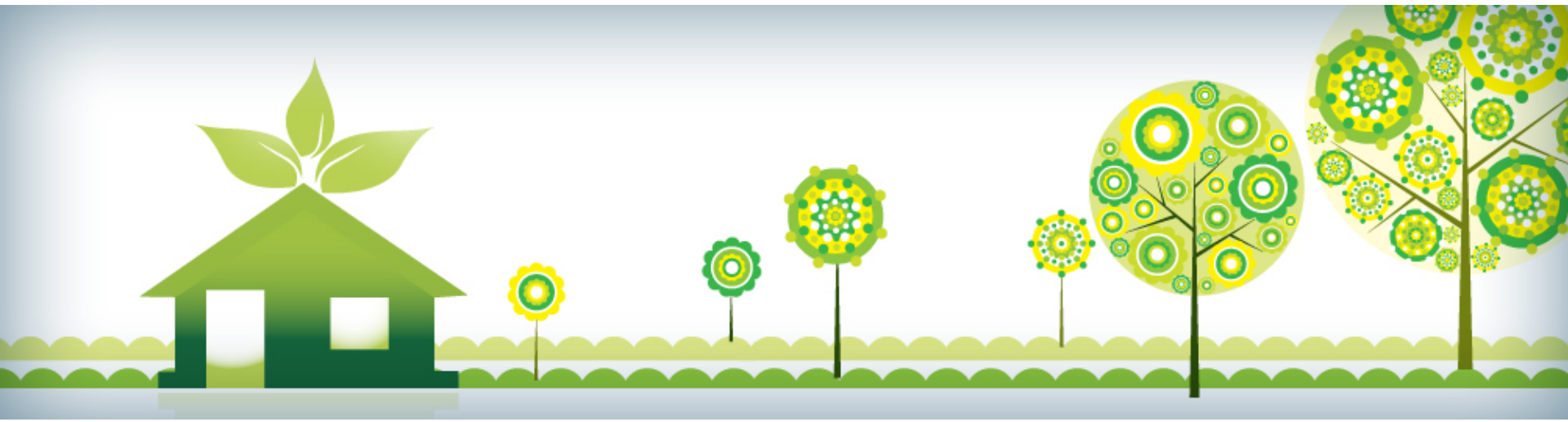


SOMANY

Green initiatives in ceramic tile manufacturing



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Green Manufacturing



- Method for manufacturing that minimizes waste and pollution achieved through product and process design.
- Basic reasoning is to conserve natural resources for future generations.
- Philosophy rather than an adopted process or standard.

Aspects of Green Manufacturing



ENERGY EFFICIENCY



Waste
Management



WATER
CONSERVATION

Energy Efficiency



- India is the 5th largest consumer of energy in the world
- Energy demand has outstripped supply leading to generation deficit
- More than 40% of the population has little or no access to commercial energy for livelihood
- Increasing cost of power Sustainable development

Waste Management



- 6 million tons of hazardous waste is generated per annum in India
- Around 90 million tons of municipal solid waste is generated annually
- Cost of environmental damage is estimated to be over 5 % of India's GDP, which is in excess of \$32 billion
- Remedy is following the existing waste management regulations and recycling to the maximum possible extent
- Collaboration among different industries to reduce waste: Waste of one industry can be raw material for another industry. Eg. Lime sludge from paper industry can be a substitute for calcite.



Water Conservation

- Physical water scarcity: Available portable water resources are less than the industrial demands.
- Economic water scarcity: Investments required for growing water demand are constrained by financial, human or institutional capacity
- Water saving potential: 35-50% (*Confederation of Indian Industry (CII)* data)
- Excellent potential to reduce, reuse and recycle
Some water saving measures by industries can be: Rainwater harvesting, Onsite waste water treatment plant or using water meter



SOMANY & GREEN MANUFACTURING

Somany Ceramics Ltd. is continuously progressing towards green manufacturing.

Several initiatives have been taken in manufacturing processes time to time to reduce all forms of energy consumption & maintaining a clean production process.

Some of these initiatives will be discussed in the following slides.

Introduction



Ceramic tile manufacturing consists of energy intensive processes such as ball mill grinding, spray drying & firing in roller kilns. First step taken by us towards green manufacturing was to consider these three processes for energy conservation.



