International Journal For Technological Research In Engineering
Volume 2, Issue 8, April-2015 ISSN (Online): 2347 - 4718

COAL BLENDING BY DATA ACQUISITION AND CONTROL SYSTEM USING PLC NETWORK OVER TCP/IP PROTOCOL

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ABSTRACT: The Result of automation is visible in various areas of industry as well as in routine life. Automation makes the process control more efficient, increases productivity of work, manufacturing quality, decreases manufacturing costs. Automation is still in development so that it could succeed in filling all requirements of today's technical advance. For this reason we daily meet new questions about implementation of automation systems, their handling and expanding in coal handling industries.The paper introduces a new technique of coal blending in industry by using automation, the automatic coal blending network system. The System includes the field automation of production plant and the Centralized monitoring control center. The field automated production center uses the TCP-IP (Ethernet) protocol to build a network, connect every controller to Profibus than by convertor connect to the control network. Feedback value of belt weigher feed rate & totalizer of Reclaimer continuously monitor. Control center SCADA & PLC control the system. Multi workstation systemize by running the monitor software WINCC7.3 to connect via Ethernet module(Scalalance) of PLC system, Real time data control and management of the entire system can be differed as per requirement of user. Reclaimer related events, alarm etc. logged in to SCADA. Data also continuously archive by server for long history.

I. INTRODUCTION

Coal handling system have large network. Which have various equipment's for stacking the coal in yard & reclaiming the coal from yard. This all equipment like Grab sip unloaders, Stacker cum reclaimers, Receiving conveyors , Dispatch conveyors, sprigling system etc. have own control logic HMI & PLC. For centralize control of this large Coal handling system equipment's require SCADA system & PLC which is continuously control & manage real time data continuously. Principle of the SCADA & PLC base automatic coal blending system is that the belt weigher of Reclaimer give present flow rate & totalizer real-time online data and according to constraints condition and set point objectives, to build a reasonable logical flow chart and dynamic optimum ratio, use closed-loop control for Reclaimer slew & long traveling speed control techniques. We can archive quality of blend coal near to requirement. so the coal blending is more stable, reliable and accurate. The coal blending system is more automatic, reducing the involvement of staff, to improve loading speed and reliability, to maximize the use of the Reclaimer equipment, full use of existing resources and cost savings.

The objective of this paper is to increase efficiency and provide Uninterrupted coal to boilers of 4600 MW power plant with quality blended coal &minimal extra cost. This achieved by using SCADA, PLC& TCP/IP protocol on stacker cum reclaimer industrial communication network. By slew drive & belt weigher flow rate automation logic implementation on various S/R, we reclaimed more coal with quality blending to large power plant.

II. COAL FORMATION & TYPES

A. Formation:-

At various times in the geologic past, the Earth had dense forests in low-lying wetland areas. Due to natural processes such as flooding, these forests were buried underneath soil. As more and more soil deposited over them, they were compressed. The temperature also rose as they sank deeper and deeper. As the process continued the plant matter was protected from biodegradation and oxidation, usually by mud or acidic water. This trapped the carbon in immense peat bogs that were eventually covered and deeply buried by sediments. Under high pressure and high temperature, dead vegetation was slowly converted to coal. As coal contains mainly carbon, the conversion of dead vegetation into coal is called carbonization.[12] The wide, shallow seas of the Carboniferous Period provided ideal conditions for coal formation, although coal is known from most geological periods. The exception is the coal gap in the Permian–Triassic extinction event, where coal is rare. Coal is known from Precambrian strata, which predate land plants — this coal is presumed to have originated from residues of algae.

B. Types

Peat, considered to be a precursor of coal, has industrial importance as a fuel in some regions, for example, Ireland and Finland. In its dehydrated form, peat is a highly effective absorbent for fuel and oil spills on land and water. It isalso used as a conditioner for soil to make it more able to retain and slowly release water.

Lignite, or brown coal, is the lowest rank of coal and used almost exclusively as fuel for electric power generation. Jet, a compact form of lignite, is sometimes polished and has been used as an ornamental stone since the Upper Paleolithic.

Sub-bituminous coal, whose properties range from those of lignite to those of bituminous coal, is used primarily as fuel for steam-electric power generation and is an important source of light aromatic hydrocarbons for the chemical synthesis industry.

Bituminous coal is a dense sedimentary rock, usually black, but sometimes dark brown, often with well-defined bands of bright and dull material; it is used primarily as fuel in steam-electric power generation, with substantial quantities used for heat and power applications in manufacturing and to make coke.

