REVIEW OF RESEARCH

ULTIMATE AND PROXIMATE ANALYSIS OF COAL IN DIFFERENT AREA OF KORIYA DISTRICT CHHATTISGARH

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ABSTRACT:

Coal is a non-renewable energy source removed starting from the earliest stage underground mining open pit mining. It is a promptly ignitable dark or caramel dark sedimentary shake regularly happening in shake strata in layers or veins called coal beds. The harder types of coal can be viewed as transformative shake in view of later introduction to raised temperature and weight. Coal is made essentially out of carbon alongside factor amounts of other component, predominantly sulfur, hydrogen, nitrogen, oxygen. Often associated with the industrial revolution, coal remains of enormously important fuel and is the largest of electricity worldwide.

Coal sample ware collected from different coal same of the koriya district .Which covered the enter analysis sequence .These sample ware tested of chemical analysis. Proximate and ultimate analysis. All test result vindicated that the aforesaid parameters had a defined relationship with the stratigraphic disposition or the rank of coal. The low rank coal found as younger same in the stratigraphic sequence was more quinces were less prone to spontaneous combustion. through combustibility characterization by different test it was found that the upper chirimiri coalfield of Bartunga coal mine same placed as younger same in the stratigraphic sequence are highly prone to spontaneous combustion whereas the lower chirimiri pondi (NCPH) and coalhelding plant churcha coalmines seems to be least prone to coal analysis.

KEYWORDS: *Coal analysis, proximate and ultimate analysis.*

1. INTRODUCTION

Coal is one of the major energy resource contributing nearly 40% of the electricity production throughout the world current estimate are 926 billon tones of total proved coal reserve in India.*(World coal institute 2010).*Presently total proved coal consumption has reached around 7 billon tones.

These methods are used primarily to determine the suitability of coal for cooking power generation or for iron one smelling in the manufacture of coal.Provide regulatory incentives to offset financial risks in commercial development of new clean coal technology. Confront Head on the need to reduce carbon dioxide emissions associated with the use of coal. (*National Energy strategy, Executive Summary, 1991/1992)*. Coal analysis techniques are specific analytical method designed to measure the particular physical and chemical properties of coal.*J.S(2007),.*

Many physical and chemical parameters are responsible for in analysis coal mines. In this paper has been made to characterize the Korea coal for their susceptibility to analysis combustion by studying their chemical.*IEA Clean Coal Centre, 48 pp (2001).*

2.METHODOLOGY

2.1 Study area:

Koriya district, also commonly known as Koriya district, is a district in the north-western part of the Chhattisgarh state in Central India. The administrative

headquarters of the district is Baikunthpur.

Charcha Colliery is a small Village/hamlet in Baikunthpur Tehsil in Koriya District of Chhattisgarh State, India. It comes under Charcha Panchayath. It is located 3 KM towards East from District head quarters Baikunthpur. North chirimiri ponrihill (NCPH)colliery of chirimiri is located in the geological coordinates of 26 degrees 11 minutes and 60 second north latitude and 82 degrees 20 minutes and 60 second east longitude. The total population of the city stands at 93,366 people.

The town has achieved a high literacy rate with 61,280 total literates in the town. The town of chirimiri is rich in the coal deposit found in the region. The coal industrial belt has developed in the region owing to the close proximity of the coalmines.

SECL Bartunga Colony-Chirimiri OCP is located in Chirimiri. Chirimiri OCP - Chirimiri on the map.Bartunga Hill is a Coal Mine in India owned by Coal India. For more data on production, status, ownership, capex and other categories, see the data section.

2.2 Experimental work:-

2.2.1 Sampling - After demarcating the field into several uniform portions. Sample was collected from each portion separately. At the end all sample were thoroughly, collected quartering procedure was applied. Sample was collected in to polythene bag labeling on inside to coal mines.

