

Gold miner improves production output with new Knife Gate Valve innovation

RESULTS

- Reduced unplanned downtime and thereby improved gold production output by 1-2%
- Eliminated USD \$4.2K cost per maintenance event
- Improved mill water efficiency
- Improved safety of maintenance and operations personnel with reduced exposure to site risks



APPLICATION

Isolation of gold ore slurry from the mill discharge hopper.

CUSTOMER

Major Gold Miner, Western Australia

CHALLENGE

Isolating ore slurry that is discharged from the mill is a challenge for any precious metal miner. Valves in this severe service application are required to cycle frequently through medium to high solids made up of small, yet sharp particles. Even the best elastomer sleeve design Knife Gate Valves quickly become damaged and fail to seal. A failing valve in this application will result in lower recovery rates as the unit is taken offline for each maintenance intervention. The operation will also see costly additional water usage to replace water that is lost from the process through the leaking valves.

This was the case for a major gold miner in Western Australia. Operating with 40% solids of <1 mm particles and cycling every 30-40 minutes with a stroke rate of approximately 15 seconds, their elastomer sleeve Knife Gate Valves were succumbing to tearing every 7-10 days. And while these valves were designed for rapid repair, the downtime required to replace the torn elastomer sleeves was limiting their production output. Added to this loss of production was the cost of replacement parts, labor and crane hire that was placing an unnecessary burden on their maintenance budget.

SOLUTION

Emerson identified this challenging application as an opportunity to demonstrate the performance capabilities of its latest Knife Gate Valve innovation. The all new Clarkson KS1 is purpose-built for extended zero leakage isolation in these severe service environments and was more than up to the challenge.

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“[The valves] have been operating satisfactorily to date with no maintenance issues.”

Mechanical Supervisor
Major Gold Miner



Clarkson™ KS1 Knife Gate Valve

SOLUTION (continued)

The new Knife Gate Valve features a patented gate edge seal design that creates a continuous seal around the gate, together with a precision-molded elastomer seat. This heavy-duty seat increases the contact area and resilient sealing ability of the valve compared to standard O-ring designs, resulting in superior isolation performance over an extended lifecycle.

The valve design is optimized to thrive in challenging, severe service slurry conditions with a full round port that eliminates protrusions into the flow, which minimizes turbulence across the valve and reduces wear on valve components and downstream equipment. Reversible, rotatable wear rings are also included as standard on both sides of the valve to protect the seat and extend maintenance intervals.

The maintenance team was also top of mind for the selection of the KS1. The valve is repairable with standard tools and readily available spare parts. Adjustments can be made to the packing system externally that dynamically self-adjust pressure to the gate edge seal system. The KS1 is also designed to standard MSS SP-135 face-to-face dimensions for simple changeout and upgrade of underperforming installed valves.

The end result is that the new Clarkson KS1 valves have currently been installed for over 8 months, cycling more than 4,000 times with no maintenance required. Since the valves have been installed, the customer has been able to achieve uninterrupted production to improve output and eliminate valve maintenance costs in this previously troublesome application.

RESOURCES

Clarkson KS1 Knife Gate Valve Product Webpage

<https://www.emerson.com/en-us/catalog/clarkson-ks1>

Clarkson KS1 Knife Gate Valve Overview Video

<https://videos.emerson.com/detail/video/6246842681001/clarkson-ks1-severe-service-knife-gate-valve?autoStart=true>

Emerson Automation Solutions

10707 Clay Road
Houston, TX 77041
United States
+1 713 986 4665
ContactUs@Emerson.com
Emerson.com/FinalControl

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THE COST OF INACTION (USD)

Cost Items	Elastomer Sleeve	Clarkson KS1
Valve Purchase	\$0.0K	\$16.8K
Spare Seats	\$1.96K	-
Labor (\$280 /hr)	\$1.12K	\$0.56K
Crane (\$280 /hr)	\$1.12K	\$0.56K
Downtime (\$3.5K /hr)	\$17.5K	\$8.75K
Maintenance Events	16	1
Total Cost (8 months)	\$347.2K	\$26.7K

Assumptions: 2 valves are repaired/replaced during each maintenance event. Initial replacement of new KS1 valves takes half the time of uninstalling, repairing and reinstalling elastomer sleeve valves.