Steam coalis a grade between bituminous coal and anthracite, once widely used as a fuel for steam locomotives. In this specialized use, it is sometimes known as "sea-coal" in the US.[15] Small steam coal (dry small steam nuts or DSSN) was used as a fuel for domestic water heating.

Anthracite coal the highest rank of coal, is a harder, glossy black coal used primarily for residential and commercial space heating. It may be divided further into metamorphic ally altered bituminous coal and "petrified oil", as from the deposits in Pennsylvania.

Graphite	English Designation	Volatiles %	C Carbon %	H Hydrogen %	O Oxy %	S Sul %	Heat content kJ/kg
1	Lignite (brown coal)	45–65	60–75	6.0–5.8	34-17	0.5-3	<28,470
2	Flame coal	40-45	75-82	6.0-5.8	>9.8	~1	<32,870
3	Gas flame coal	35-40	82-85	5.8-5.6	9.8-7.3	~1	<33,910
4	Gas coal	28 35	85 87.5	5.6 5.0	7.3-4.5	-1	<34,960
5	Fat coal	19 28	87.5-89.5	5.0 4.5	4.5-3.2	-1	<35,380

III. BLENDING CONCEPT

Blending is defined as the integration of a number of raw materials with different physical or chemical properties in time in order to create a required specification or blend. The aim is to achieve a final product from, for example, two or more coal types, that has a well-defined chemical composition in which the elements are very evenly distributed and no large pockets of one type can be identified. When sampled, the average content and the standard deviation from the average are the same. Application: e.g. using different types of coal for specific recipes. Coal as one of the most commonly used energy resources plays a very important role in our life. In china, coal resource is rich, but its distribution is imbalance. In addition, coal quality parameters and coal categories varied considerably from region to region, mine to mine, and even seam to seam. In coal-fired power plant, different coals come from different places, so the quality of the coal blend is often instability. The power plant has to face the mismatch coal quality problems between actual supplied coal and designed coal burned in the boiler. Moreover, this mismatch also brings new problems, such as low efficiency of coal combustion, high pollution, increasing generation cost and etc. To date, Coal blending technology is an appropriate approach to control coal quality to be well within the range specified of boilers. It can efficiently lower emission, reduce fuel costs and improve operations by reducing fouling and slagging while maintaining the boilers' capacity, and realize the supply of coal production and demand. The core of blending is to determine the optimum ratio of single coal in the mixed coal. Proper and purposive blending schemes can also solve the coking, ignition and combustion problem. Coal blending in power station is mainly adopted to reduce the cost of generation and increase availability of coal. The low-grade coals can be mixed with better grade coal without deterioration in thermal performance of the boiler thus reducing the cost of generation. Many nations, blending of coal were being adopted for a very long period mainly for increasing the availability of coal for power generation. To improve the availability of coal and also to improve the calorific value of coal being fired, some of the power stations look at the possibility of mixing high grade imported coal with the low grade high ash coals. There are many methods adopted for blending which can be at Coal Mines, Preparation Plants, Transshipment point and Power Stations. The method to be chosen will depend upon the site conditions, level of blending required, quantity to be stored and blended, accuracy required and end use of blended coal. Normally in large power stations, handling very large quantity of coal, the stacking method with fully mechanized system is followed. To decide blend or not, it is very important to understand the composition of coals that are to be blended. This means one will have to understand the origin of coal, the chemistry of inorganic, chemistry of organic and the combustion properties &behavior of the coals in question. It has been established that coals which are formed by Drift Theory of coal formation and the coals due to swamp theory of coal formation have to be blended with caution. The main difference between coal formed due to drift theory and swamp theory is that the coal formed by drift theory exhibits pronounced regional variation in thickness and quality of seams. They also enormously have very high ash content with varying inorganic chemistry. The organics of the drift origin coal also possess problem mainly because the vegetation that lead to forming of coal are drifted from different places having different kind of vegetation. However the coals formed by swamp theory have more uniform organic property and much less ash content with consistent chemistry of inorganic. During combustion, it is really necessary to understand the physical conditions and coal properties during heating of the particles, devolatalisation, ignition and combustion of the volatile matter and ignition and combustion of the char. It is also equally important to know the phase changes in mineral matter and other in organics present in coal. The combustion efficiency and carbon loss will have to be also addressed during blending of coals. It is also necessary to look into the aspects of slagging, fouling and emission characteristics. It has been found from various literatures, discussions and conferences that blending of coals is expected to grow over the next decade as electric utilities attempt to reduce cost, meet SO2 emission limits and improve combustion performance of their coals. All aspects of a blend's behavior and its effect on all components of power stations, from the stockpile to the stack, should be considered before the most appropriate blend composition is chosen. Because of the complexity of the combustion process and the number of variables involved (which are still not fully understood), it is difficult to extrapolate small – scale results to full – scale plant. Thus, power station operational experience in a wide range of plant configurations with a variety of coal feedstock is essential for determining the practical significance of results from bench – and pilot – scale tests. More published data on how the behavior of the coals / blends utilized in these tests differs from their actual performance in power station boilers are required. Predicting the risk of spontaneous combustion of coal stocks is another aspect of current fuel quality research. In addition to the inherent dangers, uncontrolled burning can lead to the release of pollutants; while the economic issues associated with the loss of a valuable energy resource is also a concern. The presence of trace elements in coal combustion has also received increased attention throughout the world during the last few years, with elements such as mercury of particular concern. One way to reduce trace element emissions is cleaning the coal prior to combustion. The use of cleaner coals – those with lower ash and sulphur contents – can have the added advantage of substantially reducing operating costs. Again, however, some effects may be detrimental (ash deposition may be exacerbated, and the effects on corrosion and precipitator performance are uncertain) which makes testing vital. It has been found from field data that even if the blended coal closely resembles the design coal for the boiler, the blend need not perform the same way. This is mainly due to the transformation of inorganic particles during combustion and the way in which the organics are dispersed in coal.