Fig. 1: Ball Mills



Fig. 2: Spray Dryer

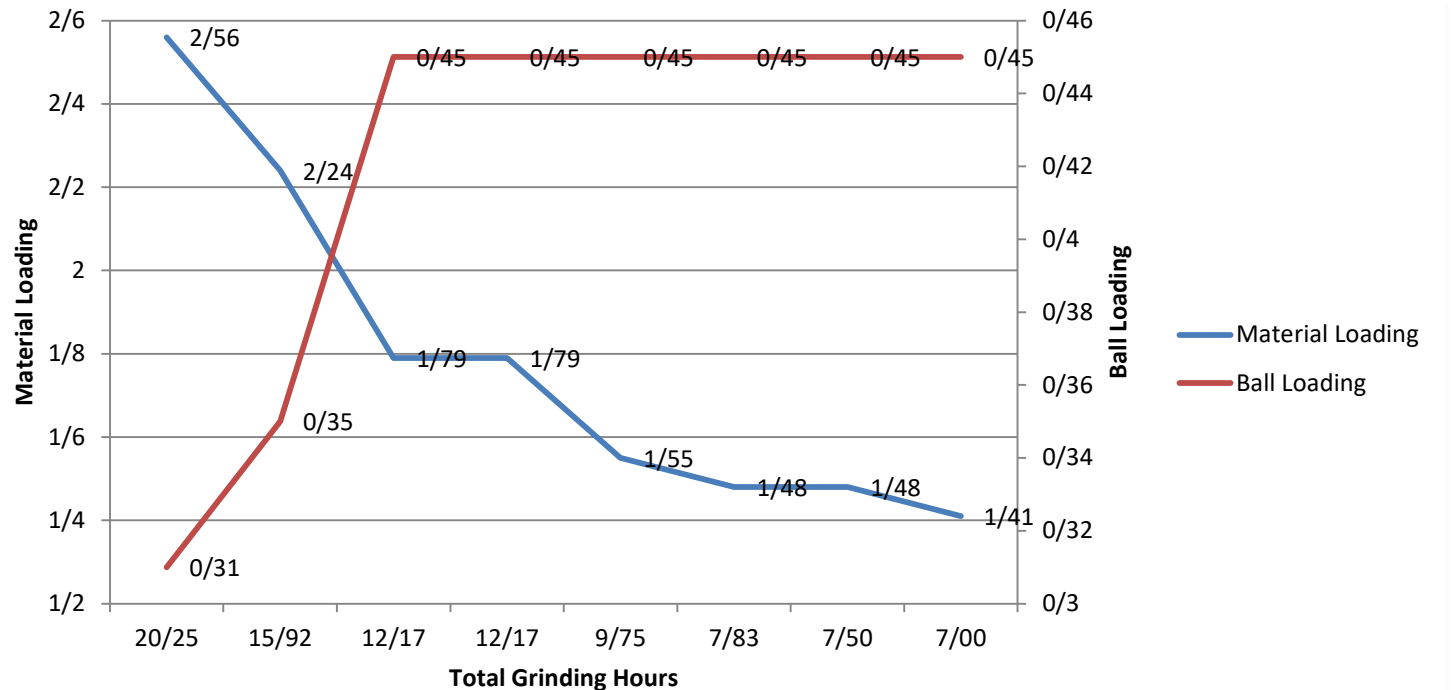


Fig. 3: Roller Kiln

Ball Mill: Optimization of Grinding



Ball mill grinding cycles of newly installed vitrified tile plant were optimized by finding optimum amount of feed and grinding media with respect to the packing of balls and volume of the ball mill respectively. Also the optimum size of grinding media to be used for make-up was calculated. Following chart shows results of pilot experimentation.



Implementation of pilot experimentation results in production resulted in substantial energy savings of about 1200 KWh/day.

Spray Dryer: Modification of Cyclone inlet duct



The highlighted portion (cyclone inlet duct) was physically modified to obtain an optimum velocity profile inside the duct resulting in natural gas savings of about 3100 scm/day.

