

# HYDRAULIC ASSISTED SEAT DESIGN FOR SUPERIOR VALVE SEALING CAPABILITY

GIUSEPPE VIGNATI

ENGINEERING DIRECTOR

FLOWSERVE VALBART SRL



## AGENDA

- BUSINESS PRESSURES IMPACTING PIPELINE OPERATORS
- PIPELINE INTEGRITY & ITS IMPORTANCE TO PIPELINE OPERATORS
- IMPORTANCE OF SUPERIOR VALVE SEALING FOR PIPELINE INTEGRITY
- INTEGRITY SOLUTIONS ENHANCING VALVE SEALING CAPABILITY
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- HYDRAULIC ASSISTED SEATS : ADDING VALUE TO PIPELINE INTEGRITY
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## BUSINESS PRESSURES IMPACTING PIPELINE OPERATORS

Apart from ensuring a reliable, safe, and cost effective operation of the pipeline, End users typically face the following business pressures :

- Maximizing production
- Reducing costs arising from unplanned pipeline maintenance
- Optimizing inspection and maintenance costs
- Maximizing value of pipeline assets



**How can Pipeline operators effectively manage these Business Pressures ??**

**PIPELINE INTEGRITY**

## PIPELINE INTEGRITY & ITS IMPORTANCE TO PIPELINE OPERATORS

### What is Pipeline Integrity?

A pipeline has integrity when it is operated and maintained in a manner that reduces the chance of failure and minimizes the consequential risks to people, environment and the pipeline operators

### What internal and external factors are driving Pipeline Integrity?

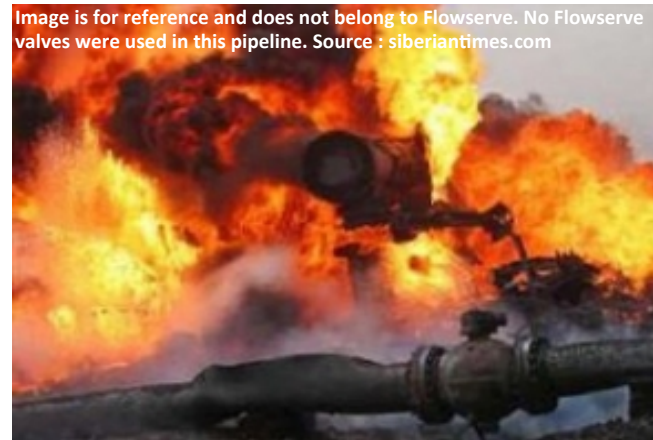
- Criteria for Risk management is tightening
- Environmental concerns and risk
- Insurers are facing intolerable liabilities for large clients
- Pipeline interruptions have wide spread impact due to interconnectivity of pipeline assets
- Critical pipeline assets need innovative safety solutions

**Pipeline integrity is a major concern to all operators and the pipeline industry has been using increasingly more sophisticated tools to detect potential damages in pipelines.**

## PIPELINE INTEGRITY RISKS AND CONCERNS

Pipeline integrity incidents can be a result of integrity risks arising from ineffective operation of pipeline components. An integrity risk arises from a situation where the potential threat can be assessed and the integrity of the pipeline can be restored during normal operation.

Pipeline operators constantly seek to manage such risks and prevent catastrophic failures which normally result in a temporary or permanent (in extreme cases) shut down of the pipeline.