Impact of Blended coal firing on Boiler Performance

Blending of imported coal with indigenous coal results in change in the aggregate quality of coal to be fired. The main characteristics of coal that affect boiler design are ash content, volatile matter, moisture content, fixed carbon, gross calorific value (GCV), Hard grove Grind ability index(HGI), coal reactivity and ash fusion characteristics. In the context of blending of two coals, properties such as ash content, GCV, fixed carbon, moisture content are additive in nature but other characteristics are nonadditive. Typical Indian power boilers supplied by BHEL are designed for high ash Indian coal and thus the furnace is typically higher by about 20%as compared to boilers sized for imported low ash coal. The GCV of coal considered for design is about 3300 kcal/kg. The performance guarantees are based on design coal; however, BHEL supplied boilers are capable of giving rated output with coal quality variation of about 1000 kcal/kg (sayfrom3000 to 4000 kcal/kg)

It would be appropriate to discuss here the impact of blending of coal on design of boilers as well as the areas to be looked into while blending two coals with widely varying characteristics.

1. High ash content in coal influences furnace sizing. It also leads to requirement of more number of mills and influences sizing of PA fans, Air Pre-Heaters and ESP, besides size of Coal Handling and Ash Handling plants. Indian coal contains high quantum of abrasive ash necessitating lower flue gas velocities and larger spacing of pressure parts to minimize the flue gas erosion. Further, heat is retained in the ash and released slowly in the SH, RH and Economiser zone. On the other hand, for low ash non-erosive coal, pressure parts can be closely arranged leading to compact design of boiler. Large proportion of blending of imported coal of very low ash content, in boilers designed for high ash coal, could affect the heat transfer profile between the radiative and convective sections of the boiler and may lead to difficulty in attaining rated main steam and reheat steam temperatures.

2. Coal with very high moisture content derates the capacity of mill sand requires higher quantum of heat for coal drying in the mill thus necessitating higher hot air temperature at mill inlet and thus impacting sizing of economizer and air pre-heater. If low moisture coals are used, heat required to dry the coal is less thus air passing through the air heater would be less resulting in higher flue gas exit temperature.

3. Fixed carbon and Volatile Matter provide an insight into the reactivity of coal. FC/VM ratio which is called as fuel ratio indicates the combustion characteristics of the coal. When the ratio is more than 1.5, combustion would be difficult and if the ratio is less than 1.5, it is easy to burn. Imported coal with higher volatile matter requires careful handling particularly in summer as it is prone to catch fire. Lower mill outlet temperature of 50-55 deg C needs to be maintained for such coals as compared to 75 - 90 deg C temperature for indigenous coal. Thus, when firing blended coal, having a component of high Volatile Matter, mill inlet temperature has to be maintained carefully, to ensure drying of coal while taking care to avoid mill fire.

4. Hargrove Grindbility Index (HGI) is important from grinding considerations and large variation in HGI poses problem of selective grinding of one coal over another and difficulty in achieving desired coal fineness for proper combustion and affects the mill output.

