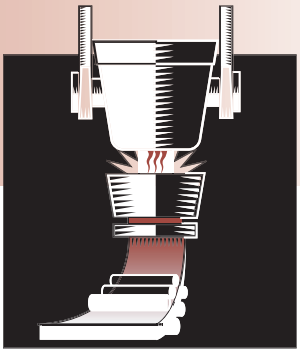
STEEL
Project Fact Sheet



Clean Production of Coke from Waste Carbonaceous Fines

The clean production of coke from waste carbonaceous fines offers an alternative to conventional coke production

Benefits

- Estimated savings of 1.6 million short tons of coal per year in a coke plant producing 1 million tons of coke annually
- Potentially saves the industry 16 million short tons of coal per year
- Potentially recovers about 2 million tons/year of coke and coal fines that are currently sold as by-products and converts these into sources of raw material for iron production
- Eliminates the need for coking coals
- Reduces the cost of finished briquettes to about half the price of traditional coke

Applications

The technology's primary application is to produce fuel for the steel industry's iron production blast furnaces. The finished product can also be used in cupolas in the foundry industry. For both applications, the technology's uniqueness promises a less expensive, high-performance product that should compete well against conventional metallurgical grade coke.

In the United States, the demand for coke used for fuel exceeds domestic supply. A new process that produces coke from waste carbonaceous fines will increase the U.S. supply of coke and provide a less expensive fuel for the steel industry. The process is projected to provide the means to produce about 10 million tons of coke per year.

About 20.3 million tons of furnace coke are produced in the United States annually. That is 5.6 million tons less than the annual U.S. demand. The production capacity of foundry and industrial coke is 1.8 million tons. Because these quantities are insufficient to meet demand, the United States is a net importer of coke. In addition, old coke plants requiring large capital investments are continually being reviewed for closure by steel company management.

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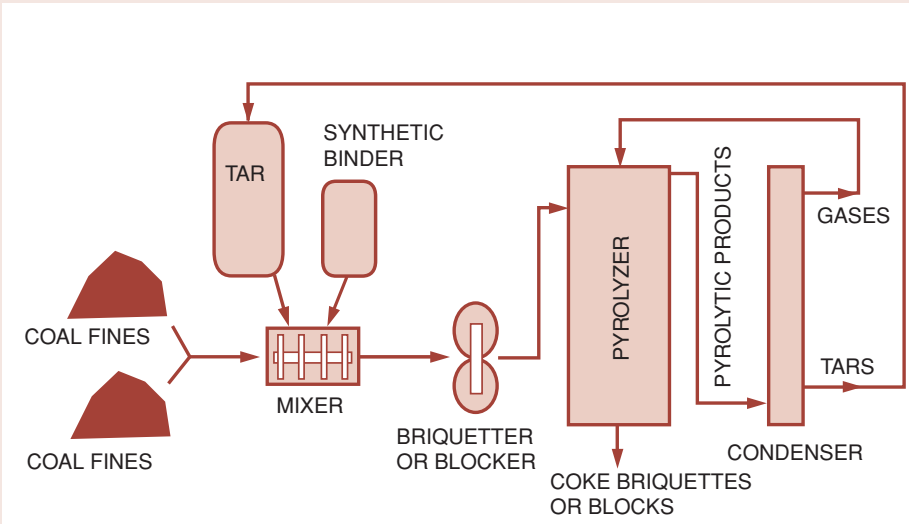

The process for the clean production of coke from waste carbonaceous fines.

Project Description

Goal: The project goal is to further refine the process to meet industry standards.

The invention is a process for manufacturing metallurgical grade coke briquettes and blocks from salvaged coke dust by mixing it with a precise amount of waste coal dust and a proprietary binder. The mix is heated in a pyrolyzer. In each batch, the gaseous output fuels the process, while the liquid output is used completely to bind the briquettes. Coke dust and coal dust are blended such that there are no excess liquids or gases, resulting in zero discharge to the environment.

The clean production of coke from waste carbonaceous fines consumes waste products, as it relies on the coke-fines discards from coke manufacture as a raw material. The process is similar to that used in conventional coking ovens, except that the production of tars and volatiles is restricted to that required for binding. A key advantage of the process is that it does not produce a by-product, as the process consumes the hydrocarbons.

The inventor, Craig Eatough, is developing this new technology with the help of a grant funded by the Inventions and Innovation Program in the Department of Energy's Office of Industrial Technologies.

Progress and Milestones

- The inventor is currently using coke and coal fines to formulate coke briquettes that meet the industry requirements of crush strength, specific gravity, and chemical composition.

- The invention is protected by two U.S. patents.

Economics and Commercial Potential

The clean production of coke from waste carbonaceous fines offers the potential for significant energy savings for both steel makers and foundries. If implemented fully, the process could recover 2 million tons/year of coke and coal fines that are currently sold as by-products. Direct energy savings are estimated to be about 14 thousand Btu/pound recovered instead of discarded.

In addition, the process could make the same quality of metallurgical grade coke produced at a conventional plant for lower investment cost, representing earlier payback.

One of the most beneficial features of this process is that there are no by-products. As coke-making facilities struggle to meet the stringent Clean Air Act standards, the invention's environmental features should become more attractive to the industry.

The Inventions and Innovation Program works with inventors of energy-related technologies to establish technical performance and to conduct early development. Ideas that have significant energy-savings impact and market potential are chosen for financial assistance through a competitive solicitation process. Technical guidance and commercialization support are also extended to successful applicants.

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