Commercial Applications of the Opposite Multi-Burner Gasification Technology

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   ——Yankuang Cathy Coal Chemical Co., Ltd.
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   ——Hua-lu Heng-Sheng Chemical Co., Ltd.
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Coal Gasification Process

- Coal mill
- Water
- Oxygen
- Gasifier
- Cyclone
- Water scrubber
- Synthetic gas
- Condensate
- Sour gas
- Edaporative hot-water tower
- Grey water
- Slag
- Coal-water slurry pump
- Lock hopper
Gasification Furnace

\[ P = 3.0 \sim 6.5 \text{ MPa} \]

\[ T = \sim 1300 \text{ °C} \]
Nozzle:

Oxygen and slurry leaving the nozzle simultaneously without pre-mixing inside the nozzle.

Advantages:

- Drop size 10% smaller and oxygen pressure drop being reduced
- The low velocity at the nozzle outlet reducing the friction of the nozzle channel and thus prolonging the life of the nozzle
National “Tenth-Five” 863 Key Project

“Novel Opposite Multi-Burner Coal Water Slurry Gasification”

Investment of 1.6 billion Yuan covering:

+ Two furnaces (4.0MPa) of 1,150 ton coal per day
+ 240,000 ton/year methanol
+ 71.8 MW Power generation
Jul. 21, 2005: started up the gasification process. After 80 hours run, shut down. Devices ok.

Oct. 16, 2005: started up the whole process. Methanol was produced.

Nov. 30, 2005: reset a pair of burners under 3.0MPa with gasifier keep running

Mar. 18, 2006: the very first IGCC power generation in China

Up to Jun. 4, 2006: totally >5,600 hrs, producing methanol >80,000 tons.
Example I: Specifications

- **Oxygen Consumption:** 309 Nm$^3$O$_2$/1000Nm$^3$ (CO+H$_2$)
- **Coal Consumption:** 535kg coal/1000Nm$^3$(CO+H$_2$)
- **(CO+H$_2$):** 84.9%
- **C conversion:** >98%
- **P:** 4.0MPa
- **T:** 1,300 °C
- **Capacity:** 1,150 ton coal per day
Example II: ECUST & Hua-lu Heng-sheng Chemical Co., Ltd.

Furnace Nozzle System
Example II: Short History

- Dec. 1, 2004: Started up successfully
- From Jun. 2, 2005: steady-state ran over 5,000 hrs
- After 784 hrs run, the four nozzles, the furnace and the furnace were in good condition.
Example II: Specifications

- Oxygen Consumption: 393 Nm³O₂/1000Nm³ (CO+H₂)
- Coal Consumption: 581 kg coal/1000Nm³(CO+H₂)
- (CO+H₂): 82~ 84%
- C conversion: >98%
- P: 6.5 MPa
- T: ~ 1300 °C
- Capacity: ~ 750 ton coal per day
Advantages of Technologies

- High carbon conversion and low oxygen/coal consumption because of proper fluid character in the gasifier
- Easy to scale up (like 2000-3000 ton coal/day) because of multi-burner
- High efficient of syngas clean-up section, low process pressure lost and low flyash in syngas because of “Step-by-Step” concept
- High heat recover efficient and stability in slag water treat section because of direct heat exchange between grey water and vapor from high pressure flash of slag water
Conclusions

OMB CWS gasification technology gives option for gasification choice especially for huge scale.

Thanks for Your Attention!