5. Compatibility of ash characteristics is most important while blending coals because ash characteristics determine the slagging/fouling characteristics of coal and also its erosion and corrosion potential. Thus, important ash characteristics like the ash fusion temperature, base/ acid ratio, iron/calcium ratio, iron content, silica/alumina ratio should be known before hand to examine the compatibility of coals for blending.

IV. BLENDING METHODOLOGIES

Various methodologies used for blending of imported and domestic coals are described below in brief.

1) Separate layering of imported and domestic coal in stockyard or blending in beds. This method leads to thorough mixing of coals and is widely practiced in several developed countries. However, this requires that entire coal quantity should first be stacked and Coal receipts in the station follow specific identified sequence.

2) Blending on conveyors by silo in this method, the imported coal is stored in a dedicated silo and is fed from this silo though an accurately weighing gravimetric feeder so as to enable varying of imported coal quantity. This is an expensive system. In a very large station, such an

arrangement may require separate silo for each coal handling plant as feeding imported coal to different CHPs from single silo may pose layout constraints.

3) Blending by ground hoppers or emergency reclaim hoppers In this method domestic coal is fed from wagon tippler/track hopper /stockyard and stacked imported coal is fed from ground hoppers with the help of dozers.

4) Blending of two streams of coal on conveyor belt this method involves blending of

(i) Both coals reclaimed by reclaimers or

(ii) Reclaiming of imported coal from reclaimers and domestic coal from track hoppers/wagon tipplers. Blending is carried out by feeding both imported and domestic coal simultaneously on conveyor belts and mixing takes place at the transfer points. However, accurate blending is not possible with this methodology. Another method for use of two different coals is by adopting mixed firing i.e. dedicating one or two mills for firing imported coal and remaining mills on domestic coal. Thus the mill settings for these mills can be made as per the requirements of Imported coal and it addresses most of the problems in milling such as coal fineness due to selective grinding, mill outlet temperature etc. The higher calorific value of imported coal may lead to greater heat loading in the particular burner zone. However, this is taken care of by proper control of coal quality being fed through feeder control and using lower mills (normally mill B/C) for imported coal. It also offers the advantage that based on any problem or abnormal operating conditions being experienced, the imported coal feed can be appropriately controlled.

V. BLENDING IN BEDS

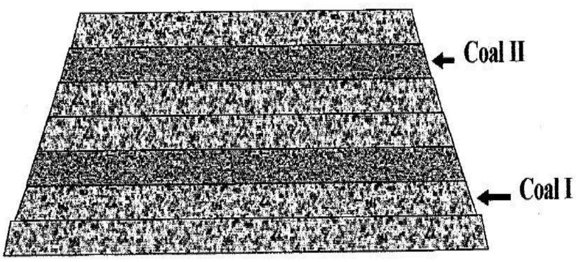

Fig.1Blending in Beds

This type of blending procedure to blend of different type of various grade coals, it is start with stacking different type of coal on stockpile. Stacker continuously moving on its long traveling track with continuous stack coal on stockpile as per require length of stockpile. By using this blending method we result, layer type stockpile. we can use four different grade of coal at build of one stockpile, this layer type stock pile give us 97% outcome of our planning blend, For example. 1st one type coal come from feed hopper then 2nd type, this type of operation make cake type layer on bed, Now at the time of reclaiming Reclaimer is cutting pile with move on track. Here another time coal is blend. Again blend occur when it reach in transfer point. so, there is so many chance to make this blend accurate.

Advantage

- Require single Stacker/Reclaimer
- single conveyor system
- low power consumption
- Accurate blending.
- Less manpower require for operation

Disadvantage

- Procedure takes more time in stacking of coal
- Its cannot reclaim without completion of batch

