

SUSTAINABLE MINING (New script)

Dr Kishor Kulkarni

This episode is on sustainable mining so as to reduce its impact on the environment and people associated with mining. The issue like the health of the miner, the new legislation etc has been discussed in this episode.

Characters

Narrator

Shyam

Srinivasan:

Mohini

Vaibhav

Narrator :- A science popularization institution called “Kanad(कणाद) Science Foundation in Mumbai organizes every year a “Science Tour” in their ‘Science Tourism activity’ . This year they have organized a Mining Tour in which the public will be shown sustainable mining and various “Mines”. The tour has been organized to show mines around Dhanbad in Jharkhand State. And onwards their return journey they will have a peep into Chandrapur coal mines, so that public will have some idea as to how the open pit mines as well as, tunnel type mines of Coal and Ores are managed and maintained. How the workers work above and under ground, whether mining really creates pollution will be shown. The public is a mixed type- means old and young, men and women, school kids and college goers. We will also have a virtual tour along these people so that we will also gain some knowledge.

.....**Change over Music**

.....
Shyam:- Welcome everybody. I am Shyam the tour conductor and your local guide. I will be with you through the tour. As has been mentioned in the printed material provided to you our main focus would be on seeing mines and particularly the

sustainable mining. As somebody said, “Mining is a destructive act”. It is true to some extent because you dig the soil ruthlessly, excavate it till the earth bleeds, excavated and dug up places cause accidents, while doing these acts we pollute the places and surrounding areas, people fall ill and sometimes die because of this pollution, workers who actually work in the mines and under the mines die due to toxic gases, sudden gush of water coming in the tunnel, displacement of people due to mining, people who are displaced not receiving the anticipated value of the land which they have either sold or leased, so on and so forth. Even then no country has stopped mining. On the contrary to fulfill the growing needs/wants of the ore and coal, mining activities have gone up several times in the recent past. This is a small introduction of our “Science Tourism”. Follow the rules and regulations of the mines whenever we are visiting the Mines. The dictum of the mine is “Follow safety rules and you are protected”. I wish everybody will come out of this tour unscathed. Now I request everybody to board the train, occupy your seats and happy journey. See you at Dhanbad. Thank you.

..... **Changeover music**.....

Shyam:- Friends welcome in the land of mines, hope you had smooth journey. Today the PR personnel Mr. Srinivasan from the Mines department will have a chat with you and will give the schedule of our tour programme. Mr. Srinivasan please have a chat with our guests.

Srinivasan:- Hallo everybody, we miners always say “Good day above ground and a good day below ground.” I may sound bit poetic but I can’t help since it is my nature so before I give information about mining I would like to quote what the miner does for us. I quote, “Down below the mountains he has dug, trying to make a living for the ones that stayed above. Deep in the dark, fighting the gas, and the dust, knowing at any time his body could be crushed but with another swing from the hammer another rock he must bust. Mostly on his belly he did crawl, praying to God please don’t let this mountain fall, and at the end of the day as he slowly rolls toward the light, it is one more day that the Lord has spared his life, and tomorrow will begin another fight, and as he slowly goes underground far from my site, I pray dear God that you will watch over him, and bring him back to me in the evening light.” Unquote.

(Quotation to be read out in different voice)

Shyam:- Wonderful! In just few lines you have described the life of a miner how dangerous and how fragile it is.

Srinivasan:- Thank you mr. Shyam That quote was about the miner but what a coal miner prays every day before he starts the digging operation you know? I quote, “Each

dawn as we rise, lord we know all too well, we face only one thing- a pit filled with hell. To scratch out a living the best that we can, But deep in the heart, lies the soul of a man. With black covered faces, and hard calloused hands, we work the dark tunnels, unable to stand. To labour and toil as we harvest the coals, we silently pray, “Lord, please harvest our souls”.

Mohini:- How apt the prayer is. This again gives the indication that how the life of miners is treacherous and cumbersome. No guarantee of life but always face the fear of death. If the workers face such grim situation then why at all mining is undertaken that’s my question.

