

WEB PROCESS EXPLORER FOR BLAST FURNACE - 4

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Abstract— In this paper we proposed a web technology which enables easy and secure way of sharing online information of blast furnace which helps managers to get online information, can take certain decision quickly, else need to contact control room operator and get current status and can lead to delay in decision making. Hence we developed a web site “WEB PROCESS EXPLORER “for BLAST FURNACE #4 in JSW Steel Limited, to see current parameters and laboratory analysis online within plant premises with user authentication. This helps operation in-charge and management to take decisions quickly regarding production, delays and abnormalities in operating blast furnace.

Keywords— Web site, Automation, Process, Operation.

I. INTRODUCTION

Recent technological development allows building and developing scalable applications such as web based applications which are very easy to build and scale and need less time to build and publish securely across the networks Normally Windows form applications required direct connect between two systems to exchange data, and is not feasible for many clients or systems which may be server or clients.

The goal of this web application is to provide access to middle and top level management to see following details;

Overview of Blast Furnace , salient features and design parameters

Live Process Parameters

Lab analysis of all input raw material’s Chemical and Size analysis and Hot metal and Slag analysis (output Products.

We have Two level automation, Level1 (Process Control) Level-2 (Data acquisition system), Level-2 functionality to get data from Level1 (such as process parameters (hot blast temperature, Oxygen %, Hot metal Temperature and thermos-couple measurements etc.,) using OPC (**OLE for Process Control**) Connection. Level 2 system currently being used for reporting in Blast Furnace-4.

So we have developed web application that can provides valuable and most recent information to every user including Live Process parameters.

It is very essential to manage plant performance, hence key performance indicator like Projected Production, Fuel Rate, coal Rate and Slag Rate etc. are more important to monitor live.

The quality deviations in raw materials are common and should be in the limit, so we incorporated Lab Chemical and Size Analysis of all the products like Sinter, Pellet, Coke , Ore, Dolomite, Quartzite, Small Sinter etc.

- ❖ Currently we don’t have a system for viewing live process parameter where ever within the plant.
- ❖ If anyone wants to know current process parameters, need to call control room and should ask.
- ❖ The accuracy of manually taken data may be incorrect.
- ❖ No possibility to see raw material analysis.

II. RELATED WORK

Now a days it very common that most of the companies uses their websites for sharing of information using web forms. Examples of web sites we deal with are online shopping site, internet banking system. It is very easy to search and get most of the information online, similarly we have started developing web application (Portal) for Blast Furnace-4, to provide online information about the blast furnace.

1. Siemens VAI's Level2-2 "Process Explorer"

Siemens VAI is one of the leading Level-2 Automation suppliers, who offers a web based process explorer, which will enable to see process trends and tags online as well as offline which is expensive to adopt.

Drawbacks:

Currently capable sharing only process data with frequency of 5 minutes and not intended to share plant's live parameters and all raw material analysis at one place.

2. ABB's Plant Control Centre (PCC):

ABB's Plant Control Centre (PCC) is centralized data acquisition and processing system, which can integrate all units of the plant using OPC (**OLE for Process Control**) connectivity, ABB provides smart client for accessing application through web over internet.

Drawbacks:

Currently it is capable of sharing only process data with frequency of 1 minutes of 40 units of company and not intended to share live process.

3. Management Information System (MIS)

Management Information System or 'MIS' is a planned system of collecting, storing, and disseminating data in the form of information needed to carry out the functions of management.

Drawbacks:

Intended to capture all plant related which was required by top level management, and is very expensive to use such system for publishing single plant information.

III. WEB PROCESS EXPLORER

"WEBPROCESSEXPLORER" is a Web based solution intended to share live information to the top management and middle managers (shift in-charges), can see live parameters within plant premises (due to security reasons restricted to plant only). This Web site provides following information to the users (upon providing credentials):

- ❖ **Sharing of instantaneous data through web with adequate security features**
- ❖ **Data provided through this application will get refreshed automatically after every 5-10 seconds.**
- ❖ **All raw material analysis contains last two days values**

This system helps people to monitor and guide operators by managers sitting in their offices.

IV. EXPERIMENTAL RESULTS

Figures a to d gives the snaps of "WEBPROCESS EXPLORER"