VI. BLENDING BY SILO

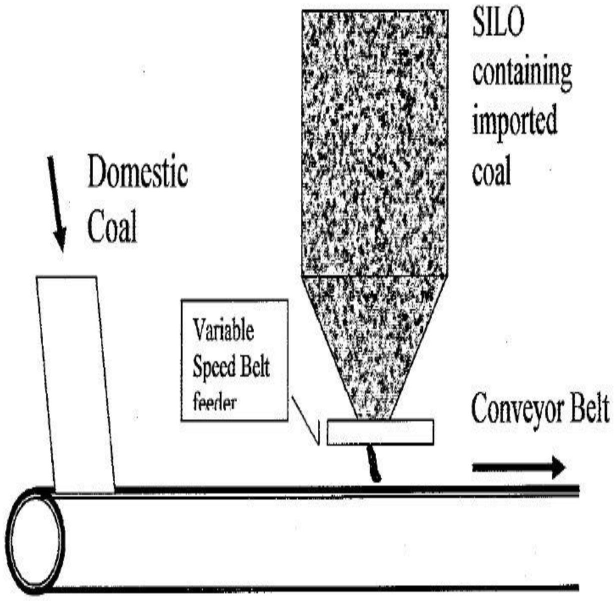

Fig 2. Blending by silo

This method need extra silo with conveyor system, then previous method. First silo filled by high grade import cargo by reclaimer. than low grade cargo continuously reclaimed by Reclaimer on dispatch conveyor, which one deliver blend cargo to bunker. Here low grade cargo conti. Reclaim on conveyor & high grade coal feed by silo on dispatch conveyor. Resulting bunker receive blend coal. There is arrangement of feeder belt which I controlled by belt weigher available on existing conveyor, control room can set percentage of high-grade coal as per requirement of boiler need, so there is better chance to accurate blending then above method.

Advantage

- Require Single conveyor system
- Flexibility of ratio change on boiler behavior
- Low manpower require for operation, it can control from control room

Disadvantage

- Capital cost of infrastructure is high (for hopper)
- System running hour is high (hopper feed need extra time)
- Ratio may vary when hopper jam.

VII. BLENDING BY GROUND HOPPER

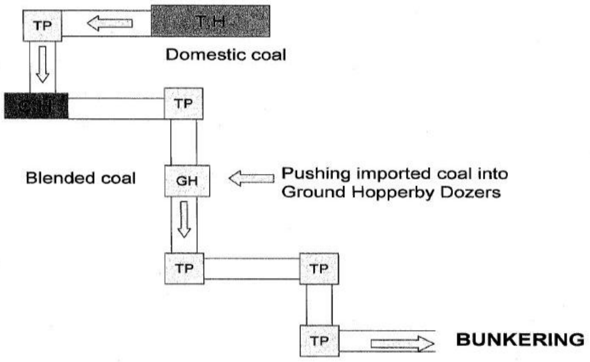

Fig 3. Imported coal reclaimed from reclaimers and domestic coal from track hopper

This method need tunnel conveyor on this conveyor there are ground hoppers, as per requirements high grade coal dozed on ground hopper by dozer or loader. conveyor which Carry low grade coal coming from truck tippler or wagon tippler, this procedure need manual feedback from boiler to equipment operators for dozing the coal, ratio can vary & blending procedure is too lengthy, Ground hopper blending use as extra source of feeding.

Advantage:

- No need to stack of low grade coal (direct feeding)
- Additional source of reclaiming
- Single conveyor system required

Disadvantage:

- Blending ratio not accurate (due to minimum transfer point)
- Feed rate not accurate (Depends on existing unloading)

Blending on moving belts by both coal Reclaimer

Two different type of coal stacked in different coal yard by stacker. Then it's reclaimed by both Reclaimer at one time both moving belts carry two different type of coal and its mixing in transfer points, its need two yard conveyors & stacker cum Reclaimer to prepare blend coal, it can use for long term blending plan in boiler, in this type of blending procedure need more communication between both machine operators for accurate blending. this method cannot give more accurate blending compare to other methods, system required more power consumption due to additional conveyor & machine.

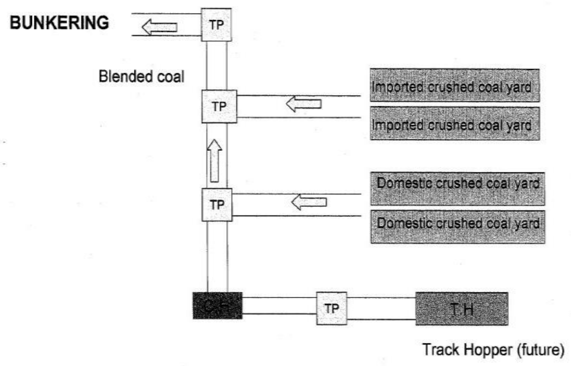

Fig 4. Both coal Reclaimed by Reclaimer

Advantage:

- High feed rate due to both pile already stacked
- Ratio can change any time

Disadvantage:

- System need additional conveyor & machine
- High power consumption
- Ratio vary due to both Reclaimer running individual

Blending on moving belt (imported coal reclaiming from yard & domestic coal from track hopper)