Srinivasan:- Madam “पापी पेट का सवाल है” as long as hunger is there one has to work since this is their bread and butter. This is their lively hood. Though the job is skilled one, they have to work in mines. None the less situations are changing but no drastic change will occur so soon. Yes to certain extent the life becoming bit easier these days because of various facilities provided to them while working in the underground mining.

Vaibhav:- Excuse me sir! I am Vaibhav one of the members of this Science tourism. Sorry to interrupt but the discussion which you people is doing, really going overhead and I am not able to understand. First of all please tell us what is mining. Once we understand that then only we will be able to decipher the poetic and philosophical part of it.

Srinivasan:- You are absolutely correct master Vaibhav. Forgot that we have little tourist guests. Sorry friend. Yes I will answer your question.

Mining is the extraction of minerals and metals from earth. Manganese, molybdenum, coal, copper, tin, nickel, bauxite an aluminum ore, iron ore, gold, silver, and diamonds are just some examples of what is mined. Not only do mining companies prosper, but governments also make money from revenues. Workers also receive income and benefits.

Vaibhav:- But we had read in the news paper different kind of mines in connection with terrorist/ Naxalite activities

Srinivasan:- oh! That mine. Explosives are sown or buried under the earth/soil which explodes when applied the pressure inadvertently by human activity, that’s also a mine but it differs from the mine we are discussing. Do you know the uses of various metals and minerals?

Vaibhav- Yes to certain extent. Minerals and metals are very valuable commodities. For example, manganese is a key component of low-cost stainless steel. It is also used to de-color glass ie removing greenish hues. Tantalum is used in cell phones,

and lap-tops. Copper and tin are used to make pipes, cookware, etc. And gold, silver, and diamonds are used to make jewelry. Still more are there. Srinivasan-There is a saying about metals and minerals. It goes like this, “Where there is cinnabar above, yellow gold will be found below. Where there is lodestone above, copper and gold be found below. Where there is calamine above, lead, tin, and red copper will be found below. Where there is hematite above, iron will be found below.” Friends, our little guest brought me on track since I had forgotten to introduce the topic itself. Thanks Vaibhav. But before we proceed I request everybody to have tea and then again we meet here.

.....**change over music**.....

Srinivasan – Welcome again. Today in the afternoon we will see open pit coal mine. Tomorrow we will visit tunnel type coal mine- Day after we have a visit of manganese and iron ore mines.

Mohini- it means that we are not visiting any of the mines today?

Shyam- No! First we will gather the information today so that it will be easy for you to understand. Mr.Srinivasan has made audio-visual arrangement in the mini auditorium to update you. Will go there and see the videos. (Everybody joins Srinivasan in the auditorium)

Srinivasan:- Welcome friends, including our little guests. As you have been told today we will have background knowledge about mining. The mineral industry in India is an important contributor to the country’s GDP and foreign trade, and also a significant source of employment generation. The industry is distributed almost all across the country and has operations in some of the remotest areas, where it has also served as a sole source of infrastructure development. India produces 89 minerals, out of which four are fuel minerals, 11 metallic, 52 non-metallic and 22 minor minerals. The mining leases are occupying about 0.21% of the total land mass of the country. Indian mining industry is characterized by a large number of small operational mines say approx 3000 mines.

As this picture shows mining are a dangerous activity since miners have to toil hard underground to bring the precious metal ores or coal or for that matter the crude oil. Miners don’t mind working in such situations since it is their bread and butter.

Shyam:- Bread is earned by workers and butter is churned by owners.(Light laughter)

Srinivasan:- very sarcastic remark. To some extent I agree but not fully.

Mohini:- How come! Don’t you agree that workers are toiling hard in explosive and hazardous conditions?

Srinivasan:- Friends you have come here to see mines and not miners working conditions isn't it? And a request to you all let me finish the presentation and we will have question-answer session, so please don't interrupt me. As I told you Mining is a destructive process but gives you precious commodities useful in our day today life. The materials can range from common to precious and from inert to hazardous. **Mining** is the foundation of **industrial** civilization .The **mines** themselves can be small or very large in size.

Vaibhav:- Sir, sorry for interruption but for good cause.(slight laughter..) How many types of mines are there?

