

Gleb Polischuk
J.V. Shishko, research supervisor
I.P. Nikitina, language adviser
National Metallurgical Academy of Ukraine, Dnipropetrovsk

Oxidative Pyrolysis of Biomass Waste. Technology of Continuous Process Development

Quantity of primary energy sources decreases. The world community works under the problem of gradually replacement them with secondary energy sources. The only effective solutions to the problem is reprocessing of biomass. Renewable energy technologies are clean sources of energy that have much lower environmental impact than conventional energy technologies.

There are three principal kinds of biomass reprocessing; they are complete burning, gasification and pyrolysis. Each kind of processing has its drawbacks, but the most perspective one is pyrolysis. It has a number of advantages:

1. Process of pyrolysis demands lower working temperatures in comparison with direct burning and gasification;
2. Universal use of biomass;
3. Generated heat from pyrolyzed gas combustion is almost twice more as the similar data for air generator gas. It is more effective for utilization in power – generating units.

Pyrolysis is a decomposition of biomass on pyrolyzed gas and bio-coal. Classical pyrolysis occurs without oxygen access that brings a number of inconveniences. The experiment made used the oxidative pyrolysis [with access of limited oxidant (air)]. It did not demand air-tightness of installation and is more acceptable technically.

The following steps of the experiment took place:

- Bunker was filled with 20 kg of walnut shell.
- For safety experiment was carried out in the street.
- The air blower was brought to installation.
- Thermocouples were connected to the special device to see the overall picture of temperatures on different districts in real time.

During the experiment the upper layer of biomass was set on fire and air was supplied. The process started and lasted for two hours. During this time, entries of temperature data were made. These data allowed determining the intensity of the process. At the end coke residue was taken out and dried, its mass was about 3.5 kg.

At this point we should determine the quality of the coal that remained. It will help us to give a rough estimate payback installation.

Then it is necessary to organize the flow of air from the bottom; it will allow filling in raw materials from the top and ensure the continuity of the process.