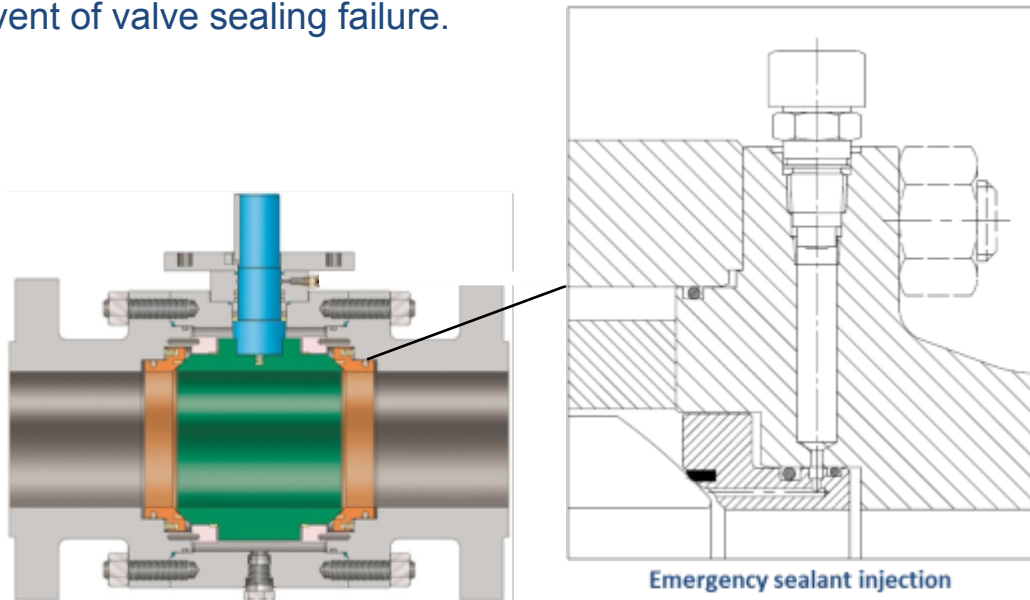
**Pipeline operators are continuously seeking pipeline components with technologically superior features that contribute to pipeline integrity**

## IMPORTANCE OF SUPERIOR VALVE SEALING FOR PIPELINE INTEGRITY

Valve leakage is a credible threat that can be costly to pipeline operators. Valves need to provide optimum sealing capability in order to prevent any leakages resulting in potential hazardous risks.

### Current Market Solution :

*Emergency sealant injection* - A port used to inject a sealant to temporarily restore sealing capability of the seats in the event of valve sealing failure.



**Critical isolation needs engineered valves with specialized features that can not only minimize damage to soft seat inserts but are also capable of providing leakage free performance**

## AREAS CRITICAL TO PIPELINE INTEGRITY

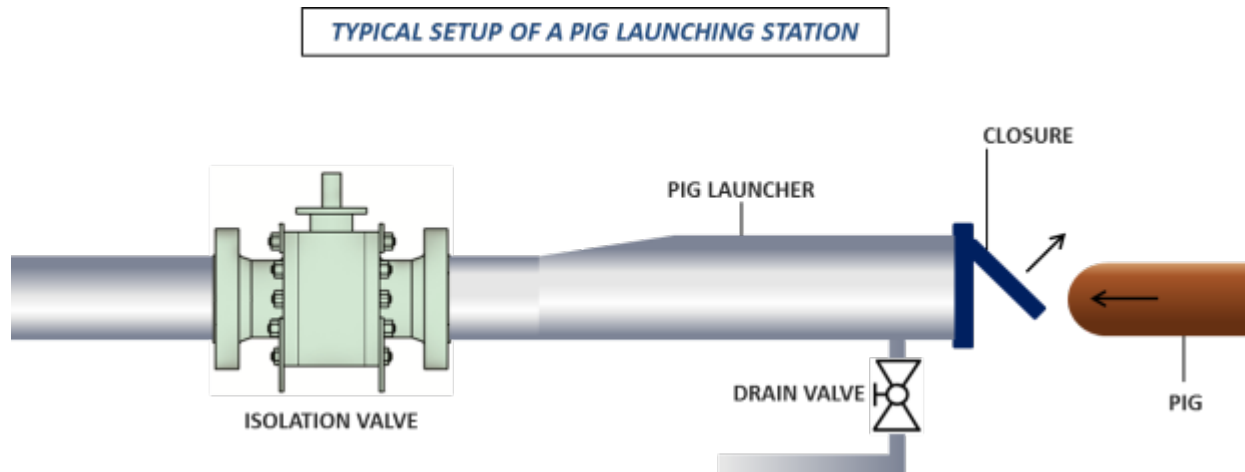
One of the most critical parts of the pipeline which require valves with superior sealing performance are the pig launching and receiving stations of the pipeline



**The isolation valve and its capability to seal effectively plays a critical role in ensuring that the pigging operation is carried out successfully**

## INTEGRITY CHALLENGES AT LAUNCHER/ RECEIVER STATIONS

Pigging is carried out by closing the isolation valve at the launcher station stopping the flow of medium towards the pig launcher station. The drain and vent valves are opened in order to drain the remaining medium within the pig launcher. Once the chamber is completely drained, the pig launcher closure door is opened and the pig is propelled through the pipeline using the flow of the pipeline medium. At the pig receiver station, the isolation valve is closed again and the receiving chamber is drained in order to ensure that the pig receiver door can be safely opened in order to take out the pig and collected waste.