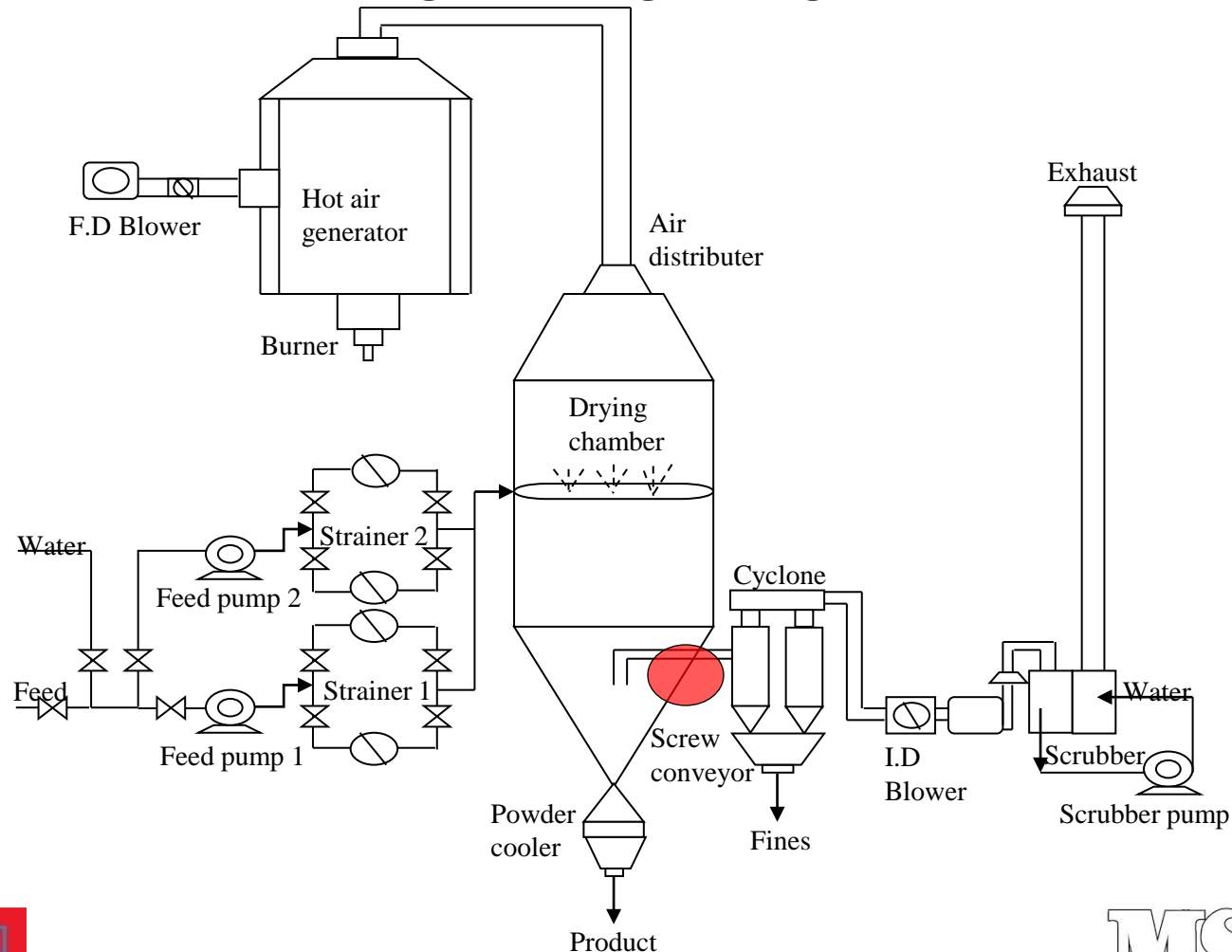