2.2.2 Proximate Analysis of Sample

Proximate analysisCoal proximate analysis includes moisture content , ash content , volatile matter ,and fixed carbon .([Speight, J.G 2013), ThomasL (2013)]

2.2.2.1 Moisture content analysis

Water moisture content from coal after reaching equilibrium with laboratory atmosphere and then done by heating 1 gram of coal samples size -212 µm in nitrogen flow at 105°C ± 5°C and dried to constant weight. The weight of moist water is obtained from heavy loss during heating.

2.2.2.2 Ash content analysis

Determination of ash content is done by weighing the residual result of perfect combustion of coal. The analysis was done by weighing1 gram of coal size -212 µm and then heated in a furnace with a temperature of 500°C for the first hour. The sample was then heated to 815°C ± 10°C for 1 hour. When the incineration period is over, the sample is allowed to cool and then weighed .

2.2.2.3 Volatile matter analysis

Determination of volatile matteris a loss of mass when coal is heated in an atmosphere isolated with air under standard conditions. The analysis was carried out by heating coal samples of -212µmsize with a weight of 1 gram without oxidation with silica crucible at 950°C ± 5°C for 7 minutes in a horizontal furnace. Estimates were made by calculating the weight lost after heating was corrected moisture content .

2.2.2.4 Determination of fixed carbon

The calculated fixed carbon is not obtained by analysis, but is obtained from the calculation of 100% -% (moisture+ ash + volatile matte)

2.2.3 Ultimate Analysis of Sample

The ultimate analysis includes elements in coal such as carbon, hydrogen, and nitrogen sulfur and oxygen .([Speight, J.G 2013), ThomasL (2013)]

2.2.3.1 Determination of carbon, hydrogen and nitrogen

The analysis was done by preparing a sieve -60 mesh-size coal with a weight of 1 g. Carbon, hydrogen and nitrogen in coal are sought simultaneously in an instrumental procedure using furnaces operating at temperatures in the range of 900°C -1050°C. Conversion of carbon, hydrogen and nitrogen values into the corresponding gases (CO_2, H_2O, and NOx) occurs during sample combustion at high temperatures in thepresence of oxygen gas. Combustion results that may interfere with gas analyses are subsequently discarded. The nitrogen oxide (NOx) is converted to N2 before it is analysed. Carbon dioxide, moisture and nitrogen elements in the gas stream are determined by appropriate analytical procedures. Record total carbon, hydrogen and nitrogen deposited as a percentage of mass. Report the

results on the dry base (adb) to the nearest 0.1% for carbon, 0.01% for hydrogen and close to 0.01% for nitrogen

2.2.3.2 Determination of sulphur

The analysis was carried out by preparing a sieve -60 meshsize coal with 1 g weight . Weighed samples were burned in a tube furnace at a minimum operating temperature of 1350°C in the oxygen stream. During combustion, all sulphurcontained in the sample is oxidized to sulphuroxide gas (sulphurdioxide / SO2and sulphurtrioxide / SO3) and chlorine in the sample is released as Cl_2. The product is then absorbed into asolution of hydrogen peroxide (H_2O_2) and dissolved into a sulphuricacid solution (H_2SO_4) and dilute hydrochloric acid (HCl). The amount of both directly produced acids depends on the amount of sulphurand chlorine present in the coal

2.2.3.3 Determination of oxygen

Determination of oxygen content is not done directly, but determined based on the difference of carbon, hydrogen, nitrogen, sulphur and ash content. The percentage of oxygen content is obtained from the calculation of100–(% C + % H + % S + % N + % ash)

3. RESULT & DISCUSSION

The result of proximate and ultimate analysis of coal of the Koriya district in the field churcha, chirimiri,coal reveals the following observations

3.1 Proximate analysis

The presence moisture content of coalfield is varying to churcha-1.8, NCPH-2.0, Bartunga-0.29. The volatile content is churcha-31.2, NCPH-16, Bartunga-17.2%. The Ash content is churcha -41, NCPH-30, Bartunga-12%, Presence of coal composition.

The result of proximate analysis of coal in there pure form and different coal sample, are shown is table1.