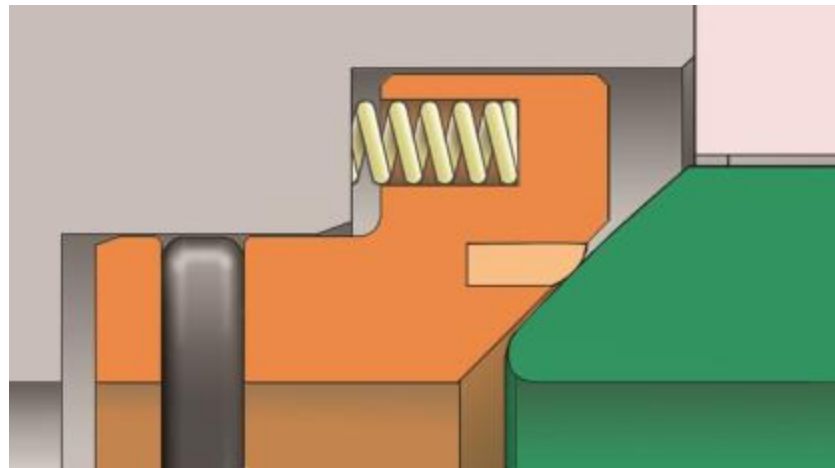


**Ineffective sealing by the valve makes the opening of the launcher closure extremely dangerous resulting in serious injury or in extreme cases, explosion of the pig launching/ receiving station**



## INTEGRITY CHALLENGES AT LAUNCHER/ RECEIVER STATIONS Cont....

The valve seating arrangement is a key feature that contributes significantly to the sealing capability of a valve. Soft seated valves suffer the risk of damage to internal components due to constant contact between the sealing surfaces during the opening and closing operation. This not only reduces the life of the product but can lead to expensive unexpected outages and unplanned maintenance.



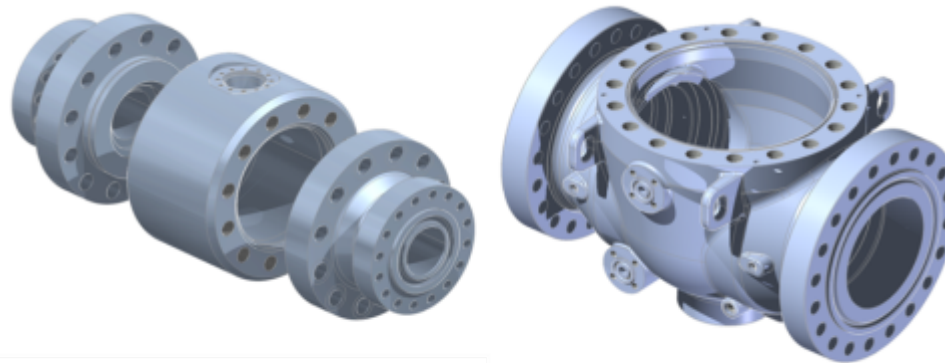
*Soft seat arrangement with thermoplastic insert*

**It is critical to choose a seating arrangement that not only mitigates potential seat damage but also optimizes the sealing capability of the valve**

## INTEGRITY SOLUTIONS ENHANCING VALVE SEALING CAPABILITY

### The Hydraulic Assisted Seat

- Compatible with Side entry and Top Entry valve models
- Enables automatic retraction of the seats caused by hydraulic pressure
- Ensuring valve sealing surfaces are not in contact during valve operation
- Reduces wear and tear on critical sealing components
- Reduces the actuator torque required to operate the valve