This system running on yard conveyor only as per requirements of power plant imported coal reclaiming by Reclaimer& domestic coal feed from track hopper. Track hopper is install on yard conveyor, track hopper operated by yard person and manual hopper feeding through loader, domestic coal stacked in yard. Imported coal reclaiming from another yard, loader feed coal from domestic coal stockpile; moving hopper can set at any position in yard. Then ratio may vary as per loader feeding

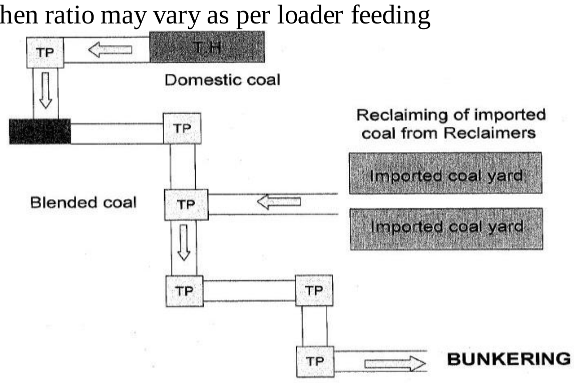

Fig 5. Imported coal reclaimed from reclaimer and domestic coal from track hopper

Advantage:

- Single conveyor system required
- Low power consumption
- Blending ratio can change

Disadvantage:

- Ratio outcome not accurate
- Feed rate low (depends on loader feeding rate)

VIII. TCP/IP PROTOCOL

A. TCP/IP Protocols

The Transmission Control Protocol/Internet Protocol (TCP/IP) suite has become the industry-standard method of interconnecting hosts, networks, and the Internet. As such, it is seen as the engine behind the Internet and networks worldwide. Although TCP/IP supports a host of applications, both standard and nonstandard, these applications could not exist without the foundation of a set of core protocols. Additionally, in order to understand the capability of TCP/IP applications, an understanding of these core protocols must be realized. With this in mind, Part I begins with providing a background of TCP/IP, the current architecture, standards, and most recent trends. Next, the section explores the two aspects vital to the IP stack itself. This portion begins with a discussion of the network interfaces most commonly used to allow the protocol suite to interface with the physical network media. This is followed by the protocols that must be implemented in any stack, including protocols belonging to the IP and transport layers. Finally, other standard protocols exist that might not necessarily be required in every implementation of the TCP/IP protocol suite. However, there are those that can be very useful given certain operational needs of the implementation. Such protocols include IP version 6, quality of service protocols, and wireless IP.

B. TCP/IP architectural model

The TCP/IP protocol suite is so named for two of its most important protocols: Transmission Control Protocol (TCP) and Internet Protocol (IP). A less used name for it is the Internet Protocol Suite, which is the phrase used in official Internet standards documents. In this book, we use the more common, shorter term, TCP/IP, to refer to the entire protocol suite.

C. Internetworking

The main design goal of TCP/IP was to build an interconnection of networks, referred to as an internetwork, or internet, that provided universal communication services over heterogeneous physical networks. The clear benefit of such an internetwork is the enabling of communication between hosts on different networks, perhaps separated by a large geographical area. The words internetwork and internet are simply a contraction of the phrase. Interconnected network. However, when written with a capital "I", the Internet refers to the worldwide set of interconnected networks. Therefore, the Internet is an internet, but the reverse does not apply. The Internet is sometimes called the connected Internet.

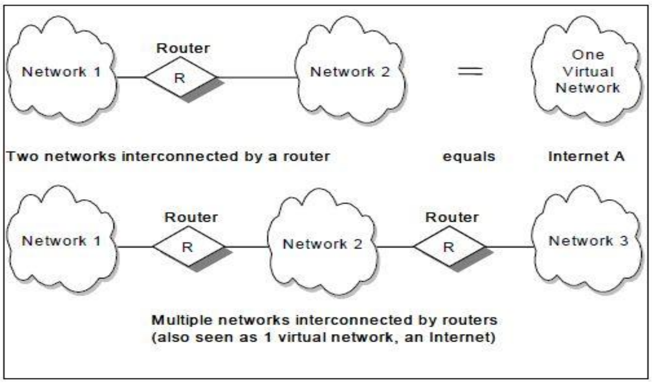

Figure 6 Internet examples: Two interconnected sets of networks, each seen as one logical network

Another important aspect of TCP/IP internetworking is the creation of a standardized abstraction of the communication mechanisms provided by each type of network. Each physical network has its own technology-dependent communication interface, in the form of a programming interface that provides basic communication functions (primitives). TCP/IP provides communication services that run between the programming interface of a physical network and user applications. It enables a common interface for these applications, independent of the underlying physical network. The architecture of the physical network is therefore hidden from the user and from the developer of theapplication. The application need only code to the standardized communication abstraction to be able to function under any type of physical network and operatingplatform. Interconnect two networks, we need a computer that is attached to both networks and can forward data packets fromone network to the other; such a machine is called a router.