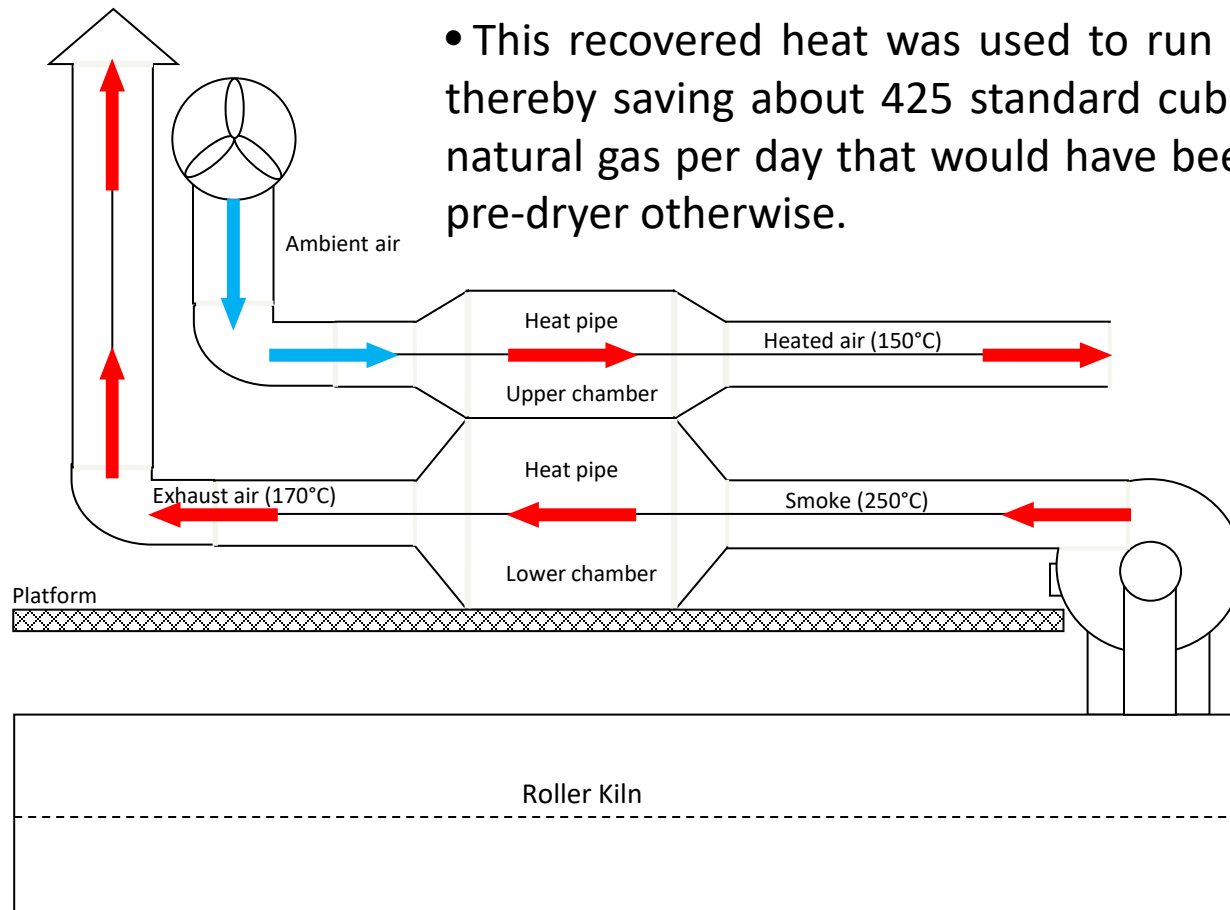