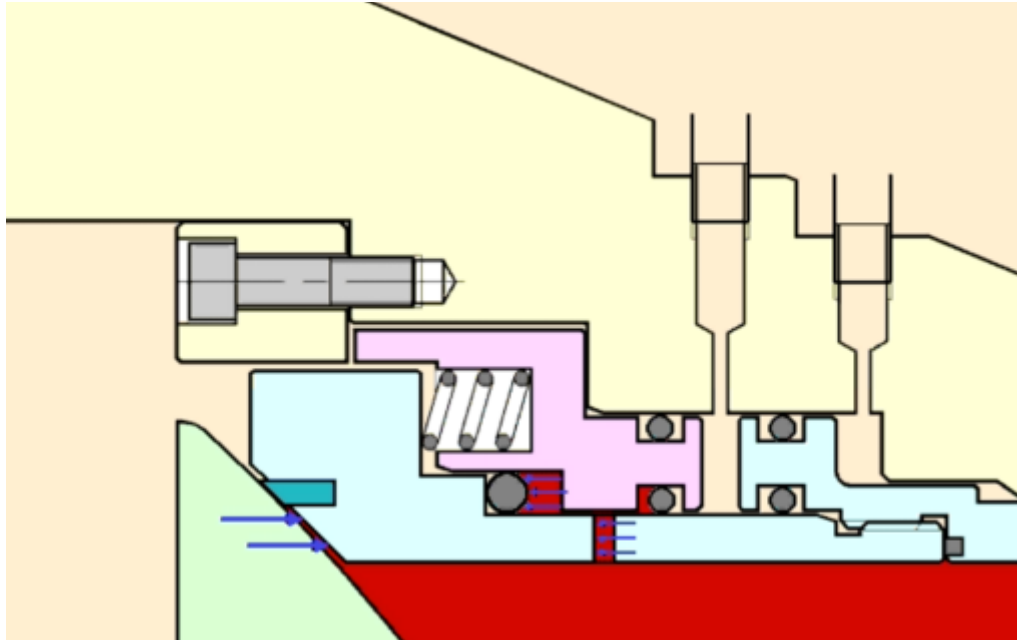


Hydraulic Assisted Seats available in Side Entry & Top Entry Models

**Hydraulic assisted seats is an excellent integrity solution that provides superior sealing capability and prolongs the life of critical sealing components**

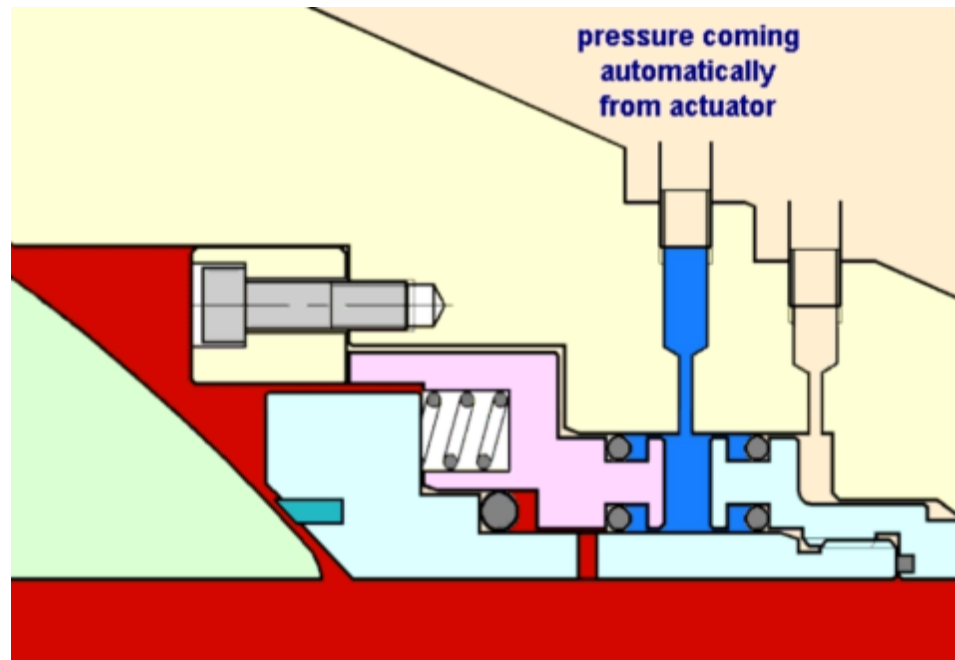
## HYDRAULIC ASSISTED SEATS – OPERATING MECHANISM

When the valve is in closed position, the seat is automatically activated by the pressure in the line and performs the required sealing action. The sealing of the valve can be obtained in Single Piston Effect (through pressure coming from the line) or in Double Piston Effect (through pressure coming from the valve cavity). The figure below shows the sealing function (SPE) of the valve in closed position.