Table 3.1.1 Comparison of result of proximate analysis of different sampling stations

Sample No:-	Proximate Analysis			
	M	**VM**	**ASH**	**FC%**
1.Churcha	1.8%	31.2%	41%	26%
2.NCPH R-6	2.0%	16%	30%	52%
3.Bartunga	0.29%	17.2%	12%	70%

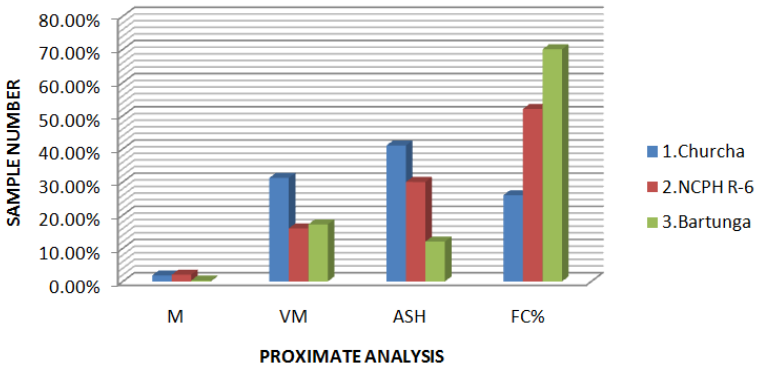

Figure 3.1.1 Graphical presentation of findings of proximate analysis of coal of different sampling stations

3.2 Ultimate analysis

Table 3.2.1 Comparison of result of Ultimate analysis of different sampling stations

Sample No:-	Ultimate Analysis			
	H	**C**	**N**	**S**
1.Churcha	3.0%	42.62%	0.08%	0.49
2.NCPH R-6	2.65%	37.46%	0.60%	0.59
3.Bartunga	4.85%	43.23%	0.99%	0.77

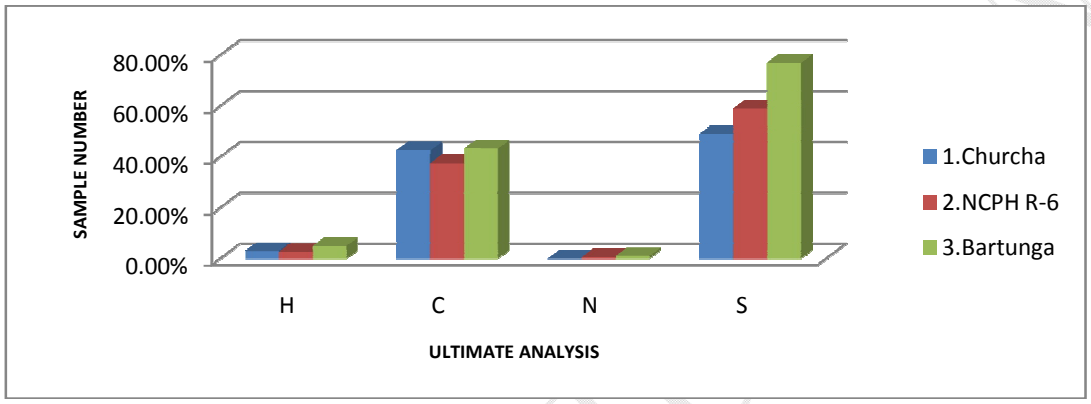

Figure 3.2.1 Graphical presentation of findings of Ultimate analysis of coal of different sampling stations.

The presence Hydrogen of coalfield is varying to churcha- 3.0% NCPH- 2.65%, Bartunga-4. 85%, The presence of carbon in churcha - 42.62%, NCPH -37. 46% Batunga-43. 23%, The Nitrogen present in churcha-0. 08%, NCPH- 0.60%, Bartunga-0.99%. The sulphur presence in churcha -0.49%, NCPH- .0.59%, Bartunga- 0.77%. Of coal composition.

4.CONCLUSION:-

It is observed from this study that the coal sample collected for the study contain low to medium quantity of moisture, medium to high amount of volatile matter and high amount of ash in General.

The best quality coal sample is of Bartunga coalfield, after that the the quality of coal the churcha coal mineis better , and coal of NCPH coal mine has poor quality coal as compared to other sampling stations

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