IX. BLENDING BY RECLAIMERS WITH SLEW CONTROL

Ultra Mega thermal power plant facing the problem of demand of coal in boiler. Coal is the basic fuel of thermal power plant. Adani power plant located near west coast of Gujarat which generated 4600 MW electricity for nation. As per data analysis of daily fuel consumption report of coal handling system, they used approx. 50000 Mt coal per day average. Day by day coal price is hike versus shortage in supply of coal. Very difficult to generate electricity on economical way. To fulfill requirement of large UMPP require large infrastructure for coal handling system. To minimize shortage between dispatch & receiving logistic process, high capacity rating equipment require for handling of this imported & domestic coal. This is a brief of mechanized system which is use to full fill power plant requirements, if we Going through our blending requirements first of all coal is purchase from various countr. like Australia, Indonesia, china, Africa because these countries anthracite coal has different CV, ash & moisture, so these type of coals blend with domestic coal. The part of this coal handling system first unload the coal from vessel arrived from various country .for this unloading process equipment used is known as "Grab ship unloader". GSU is the fully atomization equipment. Its rating to unload coal with the rating of 2000 tone/hour. On unloading process of single vessel generally 2 to 3 GSU used. The target of unload coal average 5000 to 6000 tones/hour. Coal is now calculating in premium commodity so its set coal blocks for all customers & it is not enough to fulfill this requirements, so now need to make pure blend of imported & domestic coal, this is start from stacking, This system is arrange from port to power on port vessel unload by cranes under these cranes conveyor system installed each crane unloading capacity is 2000 tph& each conveyor capacity is 6000 tph, this conveyor system convey coal from berth to stack yard, By proper planning stacking is complete our first part of blending, Stacker operator set this machine In auto mode, this mode programmed as per our blending plan, stacker make 100x14 mtr. Stockpile in yard. This blending method is working with auto control reclaimers, as per requirement of power plant we can set blending ratio in reclaimers, in this system we can use two or three reclaimers at one time as per need, due to different grade of coal containing different CV, ash & moisture content. As per behavior or output of boiler performance, we can set different coal ratio from stock yard. Two or three reclaimers are running together, each machine enter its own ration for example, reclaimer A is set on 35% (imported coal), reclaimer B is set on 35% (domestic) and reclaimer C set on 30%, which results 100% of pure design boiler related blending.

LOGIC FLOWCHART

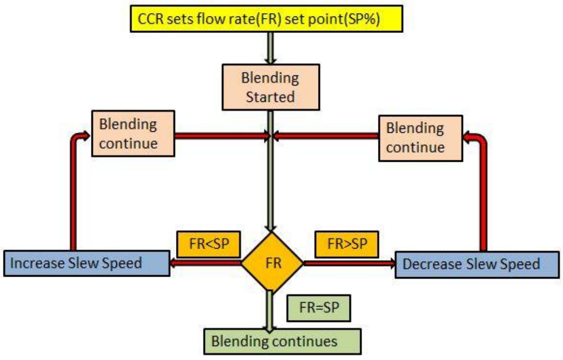

Fig 7 Blending auto logic flow chart

This blending depends on machine's belt weigher, it is installed in every machines it is calculating coal flow rate and totalizer how much coal is going on belt then it feedback going in other machine & control room via Ethernet communication protocol. This blending method's advantage is it can run continues without any problem output of flow rate is very high or we can set it as per ourrequirements, As per above blend each machine behave as per set point, As per Fig: no. 7. we can see that central control room set point machine running and controlling from slew drive all reclaimers synchronized between each other all machines working on set point and other machine's output. we can also observed it in Control room, If reclaimer A output is 30% then two others are automatic run slow and trying to match this ratio with machine A in this case machine A was not getting proper coal, /in another case if Machine A running slow as per our set point so This machine's slew drive speed automatic increase and try to get more cargo when its output come as our desired set point slew speed decrease automatic so this cycle running continue. In this method we can change ratio any time due to coal is stacked in different yards and different stock pile in same yard we can stack two or three types of different coal so we have flexibility to set blend.