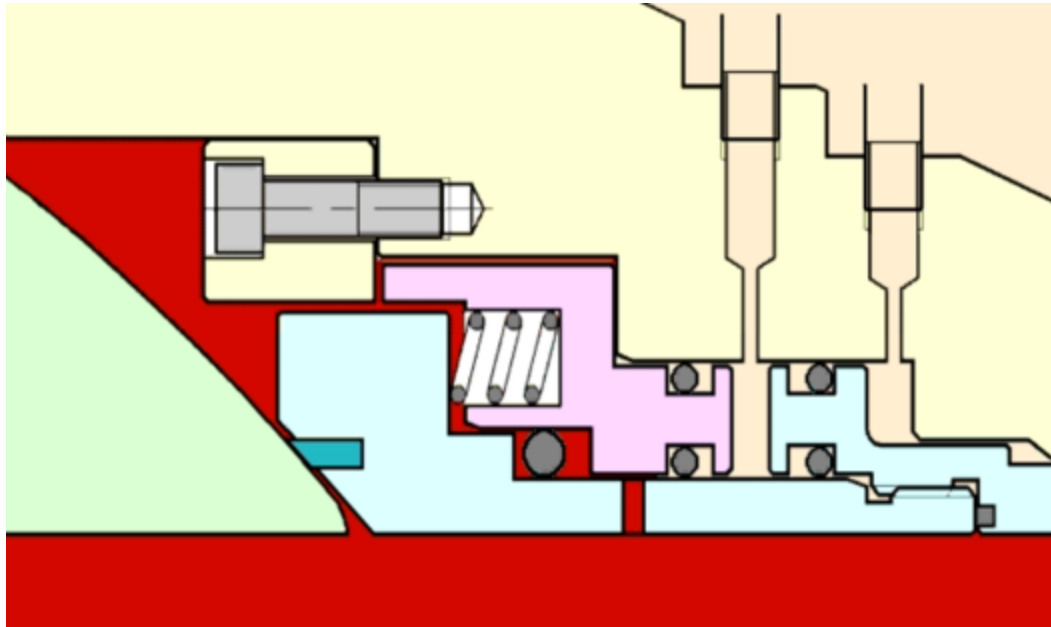
## HYDRAULIC ASSISTED SEATS – OPERATING MECHANISM Cont.....

Upon activating the hydraulic assisted seats mechanism, the hydraulic pressure enables the retraction of the seats and results in the pressure load on the seats to be removed with or without pressure in the pipeline. This enables the ball to be opened freely during complete stroke. The hydraulic assisted seat mechanism can be activated using the pressure coming automatically from the actuator as shown in the figure below.



