Wood dust burners for boilers

By: T. Gozzi, Rn'D Engineer, PILLARD (EGCI), Marseille (F)

1 - GENERALITIES

The WEYERHAEUSER MEDILAND SAS factory in Morcenx (40110 - France) manufactures panels from pinewood fibres from Landes in France. The factory consumes over 300 000 tons/year of clearing wood from renewable forest resources which the Aquitaine region supplies. The fibre is obtained by a defibering process with the help of a refiner. It is then dried through a steam dryer of around 15 tons/hr. The fibre is then treated, agglomerated (multi-stage press, 16 large scale levels), and the panels which are created this way are cut and sanded down to obtain the thickness required. At each sanding down area, the sawdust is recuperated and sent to a silo, where it supplies a special burner, fitted to a wood waste boiler, Lardet Babcock, 25 t/hr saturated steam at 17.5 bar.

Fig.1: View of the Lardet Babcock 25 t/hr boiler

2 - DESCRIPTION

The Lardet Babcock boiler is fitted with a grate for pine bark and various wood wastes.
On an upper level, it is also fitted with a PILLARD burner, dual-fuel natural gas / sawdust powder.

The burner assembly is comprised of :
- a combustion air inlet windbox
- a double turbulence air register for rotating the combustion air
- a special wood powder burner
- an annular natural gas burner
- two flame detectors
- a valve train for natural gas pilot or natural gas only operation
- a measuring type combustion control system
- an electrical control cabinet fitted with a PLC

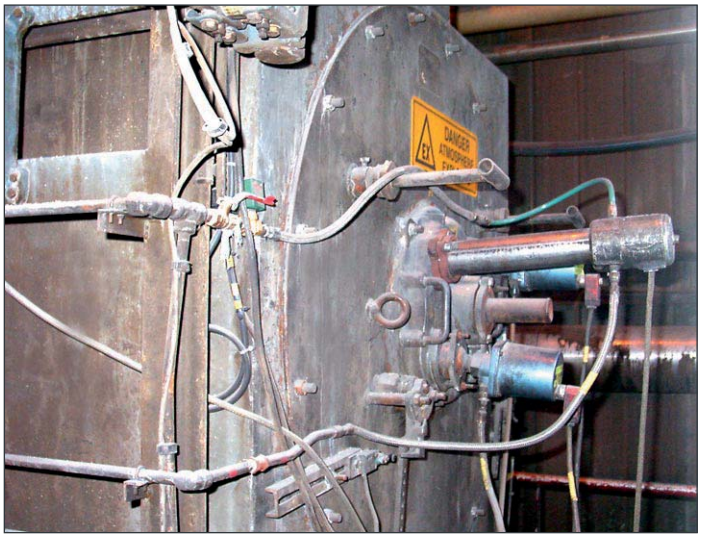

Fig.2: PILLARD dual-fuel natural gas / sawdust powder

3 - OPERATION

The sawdust powder stored outside the boiler-house is extracted from the silo by a screw which supplies a rotary valve.
The powder is sent to the burner by pneumatic conveying. A whorl for putting the dust into rotation enables it to be injected into the boiler furnace.
The wood powder burner can only be put into service if the vaporization resulting from bark combustion on the grate is at least 60 % of nominal flow.
The turndown is 1 to 3 on wood powder.
The wood powder burner operates 24 hr a day, 360 days/year.

Around the outside of the wood dust burner is a natural gas injection ring, able to fire a gas flow rate of 1300 Nm^3/hr. This gas burner is in fact only used for cold boiler start-up, in order for its rise in temperature and pressure, once per year.

General characteristics :

- Flow rate of wood dust powder	1600 kg/hr
- LHV	4500 kcal/kg
- Grain size maxi	0.3 mm
- H_2O maxi	7 to 8 %
- Resins	10 to 12 %
- Abrasives	2 %

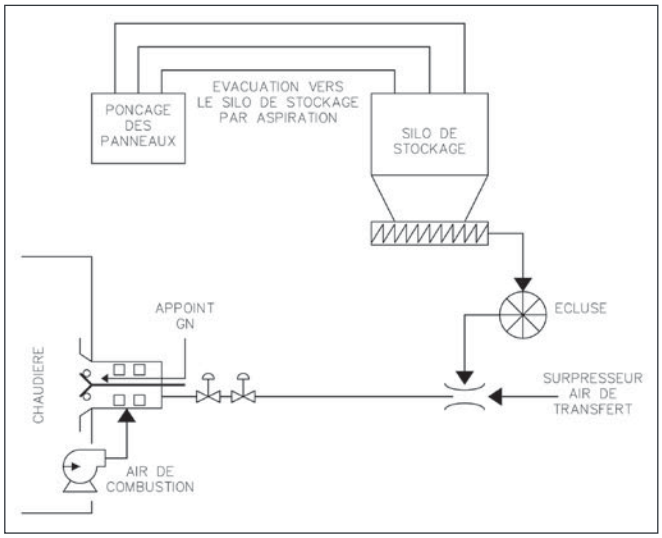

Fig.3: Operation principle

4 - CONCLUSION

The wood powder burner, at full load, fires the equivalent of 827 Nm^3/hr of natural gas, which represents an annual saving of 7 150 345 Nm^3 of natural gas.
As well as firing wood dust, this burner can also fire other vegetation products, such as citrus fruit dust or cereal wastes, in the case where their grain size does not go over 0.8 mm.