

# What is the Approach to Valve Manufacturers' Quality Culture by EPC Contractor?

**JGC JGC CORPORATION**

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# AGENDA

1. Who is EPC Contractor?
2. Project Valves
3. Troubles
4. Technical Approach
5. Adaptive Approach
6. Summary

# 1. WHO IS EPC CONTRACTOR?

- Permanent production plants
- Exploring energy source
- Operation & maintenance
- Factories, machines & tools
- Design, Manufacturing
- After sales (spare, repair)



**EPC Contractor**  
(Engineering, Procurement, Construction)

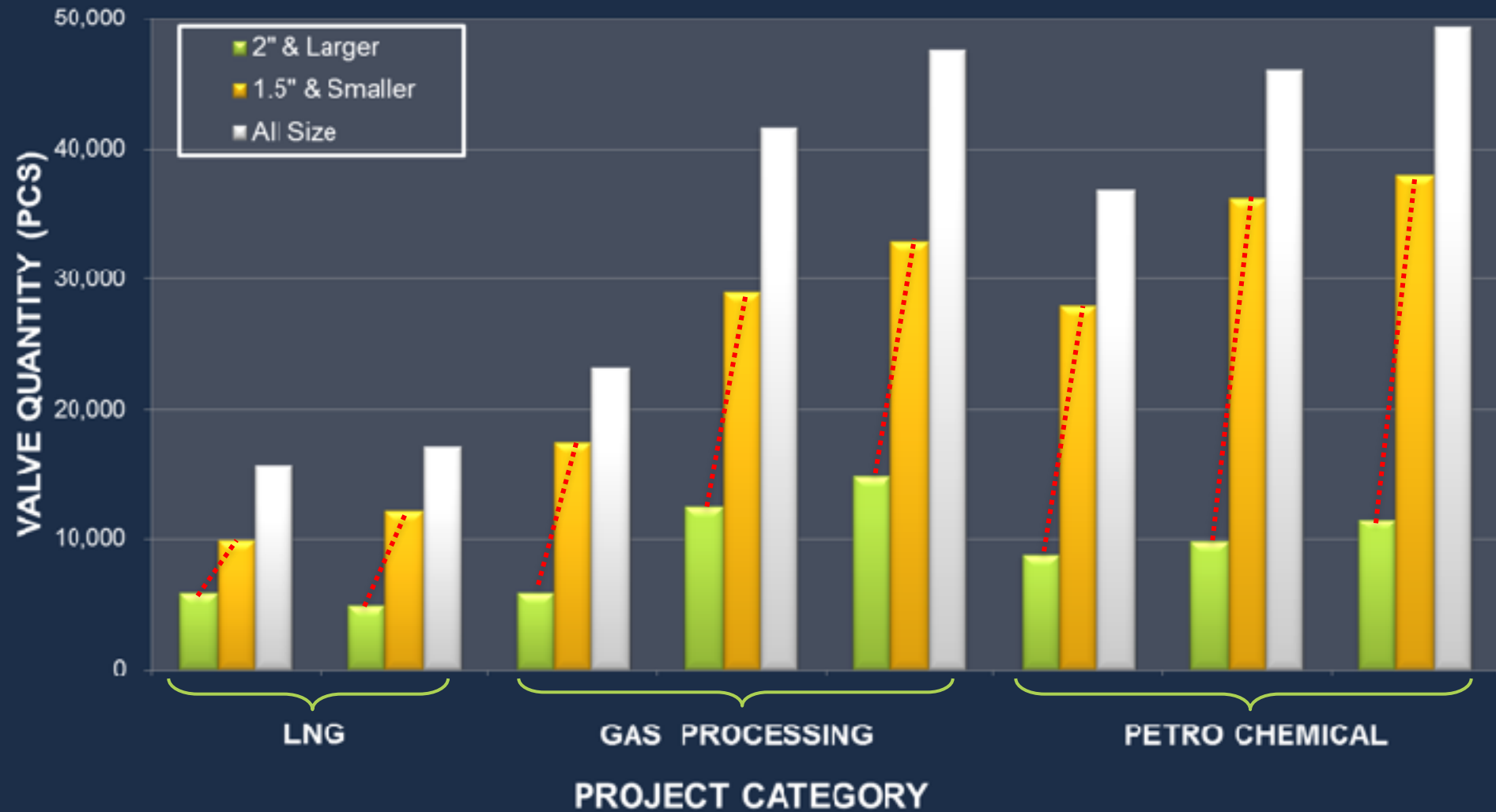
- **No fixed facility, No equipment**
- **Professional resources/services**
- **Project management**