Fig. 4: Schematic diagram of Spray Dryer

Kilns: Heat pipe heat recovery



- This method was used to partially recover the heat lost through smoke suction fans installed in our roller kilns.



Kilns: Combustion air pre-heating



During the firing cycle, kiln is cooled by direct as well as indirect cooling processes. In direct cooling, a F.D. Fan discharges ambient air directly into the kiln thus cools the kiln air, whereas in indirect cooling, an I.D. Fan is used to suck ambient air through a number of hollow pipes that pass through the cross sections of the kiln. These pipes are surrounded by hot kiln gases and in its inside ambient air blows inside to take up the heat. This waste heat is recovered and used to pre-heat the combustion air powering the gas burners. Gas savings = 500 scm/day

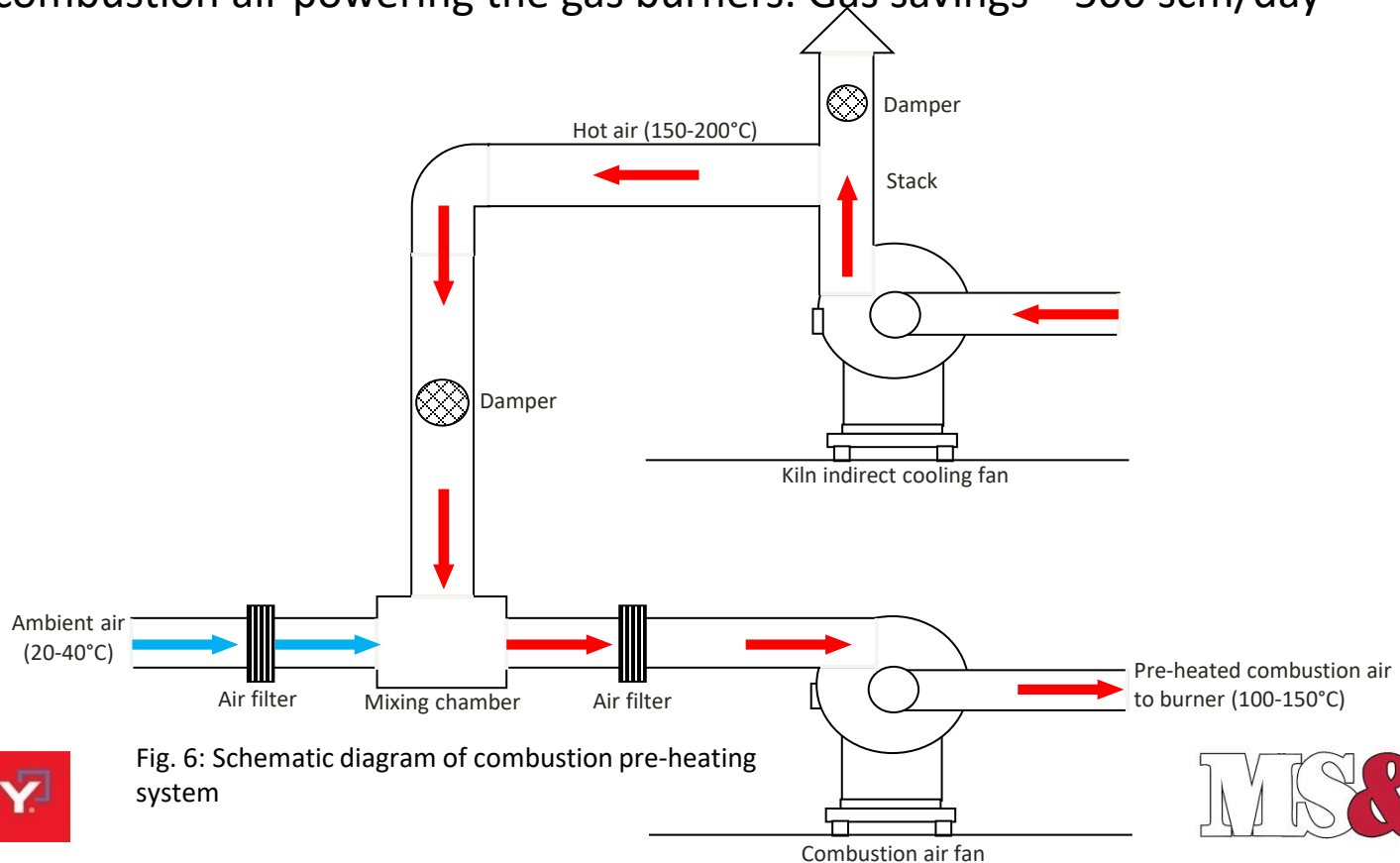


Fig. 6: Schematic diagram of combustion pre-heating system

Kilns: Hot air diversion to press dryer



Waste heat from indirect cooling is recovered for another job i.e. drying of green tiles. About 1100 scm of natural gas is saved per day by this setup.

