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Lafarge Bath upgrades performance of kiln ID fans

The Lafarge Canada Inc. Bath plant is located on the North Shore of Lake Ontario, approximately 3km west of Bath, Ontario, Canada. In 2012, the Bath plant began preparations for two environmentally-beneficial projects. Here authors from the plant and AirStream Systems describe how both were facilitated by the replacement of two kiln ID fans by AirStream.

In 2012, the Lafarge Canada Bath plant began preparations for two environmentally-beneficial projects. The first project would determine the viability of replacing up to 10% of the pulverised coal/petroleum coke fuel mix with lower-carbon fuels such as biomass. The second project was the installation of a heat recovery steam generator in the kiln exhaust system.

Among the projects' bottle-necks were two identical kiln ID fans with radial-tip-blade impellers and variable speed drives. The original performance curve indicated that their efficiencies were very low and that the future performance requirements could not be met. Lafarge contacted AirStream Systems to investigate upgrading the fans' performance. The relationship between Lafarge and AirStream began more than 15 years ago with the upgrade of a finish mill fan at the Bath plant, followed by projects at five other Lafarge plants.

Fan efficiency increases were important as the Ontario Power Authority (OPA) offered financial incentives to reduce power consumption. AirStream conducted fan performance tests in January of 2013, which indicated that fan efficiency was only 54.2% for a two fan flow of 488,025m^3/hr. AirStream then proposed fan upgrades that promised to increase the efficiency to 87%. The two fan drive-input power use would be lower by 287kW at test flow. Additionally, the new rotors would attain much more pressure and a flow of 666,000m^3/hr with future 1250hp motors. For present operation up to 596,000m^3/hr, the existing 800hp motors would be used.

In addition to testing, AirStream conducted a thorough site investigation, which included foundation, housing and duct condition. Some maintenance points were discovered for correction during rotor installation.

The upgrade consisted of two new backward-curved-blade rotors and was designed to minimise equipment and installation costs by re-using the

Right: Two kiln ID fans at the Lafarge Bath plant.

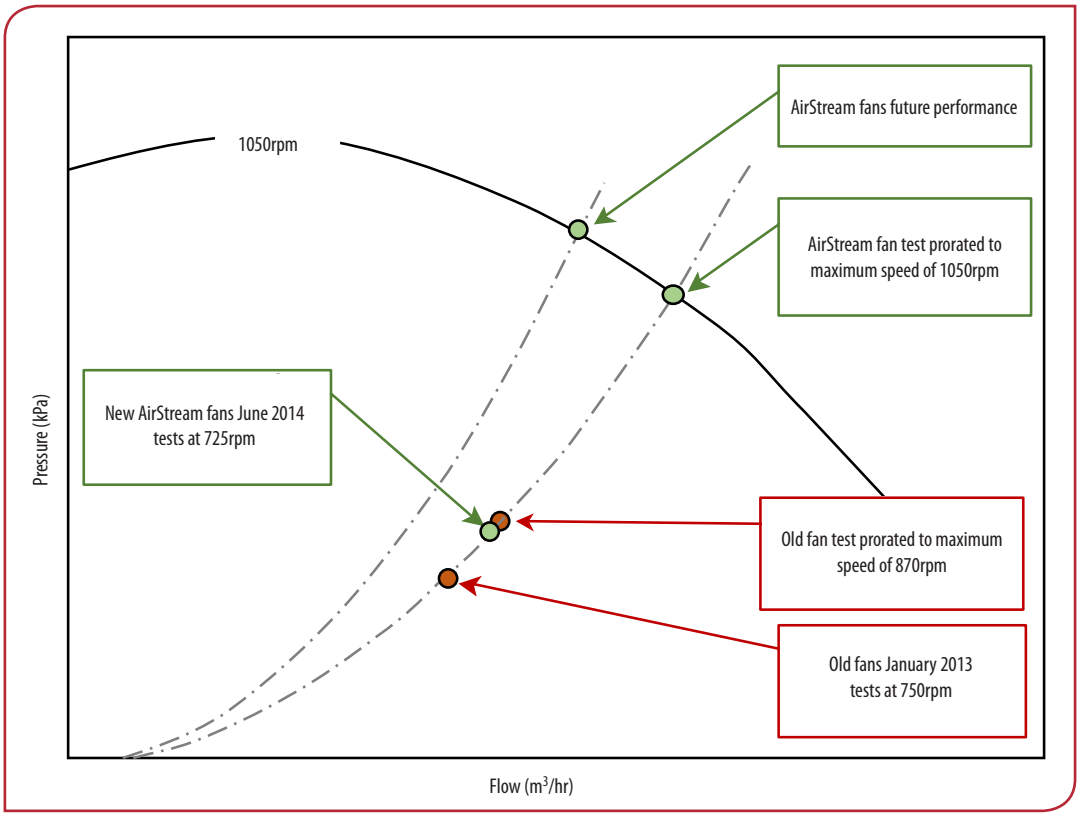
Left: New AirStream rotors being installed in the existing fan housings.

existing fan housings, dampers, couplings and bearings. Although the rotors were 26% larger than the existing ones, only modest fan housing modifications were needed.

By late 2013 Lafarge was able to proceed with the projects and entered into a turnkey contract with AirStream. The new rotors were installed on schedule in March of 2014 and were started-up without incident.

Lafarge and AirStream carried out verification tests in June 2014. The results confirmed that the fans were providing the guaranteed efficiency and performance. The results are summarised in the performance curve (See Figure 1).

Above: New backward-curved-blade rotor is larger and much more efficient than the old radial-tip-blade rotor.



Left - Figure 1: Performance curve.