Srinivasan:- I don't mind such kind of interruption. Well the answer to your question is there are four types of mines. (Takes a pause) You can see the picture on your screen; it is showing Placer type of mine. Placer mining involves any type of mining where raw minerals are deposited in sand or gravel or on the surface and are picked up without having to drive, use dynamite or any other significant means. The word placer means "sand bank" in Spanish. Specific types of placer mining are panning, dredging, slicing, using a Rocker, or just picking up what lies on the ground.

Musical interlude(2seconds)

Next picture shows hydraulic mine. Hydraulic mining involves high pressure water. The water is sprayed at an area of rock and or gravel and the water breaks the rock up, dislodging ore and placer deposits. The water plus ore mixture is then milled. This is a very destructive way to mine and has been outlawed in most areas.(music 2 sec.)

The third one is hard rock. Hard rock mining entails digging into solid rock to fine minerals usually in their ore form ie the metal plus oxygen. To do this, miners used picks and shovels, rock drills, dynamite and more. Miners dug either shafts that went straight down to follow ore bodies and veins, or tunnels which went somewhat horizontal into rock faces. Shafts usually had some sort of head frame standing above them to support the hoists. Shafts and tunnels were often supported with large timbers to prevent cave-ins. Most shaft or tunnel mines would eventually flood as they hit the water table and water would have to be continually pumped out. Sometimes there was so much water they had to abandon the mines. (music 2 seconds)

The last picture on the screen is of open pit mine. Open pit mines involve digging large open holes in the ground as opposed to a small shaft in hard rock mining. This method of mining is most often used with minerals like copper and molybdenum. Open pit mines are very large and devastate the surrounding landscape as can be seen in this picture. Mining operations of this scale were not done too often in the 19th century

..... **Change over music**.....

Narrator :- Mining itself may occur on a relatively small land area, the associated infrastructure and pollution from mining activities have the potential to affect the health of ecosystems and reduce their ability to provide the goods and services

necessary for human and environmental well-being. These services include the purification of air and water and the decomposition of waste materials, In order to be more environmentally sustainable, mining operations are increasingly conducted in a manner that minimizes their impact on the surrounding environment, and leaves mine sites in an acceptable state for re-use by people or ecosystems. A number of management strategies and technologies are being developed and used by the mining industry to reduce the environmental impacts of mining. What Mr. Srinivasan has to say about this, let us listen to him?
(Change over scenemusic 2 seconds)

Srinivasan:- Water is used in a number of applications at mine sites. By diverting surface water and pumping groundwater, mining operations can reduce both the quantity and quality of water available downstream for aquatic ecosystems and other industrial and municipal water users, especially in areas with arid climates. In response to water scarcity in many mining regions, a number of innovative water conservation practices are being developed and implemented to reduce water use.

(Music 2 seconds)

Mining and metal processing can be very energy-intensive processes. For instance, diesel fuel is used by trucks and excavators during mining, electricity is used to grind ore and refine copper and aluminum, and coal is required in order to smelt iron ore and make steel. Reducing energy consumption at mines can reduce greenhouse gas emissions and extend the life of fossil fuel reserves in addition to reducing operating costs and therefore the cost of the commodity being mined.

Mohini:- Sir, Mining activities use land at every stage of the mine cycle, including exploration, construction, operation, closure, and post-closure. Vegetation is cleared for the construction of buildings, roads, and power lines, open pits or tunnels are dug to gain access to the ore, and waste storage facilities potentially leading to habitat loss and deforestation. What measures are under taken for sustainability?

Srinivasan:- There are a number of ways to reduce the land-use impacts of mining. These include reducing the overall footprint of the mining area, minimizing the amount of waste produced and stored, maintaining biodiversity by transplanting or culturing any endangered plants found on site, and planning mines around existing infrastructure where possible. Although current technology requires ores to be excavated in order to produce metals, research in areas such as biomining offers the possibility of mining with minimal land disruption in the future

Shyam:- Sir you have talked very mildly about the sustainability, we appreciate the soft spoken deliberation but don't you think that the environmental degradation brought about by unscientific, unplanned and ruthless mining is common?

Srinivasan:- Well, Several initiatives have been taken in this direction along with case studies, which could be replicated in other parts of the country.

Mohini:- It is said that Mining has eroded the subsistence base of many communities due to the loss of tree cover, grass and other forms of vegetation.

