BLAST FURNACE OPERATOR`S PC: AN INTERACTIVE SYSTEM

The system enables a process engineer to carry out computational simulation and engineering calculations, to use their results for bringing current operation mode closer to an optimum for the conditions at hand, and thereby to exploit the vast potential of process engineering measures for improving blast furnace performance.

The functions of the major subsystems:

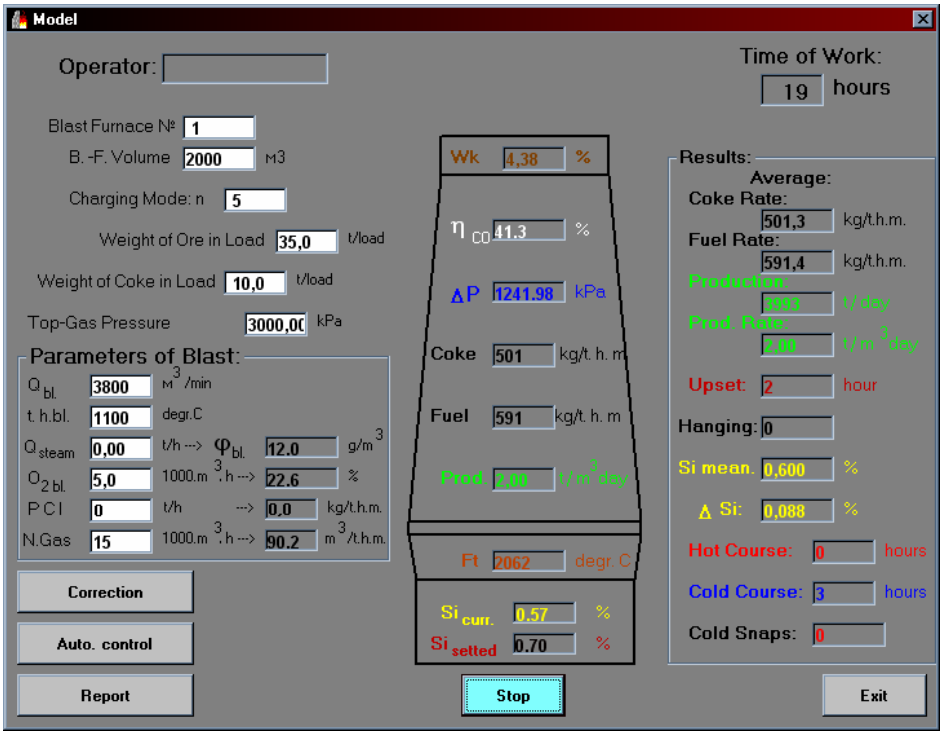
Burden subsystem realizes the computational search for the burden composition that ensures the minimum cost-price of blast furnace iron and takes into account the indexes of each burden material quality, their influence on the coke rate, the material prices and all desirable limitations.

Charge subsystem effects computer simulation of material charging by various modifications of bell-and-hopper and bell-less arrangements, estimates locations of burden layers, and calculates distributions of ore/coke ratio and burden basicity along top radius.

Slag subsystem uses a mathematical model to estimate the major properties of slag having a given composition. Furthermore, it automatically selects a charge blend from materials available, so as to provide desired basicity and optimize slag properties.

Blast subsystem estimates from given parameters of blast its integral characteristics. Also, it selects estimated values of blast parameters so as to provide the desired optimum levels in a group of integral blast characteristics.

Trenager subsystem simulates on speeded up scale of time the functioning of any blast furnace with its individual characteristics and conditions of work. The subsystem promotes formation of uniform correct skills in complex heat and gas-dynamic control of the blast furnace process.



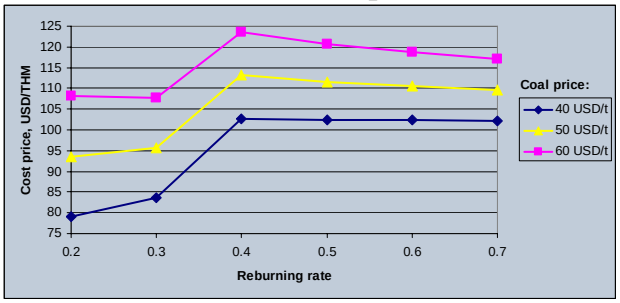
The interactive system may be used also for research calculations and for training of students and specialists.

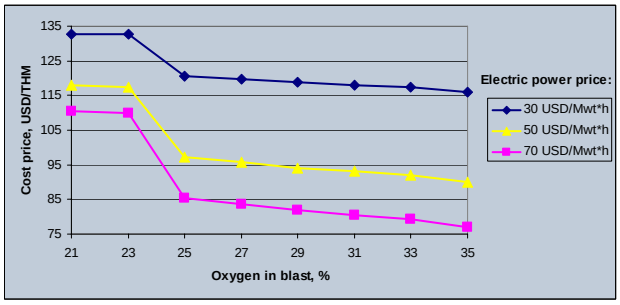
SIMULATION OF THE SMELTING REDUCTION PROCESSES

Smelting reduction processes are the new and effective alternative to the coke-agglo-blast furnace technology. To date, all the most effective technological and constructional elements of smelting reduction processes are not only proposed and grounded, but also tested on pilot scale. There are not by now doubts in function ability of a great number of smelting reduction processes. Our mathematical models make the opportunity to choose in particular conditions the most effective technology, proceeding from the definite criteria of optimization and assigned limitations.

For designing of industrial smelting reduction aggregates it is not already so necessary to construct previously a demonstration plant. Deeply understanding the essence of the processes taking place in such aggregates, having the applicable quantitative restrictions of each of the technologies, it is possible with sufficient trustworthiness to forecast technical and economic parameters of diverse versions of smelting reduction processes.

Examples of the smelting reduction simulation results:





The created universal dynamical imitator of the smelting reduction process is realized on the basis of reproducing model of main channels of bath process management and perturbations. The model includes determined and probability functions. The determined functions simulate the channels of control in form of elementary links of automatic control theory. The probability functions simulate perturbations of the smelt reduction process and contain the generator of hindrances that imitate perturbations of the real process. The imitator may be used for working out of the smelting reduction process control methods.

On offer are: Application packages of the mathematical models and simulators.
Addition of further systems functions at customer's demand.
Research and mathematical modeling in processes of metallurgy.