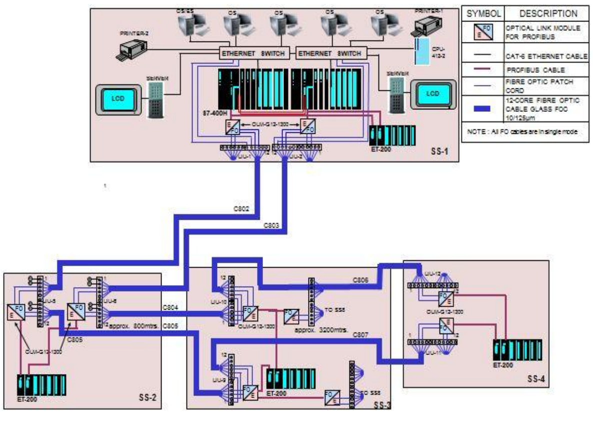

Fig.8 Plant communication network with PLC, SCADA& SERVER.

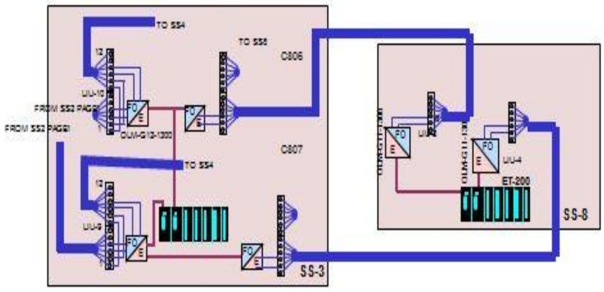

Fig.9 Plant communication network distribution.

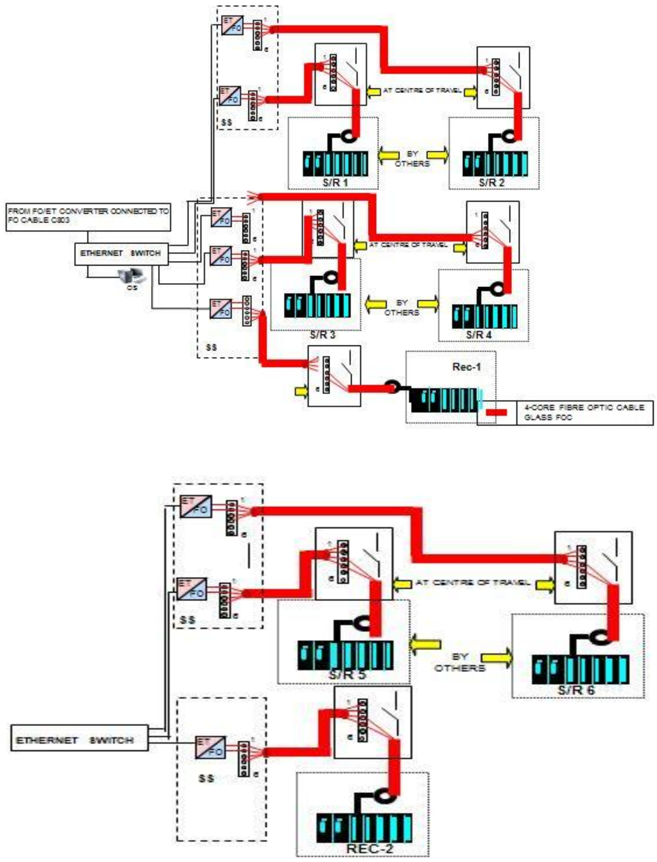

Fig.10 TCP/IP communication purpose modified network for stacker cum reclaimer.

X. CONCLUSION

Communication in industrial applications is the very intelligent part. In case of industry having more PLCs in one network, it is necessary to solve their inter-communication. We should deal with this question in dependence on some facts, for example: used control system, used industrial network, transmission reliability requirements and so on. Here we would like to present a solution for intercommunication between PLCs in one industrial network by S7 communication via Industrial TCP/IP (Ethernet).The paper introduces a new technique of coal blending in industry by using automation, the automatic coal blending network system. The System includes the field automation of production plant and the Centralized monitoring control center. The field automated production center uses the TCP-IP (Ethernet) protocol to build a network, connect every controller to Profibus than by convertor connect to the control network. Feedback value of belt weigher feed rate & totalizer of Reclaimer continuously monitor. Control center SCADA & PLC control the system. Multi workstation systemize by running the monitor software WINCC7.3 to connect via Ethernet module(Scalalance) of PLC system, Real time data control and management of the entire system can be differed as per requirement of user.

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