

SUCCESS STORY

NorskeCanada, Port Alberni Division Vancouver, British Columbia

***\$150,000 biannual maintenance cost savings • Predictable cladding life
reduced outages caused by fan erosion • Doubled ID fan's useful life***

NorskeCanada's Port Alberni Division is one of the largest producers of telephone directory and lightweight coated papers in North America.

With an annual production capacity of 432,000 metric tons, the Port Alberni Division manufactures papers used to print telephone books, magazines, catalogs and flyers.

The mill requires a sizeable energy supply, a portion of which they produce internally with a hog-fueled steam power boiler. The boiler utilizes an induced draft (ID) fan to pull erosive flue gases from the boiler and force them through to the precipitator, where fly ash and other matter is removed. The fan consists of 10 forward facing curved fan blades, and has a 10' diameter fan wheel with inlets on both sides.

In order to extend fan life from one to two years, reduce operational and maintenance costs, and minimize shutdown periods, the mill addressed the severe wear affecting their boiler and conveyance equipment.

SEVERE WEAR

Port Alberni began experiencing severe wear on their power boiler's ID fan in 1997, when the boiler was converted from a stoker grate to a fluidized-bed system. The outer portions of the blades experienced extreme wear, caused by the highly erosive fly ash components passing through the fan at elevated speeds. Eventually, sections of the fan blades wore completely through, significantly reducing fan capacity.

Port Alberni experimented with protecting their fans with chrome carbide weld overlays. Approximately eight months after installing the fan protected by weld overlays, plant operators detected a decrease in fan capacity. Fine ash particles had eroded through the hairline cracks inherent to hardface weld overlays and began to wear through the overlays.

Portions of the chrome carbide were undercut and began to detach from the fan. Fan speed was steadily increased to maintain capacity. After 10 months of operation, the wear and productivity losses exceeded the ability to compensate with increased fan speed.

**"We expect to double life of
our ID fan with Kennametal
Conforma Clad"**

— *Andreas Weckesser, Quality Coordinator
NorskeCanada, Port Alberni Division*

The fan was unable to reach required boiler loading until the next planned outage. As a result, the steam plant was forced to burn costly natural gas in their second boiler to achieve the needed mill steam load. Over a two month period, these additional fuel costs were estimated at \$150,000.

Severe ID fan erosion can also create unbalanced vibrations, causing the fan to trip. Fan failure would result in incremental boiler fuel costs of approximately \$80,000 per 24 hour period and could potentially affect daily paper production, resulting in lost revenue.

Reduced boiler ID fan efficiency placed both financial and productivity strains on mill performance. The chrome carbide weld overlays did not provide acceptable erosion protection. As a result, Andreas Weckesser, Port Alberni's quality coordinator, eagerly sought improved preventative wear solutions.

MATERIALS TESTED

In an attempt to decrease costs associated with reduced fan efficiency and downtime, and to extend the useful life of the fan to two years, Weckesser began investigating alternative wear protection solutions. In June 2001, he initiated the testing of protective materials by placing sample coupons onto the fan. He tested 4' x 10' samples of chrome carbide weld overlay, hard alloy steel, and Kennametal's Conforma Clad™ tungsten carbide cladding. The samples were attached to the scroll of the fan housing and were monitored for six months.

The sample materials were compared in December 2001, and it was quickly established that Conforma Clad cladding outperformed the others. Only the Conforma Clad brazed tungsten carbide cladding retained its original length.



**Port Alberni Wear Protection Test Results —
A. Alloy Steel; B. Chrome Carbide Weld Overlay;
C. Conforma Clad Brazed Tungsten
Carbide Cladding**

THE CONFORMA CLAD™ SOLUTION

In July 2002, Port Alberni installed 10, 33" x 17 1/2" fan blade liners protected with .060" of Kennametal's Conforma Clad tungsten carbide cladding on the operating ID fan (Fan A). The fan maintained optimal capacity through 12 months of continuous operation.

In July 2003, the mill expanded the Conforma Clad application to their auxiliary fan (Fan B), cladding blades and areas on the center of the support web. The cladding application on Fan B included 10, 33" x 17 1/2" blade liners; 10, 42" x 9 1/2" blade liners; 10, 19 13/16" x 23" rib plates; and 20, 11 5/16" x 17 3/4" side plates. The cladding thickness of all fan components remained .060". Fan B also maintained full capacity through 12 months of operation.

The mill expanded their use of the cladding again in June 2004 by cladding Fan A with 10, 42" x 9 1/2" fan blade liners; 10, 19 13/16" x 23" rib plates; and 20, 11 5/16" x 17 3/4" side plates. I

n an attempt to extend the useful life of the fan even further, next-generation liners for the 33" x 17 1/2" blades were developed. The entire liner was clad with a .04" thick application of brazed tungsten carbide, with the high-wear portion of the fan receiving an additional .040" thick application.

"Kennametal Conforma Clad gives us a very high level of service and support," says Weckesser. "We work closely with their engineers to determine the best cladding formulations and thicknesses needed to protect our fans in our specific boiler environment."

Because of the predictable wear rate associated with the dense, uniformly applied cladding, it is expected that the double-clad fan liner will perform at ideal efficiency for at least two years.

Weckesser states, "We're impressed with the reliability of the cladding. Because the tungsten carbide is densely and uniformly dispersed throughout the cladding, we can predict the life of the liners by measuring the remaining thickness. It really helps us accurately plan our maintenance outage schedule without worrying about unexpected fan outages."



Port Alberni's ID fan protected with Kennametal Conforma Clad infiltration brazed tungsten carbide cladding.

As a result, the mill anticipates replacing the power boiler's ID fan once every other year instead of annually, resulting in a \$150,000 biannual savings in maintenance costs. Additional productivity and opportunity savings are expected to be significantly greater.

Port Alberni improved their power generation productivity and plans to protect other paper production processes with the Conforma Clad cladding. Weckesser is confident that the cladding will perform similarly well on other mill applications, including hog, chip, and ash handling equipment.

"We're very pleased with the level of wear protection Kennametal Conforma Clad provides. Their erosion protection has helped us lengthen our fan life and greatly increase our boiler capacity. We expect to double the life of our ID fan with Kennametal Conforma Clad," says Weckesser.

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KENNAMETAL TECHNOLOGY

Kennametal is a leading provider of severe wear solutions for industrial applications involving extreme abrasion, corrosion, and erosion. Conforma Clad-protected components are effective in high wear environments where equipment failures are persistent problems.

Kennametal's proprietary cladding products are metallurgically bonded to component surfaces. The unique cloth delivery system enables densely-packed tungsten carbide to be uniformly applied to complex geometries, providing a protective layer that wears at a uniform and predictable rate. The result is a durable cladding that is extremely abrasion, erosion, and corrosion resistant.

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