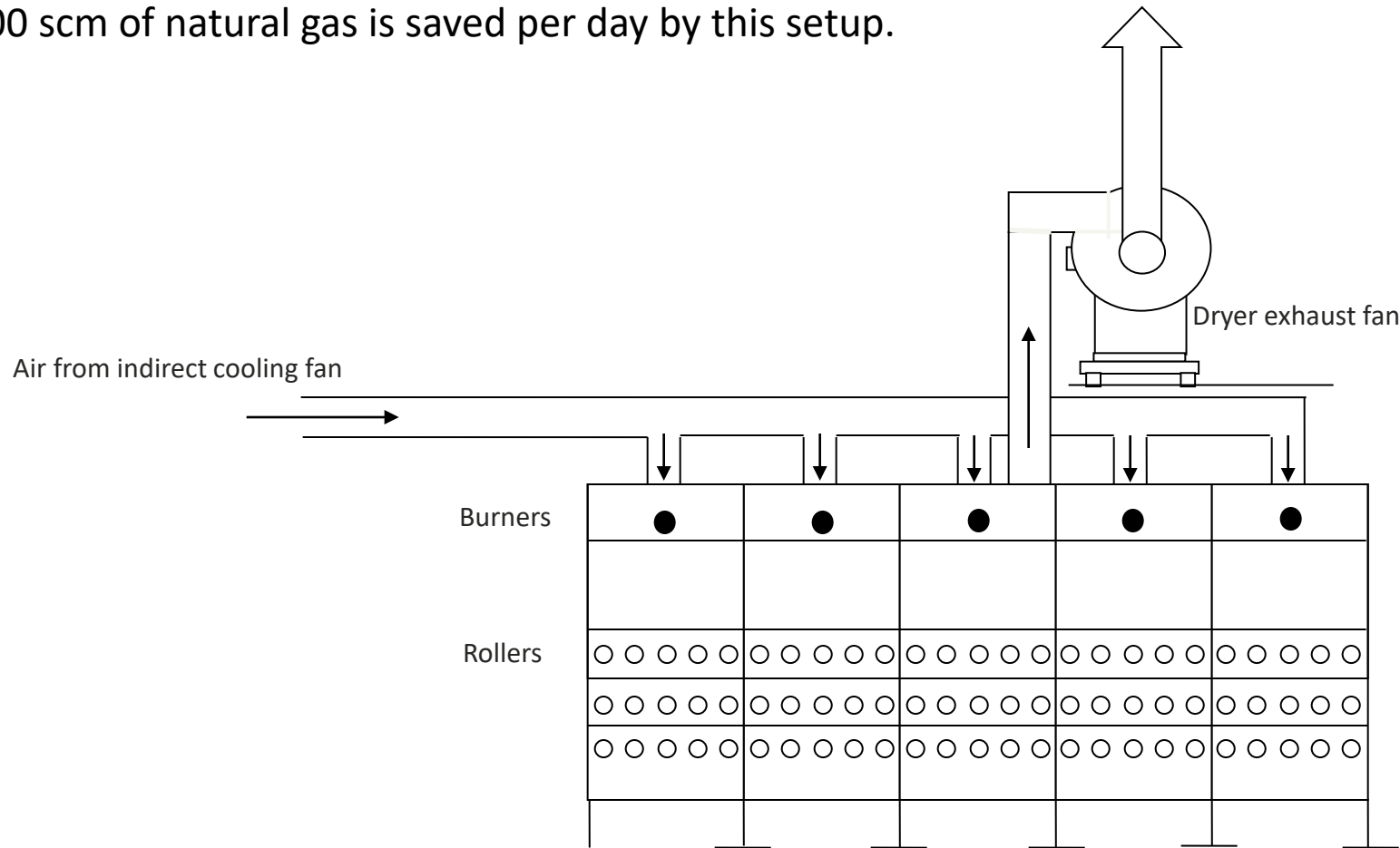


Fig. 7: Schematic diagram of hot air diversion system to a 5 layer press dryer

Clean Production



First came flat printing, then roto-color printing and now, we have Digital printing which has resulted in reducing wastes & energy loss due to reworking.



Conversion of wet cutting machine to dry cutting machine in wall and floor tile plants enabling cleaner production, eliminating water pollution & also support the green supply chain by enabling us to transport more material in the same volume.

Waste Utilization



Each year,

- Approx. 1950 tons of glaze sludge from ETP is utilized in body preparation.
- Approx. 12900 tons of dry cutting powder is utilized in body preparation.
- Approx. 165600 Kl of water is reused in body preparation after treatment.
- For wall & floor tiles, any in-process waste is re-utilized.

Conclusions



- Optimization of ball mill grinding resulted in energy savings of about 1200 KWh/day.
- Modification of cyclone inlet ducts in spray dryers resulted in natural gas savings of 3100 scm/day
- Recovery & utilization of waste heat from roller kilns resulted in natural gas savings of about 2000 scm/day.

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THANKS!!

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