

GEAR OPERATED CONDUIT CLAPPER FOR CHECK VALVES WITH LOCK OPEN LEVER

A standard swing check valve stalls cleaning and inspection pigs in its open body cavity and leaves intelligent pig sensors exposed. Anthis modified the clapper with a bore-matched conduit guide, so the pig rides straight through, without buying a new valve.

✓ Fully piggable

🛡️ Protects intelligent pigs

🔄 Check function retained

✏️ Modified, not replaced



Anthis Valve Enterprises, Inc. | Houston, TX
Looking through the modified valve: the pig's continuous path past the conduit clapper.



EXECUTIVE SUMMARY THE BOTTOM LINE

On a long-distance pipeline that is cleaned and inspected by pig, the swing check valve sits directly on the pig's path. In its normal open position a standard swing check leaves a large cavity beneath the body, with no continuous surface to guide the pig across. Low-density hollow pigs float up and stall, and high-value intelligent pigs can strike the cavity wall and seat edges.

Rather than replace the valve with a dedicated through-conduit check, Anthis re-engineered the clapper itself. An arc-shaped conduit guide, machined and welded to match the pipe bore, fills the cavity when the clapper opens and forms a smooth, continuous conduit. The pig passes straight through, and the valve's automatic check and sealing functions are fully retained and verified.

Piggable

continuous bore for cleaning & intelligent pigs

Protected

no cavity step to damage pig sensors

Retained

check & seal functions unchanged

Modified

not a new valve purchase

Why this matters. A pig that floats, stalls, or hangs up in a check valve stops the run, costs cleaning and inspection time, and can wreck an expensive intelligent tool. This paper walks through the field problem, the design of the conduit clapper, the manufacturing constraints Anthis solved, and what the modification delivers.



INTRODUCTION THE VALVE ON THE PIG'S PATH

In pipeline pigging (PIG) operations, a train of cleaning or intelligent pigs is driven through the line. Every fitting on that path has to let the pig pass without snagging or losing it. Swing check valves are a frequent trouble point: once the clapper is opened, the pig loses the continuous pipe wall required for stable travel, leaving a substantial open void at the top of the valve neck.

A dedicated through-conduit check valve exists, but it is a full new-equipment purchase with a long lead time. For an operator who already has a good swing check in the line, the practical question is whether that valve can be made piggable, keeping its check and sealing duty, without replacing it.



The valve's original clapper at the start of the project, before the conduit guide was engineered onto it.



Pipeline operators

Teams running cleaning and in-line inspection programs who need every valve on the run to pass a pig cleanly.



ILI & pigging services

Providers protecting high-value intelligent pigs and smart tools from impact and stalls in check-valve cavities.



EPC & maintenance

Engineers weighing a valve replacement against a faster, lower-cost engineered modification of the valve in service.



THE PROBLEM

A CAVITY THE PIG FALLS INTO



Hollow pigs float & stall

Low-density hollow pigs rise on buoyancy in the check cavity, drift off the pipe center axis, and stall, interrupting the run.



Intelligent pigs at risk

With no continuous guide, the front-end sensors and probes of costly intelligent pigs can strike the cavity wall or seat edges and be damaged.



Interrupted pig runs

A stalled or hung-up pig means a stopped run, lost cleaning and inspection time, and a slow, costly recovery.



Replacement is expensive

Buying a dedicated through-conduit check valve is a full equipment purchase and a long lead time to design out one problem.



THE DESIGN

A BORE-MATCHED CONDUIT CLAPPER

The fix is to remove the cavity the pig falls into. Anthis restructured the clapper by machining and welding an arc-shaped conduit guide onto its front face, precisely matching the inner-diameter curvature of the pipeline. When the clapper is opened, the arc surface swings into the guide position and fills the body cavity, forming a continuous, seamless conduit that carries the cleaning pig and the intelligent pig straight through the valve body into the downstream line.



Inside the modified valve: the machined arc conduit guide (upper crescent) blends into the bore so the pig passes without a step.



The finished valve, bore and seat machined and the flange face refaced, ready for a continuous pig path.



THE SOLUTION

ENGINEERED ONTO THE CLAPPER

1

BUILT THE CONDUIT PROFILE

Machined and welded an arc-shaped guide onto the front of the clapper, matched to the pipe inner-diameter curvature. In the open position it fills the body cavity and completes a continuous, seamless bore.

2

PRESERVED SWING & SEATING

Shaped the outer profile so the clapper still swings its full stroke on the hinge pin without touching the body wall, and returns precisely to the seat. Drop-in through the top-entry bonnet was verified so the modified clapper clears on assembly.

3

PRECISION WELDING & CNC FINISH

Controlled heat input on the arc weld to limit distortion, then CNC-milled and polished the seat face and flow channel so the conduit runs smooth and the clapper seals tight.

Constraints solved. Drop-in envelope through the top-entry bonnet, full swing and seating clearance against the body wall, and welding heat control with post-machining, so the arc guide adds no interference and no loss of check function.



The finished valve with its gear operator, check and seal functions retained.



Clear line of sight through the conduit.



THE RESULTS

PIGGABLE, AND STILL A CHECK VALVE

Smooth pigging

hollow pigs no longer float or stall

Pigs protected

no cavity step to strike sensors

Full function

automatic check & sealing retained

Lower cost

modified, not replaced

MEASURE	STANDARD SWING CHECK	ANTHIS CONDUIT CLAPPER
Pig path	Open cavity, no continuous guide	Bore-matched conduit, continuous wall
Hollow pig	Floats off axis and stalls	Rides straight through on center
Intelligent pig	Sensors exposed to cavity edges	Guided smoothly, impact removed
Check & seal	Standard swing check function	Fully retained, verified after machining
Sourcing	Buy a dedicated through-conduit valve	Modify the valve in service, faster

The bottom line: the modification makes an existing swing check valve fully piggable for both cleaning and intelligent pigs, protects the tools that pass through it, and keeps the valve's automatic check and sealing duty, at a fraction of the cost and downtime of replacing it with a dedicated through-conduit valve.



WHY ANTHIS · GET IN TOUCH

THE HOUSTON SHOP FOR THE HARD WORK

Anthis Valve Enterprises has repaired and modified industrial valves since 1971, with more than 10,000 projects behind us. We are a repair and modification shop with an in-house engineering team. When a valve needs to perform a function the original manufacturer did not intend, or when specialized work must be completed rapidly, we design the solution, machine it in-house, and verify it before shipment.



Non-standard valve modification



Gate, globe, check, ball & butterfly to 48"



In-house CNC, welding & painting



Hydrostatic testing to 20,000 psi



Helium / ISO 15848 leak testing



Cryogenic modification to -350°F

"Excellent service, quick response, and quality work."

Midstream Valve

"We have a great working relationship with Anthis and will continue to utilize their facility to help us serve clients together."

Microfinish Valves

"Anthis does a good job meeting the delivery requirements. If there's any problem, they fix it."

Patton Myhre Sourcing

RUNNING PIGS THROUGH SWING CHECK VALVES THAT STALL THEM?

Send us the problem valve. We will engineer the conduit modification, machine and weld it in house, retest the check and seal, and turn it around locally, faster than sourcing a new through-conduit valve.

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