# JGC COMPANY PROFILES



- Established in 1928
- Independent, Not member of a group
- JGC Group Manpower: 9,600 (Domestic: 4,900 + Overseas: 4,700)
- Publicly Owned
- LSTK Contract Expert of EPC Project /Feed Contractor

## 2. PROJECT VALVES



# NUMEROUS & VARIOUS VALVES



## 3. TROUBLES

Casting Defect

Leakage

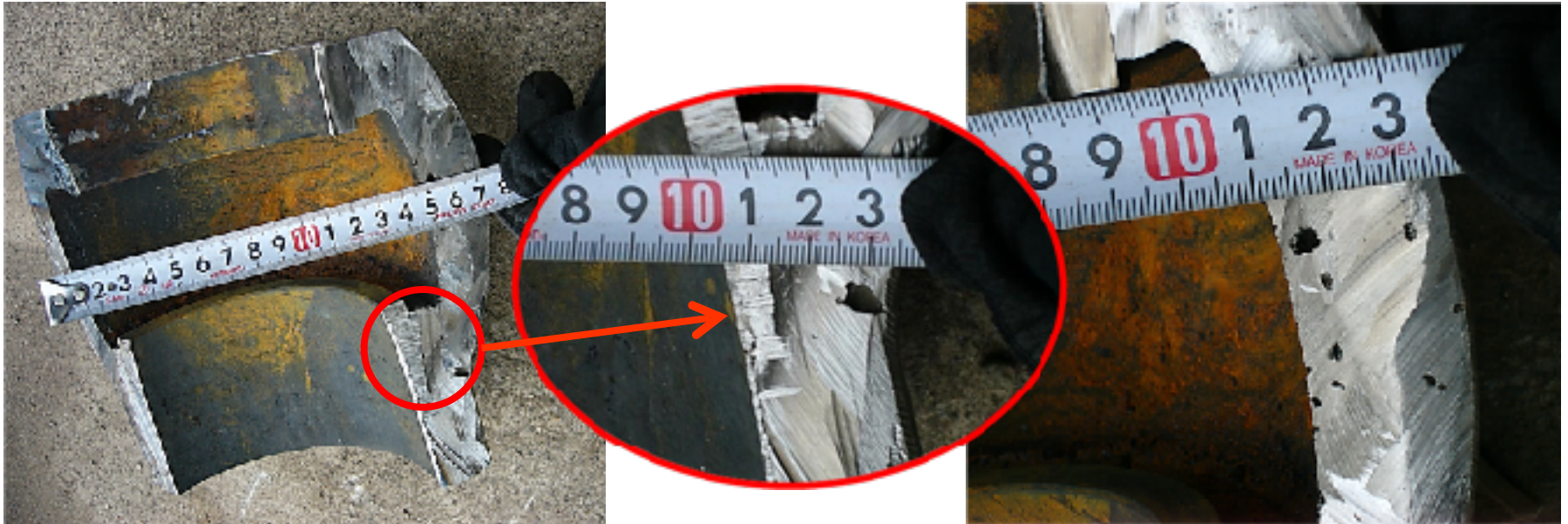
Damage on Flanges

Improper Product Design

Misalignment (Actuated Valve)

Paint Issue

# CASTING DEFECT



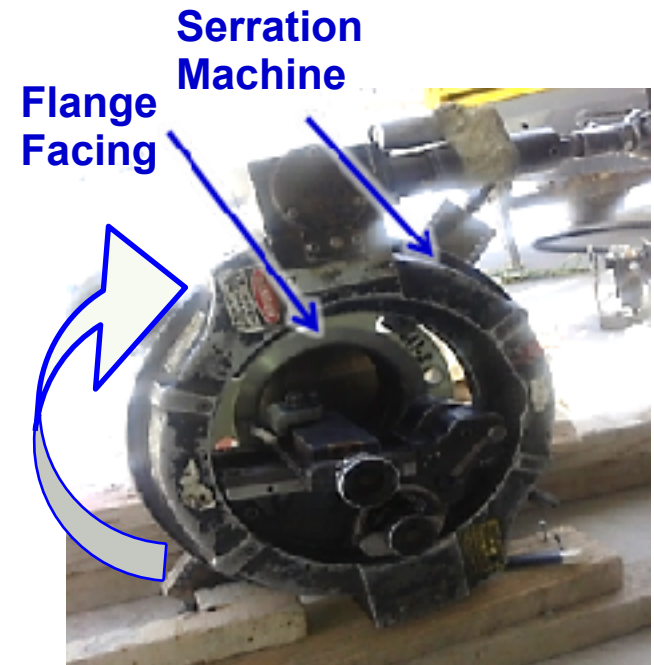
<b>Item</b>	<b>Cast Steel Gate, Globe, Check Valves</b>
<b>Issue</b>	<b>2,000 valves are rejected and replaced</b>
<b>Root Cause</b>	<b>Improper casting methodology</b>