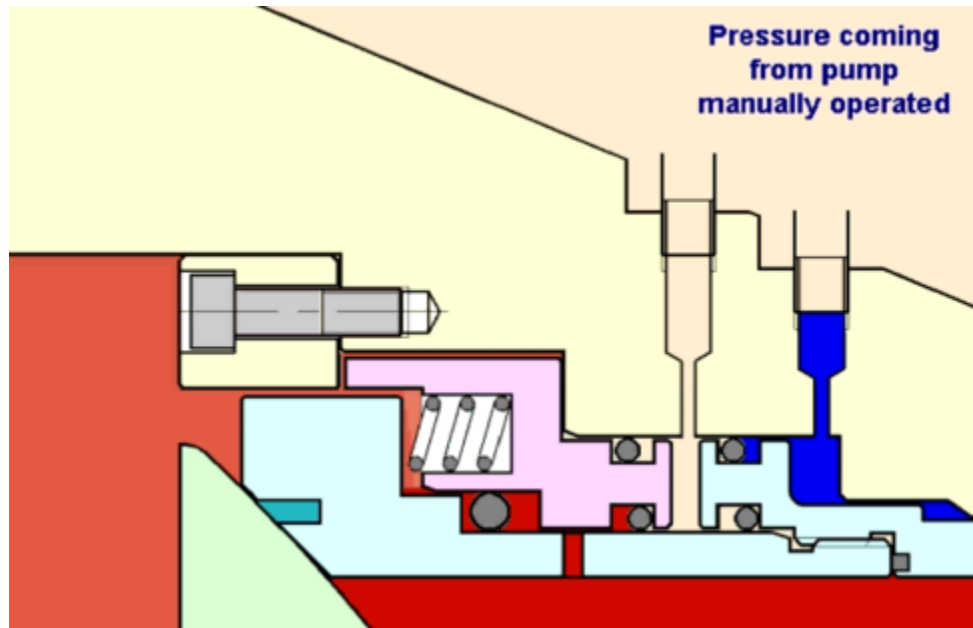
## HYDRAULIC ASSISTED SEATS – OPERATING MECHANISM Cont.....

Once the Hydraulic Pressure is released, the seats are pushed back in contact with the ball with the help of the spring load and positive sealing is achieved. This sequence is shown in the figure below. The seat retraction action can be activated also before the closing operation of the valve.



## HYDRAULIC ASSISTED SEATS – OPERATING MECHANISM Cont.....

In case of leakage caused by damage to soft inserts, the hydraulic assisted seats can help in regaining the sealing capability of the valve. This can be done through the manual activation of the mechanism using a pump. The hydraulic pressure is introduced into the seat room which causes the seat to be pushed in contact with the ball. This reinstates the sealing between the ball and the seat and closes the damage caused. The figure below shows the activation of the mechanism through a manual pump.



VIDEO

This is an alternative to the standard sealant grease injection operation.

## HYDRAULIC ASSISTED SEATS : ADDING VALUE TO PIPELINE INTEGRITY

The hydraulic assisted seats is the ideal value proposition to support pipeline integrity as it :

- Enhances the integrity of critical pipeline areas such as the pig launcher and receiver closure doors and allows safe operation
- Minimizes pipeline downtime and unexpected outages by guaranteeing leakage free performance of the valve
- Reduces costs resulting from unplanned pipeline maintenance
- Extends the life of the valve through minimized wear and tear of internal components
- Maximizes value of pipeline assets

**The hydraulic assisted seats not only guarantee the integrity of the valve but also contributes significantly to make the pipeline reliable and safe to operate**

## ABOUT FLOWERVE®

*With more than 16,000 employees in more than 50 countries, Flowserve is the recognized world leader in supplying pumps, valves, seals, automation, and services to the power, oil, gas, chemical, and other industries.*

### **A Broad Set of Product Capabilities**

*Pumps - Valves - Seals*



### **Critical Industry Application Solutions**



### **Aftermarket Support Services**



**Global Quick Response Center (QRC) Footprint**



## FLowsERVE VALBART SRL

*Located at : Via Delle Industrie 9/5, Mezzago (MB), Italy*

*4 Manufacturing facilities*

*Total area 32.000 m<sup>2</sup> (345.000 ft<sup>2</sup>)*

*Covered area 14.900 m<sup>2</sup> (160.000 ft<sup>2</sup>)*

*of which Warehouse 3000 m<sup>2</sup> (32.292 ft<sup>2</sup>)*

*Annual capacity in excess of 18000 valves (180M\$)*

*250 people employed with strong valve industry experience*



### VALBART PRODUCT RANGE : API 6D AND 6A TRUNNION MOUNTED BALL VALVES



**Bolted Body**



**Top Entry**



**Rising Stem Ball Valves**



**Trunnion Mounted Control Ball Valves**



**Welded Body**



**Double Block & Bleed Trunnion Ball Valves**

# THANK YOU

Contact Information :

Mr. Giuseppe Vignati  
Engineering Director  
Flowserve Valbart Srl  
[GVignati@flowserve.com](mailto:GVignati@flowserve.com)  
+39 039624111

# QUESTIONS?