>th</sup> October 2018.

We hope that the findings of our union will be duly examined for taking action and the recommendations made by our union will be implemented to prevent any such disaster in future.

With Regards

Yours Sincerely

  
( S.P. Dey )

- Copy To – 1) H'bie Steel Minister, GOI  
2) Chairman (SAIL)  
3) ADM, Durg  
4) S.P., Durg  
5) Dy. Director, Industrial Health and Safety  
6) Genl. Secretary, CITU  
7) Genl. Secretary, SWFI  
8) Member, JCSSI

**Report on fatal accident occurred on 9<sup>th</sup> October 2018 in Bhilai Steel Plant**

**BRIEF DESCRIPTION**

On 9<sup>th</sup> October 2018 a group of EMD (gas safety-mechanical) was engaged in De-blanking (removing the dummy plate inserted in the flange) of dia1800mm at C-50 (behind Coke Oven Battery 11). Rescue Team of 10 fire brigade personnel was also present there for rescue operation as a part of disaster management with snorkel and other fire fighting equipment.

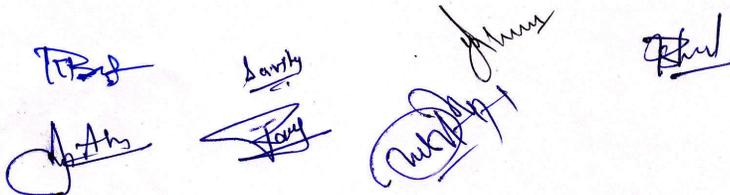
The dummy plate was to be removed to commission the Coke Oven gas Ring Main. Ring Main commissioning is actually allowing the gas in coke oven gas line network to flow from all directions uniformly to maintain a uniform gas pressure in the entire network. It needs mention that the coke oven gas pressure was not uniform on both sides of the dummy plate because gas had to travel through a few kilometres pipeline from one end of dummy plate to reach the other end. It also needs mention that the dummy plate was fitted there because it was the end of the Coke oven gas line from battery 11 which was later connected to the coke oven gas line extension from SMS-3 via RMP-3 and SP-3 to complete the coke oven gas ring main.

On the fateful day when the dummy plate was lifted with Chain Pulley after loosening the bolts, the gas inside the line started bleeding out. The bleeding out of gas was a foreseen risk which was to be combated with gas mask and the flanges were to be fitted with bolt after inserting a packing between the flanges.

Fire brigade personnel were on Red Alert on the snorkel cage placed just adjacent to the platform on which the job of instating the gas flow connectivity was to be carried out.

Unfortunately the gas bleeding out through the flange caught fire with huge initial flash. The flash was so intense that all the persons on the platform fall prey to the fire. Some fell down, some jumped out of the platform, some could not run because they had tied safety belt.

The most unfortunate aspect is that the fire brigade personnel who were on Red Alert on the snorkel cage for rescue, got trapped into the fire, the circuit of the hydraulic ladder operation burnt out and snorkel could not be operated.

The block contains several handwritten signatures in blue ink. There are approximately seven distinct signatures scattered across the lower half of the page, some appearing to be initials or names.

## CASUALITIES

The unfortunate disaster caused total 23 casualties.

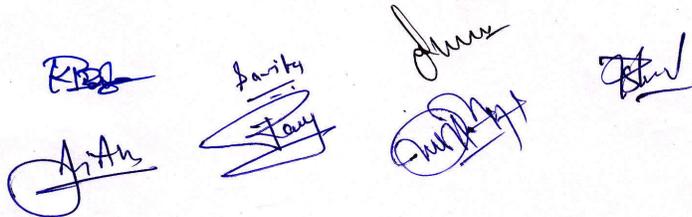
**On the spot Fatal (Identified after DNA)** – Total 9 persons 5 from EMD and 4 from Fire brigade persons died on the spot after getting trapped into the fire and their body could be recovered only after getting over the fire, after fire fighting for more than 2 hrs. Late Uday Pandey, Ganesh Ram, S. Akil Ahmed, K.R. Dhruv, Sanjay Chaudhary all from EMD and Late Vishwanath Rajput, Malkham Prasad, Indranmani Dubey, Narendra Patel from Fire Brigade are the fatal victims.

**5 persons died in hospital** - 5 persons who breathed their last in hospital while treatment are Late Durgesh Rathore, Dinesh Maurya, D.K. Chauhan, Satya Vijay from EMD, and Late Narendra Patel from Fire Brigade.

**Undergoing treatment** - Shri Ranjeet kumar, T.N. Jaiswal, Hemant Oraon, Hemant Behra from EMD and Shri Lokendra Dhruv, Kshatrapal Rana, Vimal Kumar, Sohan Mina, Jitendra Mina from Fire Brigade.