Srinivasan:- Appropriate systems have been put in place to ensure sustainable growth of the sector, which include formulation of procedures for scientific prospecting and mining and development of a mechanism of prior environmental and forest clearances for mining projects etc. Efforts are made to safeguard the interests of indigenous people through rehabilitation and resettlement packages

Shyam- What about workers' health?

Srinivasan.- Our emphasis is to protect the health and safety of mine workers, as well as people residing in the vicinity of mining activity. I would like to add certain new innovations being used in Underground Mines to comfort the workers for better communication during disasters, and other facilities for excavation and safety gadgets. etc..

Vaibhav:- Like what? Are they been provided with fiber optic devices which are being used in developed countries?

Srinivasan:- Yes. You want to have the details? Here are some of them.

Fiber optic cables and connectors are unaffected by noise, lightning, interference from RF, EMF, EMI, and Harmonics from the VFD drives common in mining. Intra-system communication is achieved with a fiber optic backbone consisting of the cable plant and the necessary connections. With the backbone installed, we can start putting the equipment in-place. The general parts of the fiber optic linked system include: Centralized control rooms with video camera systems, VOIP (voice-over-internet protocol) phone systems (underground and above ground), Emergency communication systems, Environmental sensors like, carbon monoxide, methane, hydrogen sulfide, and other gases, Long wall systems and sub systems, Complex conveyor belt system controls, Automation of remote system controls, Conveyor belt scale and coal ash analysis systems, then some safety equipments like Fire detection systems, Conveyor belt video inspection systems, Laser safety in underground coal mines a must!

Change over music (2 seconds)

Shyam - I heard that for the total reforms in the mining industry Govt. of India is likely to enact a bill, useful for sustainable mining, could you throw light on this bill?

Srinivasan - Sure.The bill seeks a complete and holistic reform in the mining sector with provisions to address issues relating to sustainable mining and local area

development and benefit sharing mechanism to the people affected by mining operations. It is a major step forward which would bring about sustainable mining growth and transformation in the lives of project affected persons”.

Mohini – Does it talk about profit sharing?

Srinivasan – yes. The bill talks about a profit-sharing formula for the project- affected people i.e. 26% profit from coal mining and for other minerals, an amount equal to royalty paid in the previous year.

Person – what is the bill named?

Srinivasan – It is called Minerals Development and Regulation Bill (M D R)2011. According to this bill Industry has to adhere to principles of sustainable mining to enhance Mining Industry’s contribution to the larger goal of sustainable development in the country and advocates to operate within a sustainable development framework.

Vaibhav- Thank you Srinivasan uncle. I declare the questions are over.

Srinivasan – Thank you Vaibhav and thanks all for getting to know about the Mining Industry.

Narrator – so friends be assured that when some of you visit the Mines in India be assured that the things are on the progressive path. Will not get dejected even if miner’s wife says, quote

“A gentle kiss to say goodbye, He sees the love within her eyes.

Please be careful she will always say, don’t worry dear, it will be okay.

He holds her tight and shows no fear. She holds him tighter, holds back her tear. Now out the door to earn his pay, she sits head bowed, begins to pray.

She watches his taillights go out of sight, in early morning, or late at night. She never knows when will he come home, the work is hard, the days are long.

She tries so hard to hide her fears, keep the children safe and near. God blessed her Heart; he made her tough, with a will so strong, and a gentle touch.

A special woman to share a life, God’s special gift, a miner’s wife!!! unquote
(Long music..... change)

Narrator- Next two days were spent in visiting the various mines and visitors were thrilled. What can I say about the trip? You have enjoyed along with the actual tourists. I say only Science tourism was successful yet again, so friends Happy tourism! Friends, all these days the workers were really under paid, were not given

adequate facilities, the land which was used for mining was kept as it is in a disastrous mode, the land owner was not paid adequately, local people were not given their proper dues ,pollution was rampant, no sustainable movement, people were killed because of explosion, fire and floods in the mine so a long list of destruction will come to an halt, if not halt but the miseries will be lessened in near future. How and when that is a thousand dollar question. Hope it will soon be implemented to see us the Sustainable mining