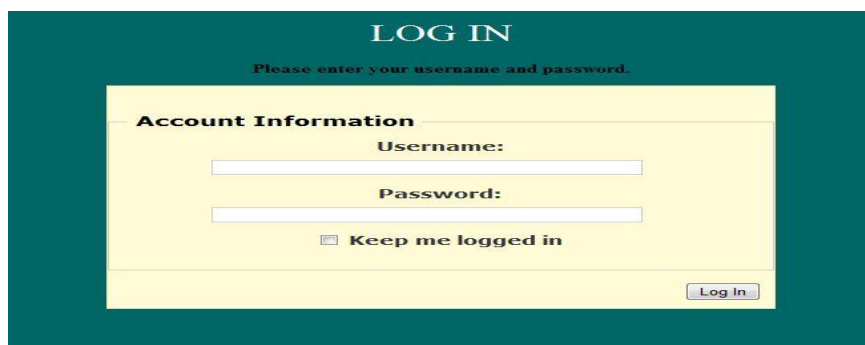


Fig. (a) Login Page

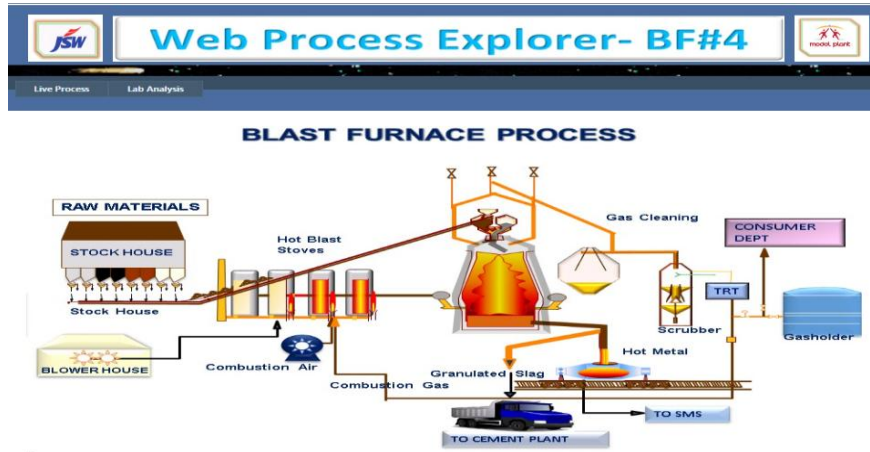


Fig. (b) Blast Furnace over view

FURNACE PARAMETERS

DESCR	VAL	UNIT
ProjectedProduction	8776.95	Tons
ActProduction	682.50	Tons
HotMetalPerCharge	59.54	Tons
WindVolumeRate	5713.51	Nm ³ /min
HBPressure	3.96	Kg/cm ²
HBTemp	1153.40	Deg C
OxygenPerc	8	%
CokeRate	386.39	kg/tHM
CoalRate	136.45	kg/tHM
FuelRate	522.84	kg/tHM

Fig. (c) Live Parameters of Blast Furnace

Sinter Chemical Analysis:

SAMPLETAKEN	CLOCK	H2O	FeTot	FeO	SiO2	Al2O3	CaO	MgO	MnO	TiO2	PTot	STot	Na2O	K2O	ZnTot	B2
7/30/2016 10:45:00 PM	7/31/2016 2:15:20 AM	0.00	54.95	9.49	5.05	3.20	11.20	2.17	0.47	0.13	0.08	0.01	0.08	0.07	0.07	2.22
7/30/2016 6:40:00 PM	7/30/2016 9:45:12 PM	0.00	55.37	10.09	4.98	3.19	10.92	2.12	0.33	0.15	0.09	0.01	0.07	0.06	0.06	2.19
7/30/2016 2:50:00 PM	7/30/2016 7:40:17 PM	0.00	55.61	8.60	4.95	3.22	10.46	2.13	0.25	0.17	0.09	0.01	0.07	0.06	0.06	2.11
7/30/2016 11:40:00 AM	7/30/2016 1:45:11 PM	0.00	55.68	10.36	5.25	3.24	10.25	2.12	0.26	0.16	0.08	0.01	0.07	0.05	0.05	1.95
7/30/2016 7:20:00 AM	7/30/2016 10:45:15 AM	0.00	55.24	10.94	5.05	3.27	11.00	2.24	0.26	0.15	0.09	0.01	0.07	0.05	0.05	2.18
7/30/2016 1:55:00 AM	7/30/2016 5:05:11 AM	0.00	54.70	8.94	5.22	3.49	11.07	2.22	0.37	0.15	0.09	0.01	0.08	0.06	0.06	2.12
7/29/2016 11:00:00 PM	7/30/2016 2:40:17 AM	0.00	54.72	9.37	5.15	3.46	11.21	2.19	0.37	0.15	0.09	0.01	0.08	0.06	0.06	2.18
7/29/2016 6:50:00 PM	7/29/2016 9:50:12 PM	0.00	54.19	9.52	5.12	3.29	12.10	2.30	0.35	0.15	0.09	0.01	0.08	0.05	0.05	2.36
7/29/2016 3:20:00 PM	7/29/2016 7:10:12 PM	0.00	55.66	10.28	5.29	3.34	10.25	2.12	0.20	0.12	0.07	0.01	0.08	0.05	0.05	1.94
7/29/2016 11:40:00 AM	7/29/2016 2:00:12 PM	0.00	55.09	10.22	5.34	3.39	10.86	2.16	0.20	0.17	0.08	0.01	0.07	0.06	0.06	2.03
7/29/2016 6:40:00 AM	7/29/2016 11:30:18 AM	0.00	55.42	9.04	5.36	3.33	10.34	2.10	0.22	0.15	0.07	0.01	0.08	0.06	0.06	1.93
7/29/2016 2:05:00 AM	7/29/2016 5:10:11 AM	0.00	55.41	9.00	5.30	3.56	10.16	2.12	0.20	0.18	0.08	0.01	0.07	0.06	0.06	1.92

Sinter Size Analysis:

Fig. (d) Shows Laboratory Analysis of Raw materials

V. CONCLUSION

This application will help in viewing live process parameters and Analysis of all raw materials, Hot Metal and Slag which are essential for shift in-charges through web browsers. This helps management to take quick decisions during abnormalities in furnace operation. In future this web application would be extended to see some process graphs and inclusion of incidents analysis reports and periodical monitoring trends data.

REFERENCES

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