## FORESEEN RISK AND ARRANGEMENT

1. **Risk of bleeding of gas while de-blanking** – Coke Oven gas is highly inflammable and it forms explosive mixture when comes in contact with air in a confined space (explosive range-6 to 30%). To confront such situation it was planned to maintain optimum low pressure and keep the firefighting team on Red Alert
2. **Explosive nature of Coke Oven gas** – The explosive nature of Coke Oven gas is attributed due to the presence of about 60% hydrogen in it. To stop any scope of formation of explosive mixture of air and gas inside the pipe line, the pressure was reduced to an optimum level by bleeding gas through para flame bleeder so that explosive mixture formation inside the gas line could be prevented and the bleeding gas could be managed with the available fire extinguishing equipment. The optimum level of gas pressure was being monitored by Energy Centre.
3. **In-flammability of the bleeding gas** – Keeping in view the high in-flammability of c/oven gas, nearby loco-movements, battery 11 coke pushing, Sinter conveyors S-114 & E-9011, Blast Furnace-8 main conveyor belt were stopped.



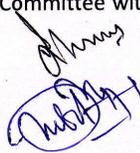
### APPREHENSIONS OVERLOOKED

The following possible consequences of working in coke oven gas line under pressure were ignored:-

1. The apprehension of generation of static electricity was not considered.
2. The possibility of generation of spark due to friction during the removal of the metal dummy plate ignored.
3. The consequences of pressure difference on both sides of the dummy plate were also overlooked.
4. The disastrous consequence of formation of explosive mixture for a few seconds due to mixing of air and huge quantum of coke oven gas bleeding out from 1800 mm dia line while de-blanking was also not assessed .

### FINDINGS

1. The job was carried out in gas line under gas pressure, which is a gross negligence of safety on the part of concerned management, because working in gas line under gas pressure cannot be justified, if provision of isolating gas flow like U-seal, valves etc are there.
2. Protocol was not prepared with precision. Obviously the sequence of all the activities to be followed in this case is also not mentioned in the protocol.
3. The pressure in the network were monitored from Energy Centre, but not cross checked manually. It is suspected that there may have been pressure difference between both sides of the plate which may have caused spark.
4. Fire brigade employees were not deployed properly. The deployment of fire brigade personnel on platform only overcrowded it which not only made them the victim of fire but also obstructed the safe escape of the employees who were to be rescued by them.
5. The snorkel cage was placed so near to the job site that the circuit panel of the snorkel burnt when the fire occurred, leading to the death of the fire brigade personnel who were there to rescue the victims thus defeating the very purpose of their deployment.
6. Gas masks were arranged to combat the poisonous effect of gas leakage but the risk of formation of explosive mixture, self-ignition of gas and ignition of gas due to generation of static current were not foreseen.
7. Max pull system should have been used to lift the dummy plate instead of chain block pulley, so that it could have been operated from the ground.
8. Safe escape route was not arranged.
9. Foreseen risks were not properly quantified. The maximum size of gas line which was attended in running condition prior to the accident was of 1600 mm. dia., that too in branch network. This was the first time that the job was carried out in running gas line of 1800 mm from gas flow dia in the main network.
10. Management's preconceived notion of victimization to employees who raise any question regarding hazard and life risk at work place has been proved again. Like any other department Statutory Safety Committee with workers elected representatives



Page 3 of 4

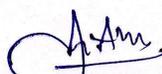
has not been formed in EMD and Fire Brigade department also. It needs mention that there were no safety committees for more than 31 months. Thereafter Mr. T.B. Singh the then E/D(Works) published a list of safety committees of 26 departments without workers elected representatives on 15/02/2018 which has been declared illegal by the Factory Inspector Mr. K.K. Dwivedi.

### **RECOMMENDATIONS**

1. Safety Management System should be reviewed and necessary changes should be incorporated with the objective of ensuring safe work and fixing responsibility of any unwanted incident.
2. A programme should be arranged to educate all the employees of Bhilai Steel Plant, about the causes and ways to prevent the repeat of all the major disasters like 6<sup>th</sup> January 1986, 12<sup>th</sup> June 2014, 9<sup>th</sup> October 2018 etc.
3. The safety management system should be made more participative.
4. **Strict action should be taken against the persons responsible for not constituting Statutory Safety committee for more than three years and safety committees should be formed immediately in all the departments.**
5. Separate Standard Operating Practices/ Standard Maintenance Practices, should be made for different gas lines e.g. BF Gas line, Converter Gas line, Mixed Gas line etc.
6. Working on gas line under gas pressure should not be permitted. The entire gas line network should be inspected for identifying the portions not having provisions of U-seal and Nitrogen/Steam purging and same should be provided.
7. While making protocol the sequence of the steps to be carried out for doing the actual job must be mentioned with the name of responsible official.
8. **The failure of snorkel operation should be investigated and strict action should be taken against the responsible person.**
9. Safe escape route should be ensured at all places where gas pipe line has to be attended.
10. Our long pending demand to register the entire Bhilai Steel Plant as a single Factory should be considered seriously.

  
(S.P. Dey)

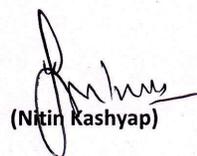
  
(Savita Kumari)

  
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