# LEAKAGE



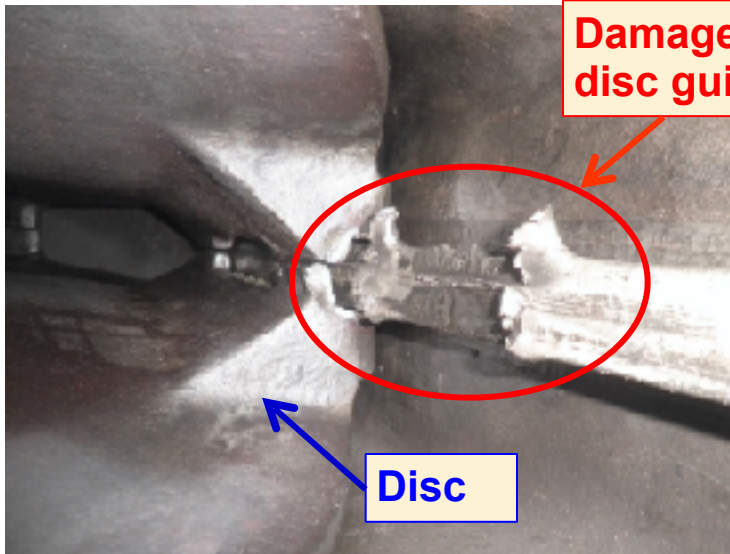
<b>Item</b>	<b>Ball Valve Gear Box</b>
<b>Issue</b>	<b>Grease leaking from gear box</b>
<b>Root Cause</b>	<b>Wrong size of o-ring on groove</b>

# DAMAGE



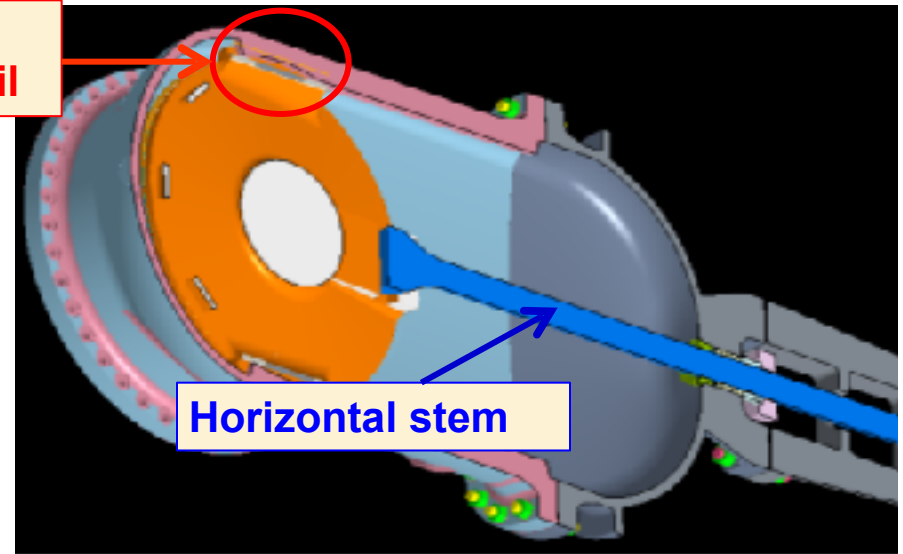
<b>Item</b>	<b>Flange</b>
<b>Issue</b>	<b>Flange facing damage</b>
<b>Root Cause</b>	<b>Rough handling and a lack of suitable protection at factory</b>

# IMPROPER PRODUCT DESIGN



Damaged on  
disc guide rail

Disc



Horizontal stem

Item	Gate Valve on horizontal stem installation
Issue	Damaged on disc guide rail, and disengagement between disc and stem
Root Cause	Improper design of disc guide rail

## MISALIGNMENT (Actuated Valves)

**The valve not closed in the deep sea  
(35Km away from the land)**

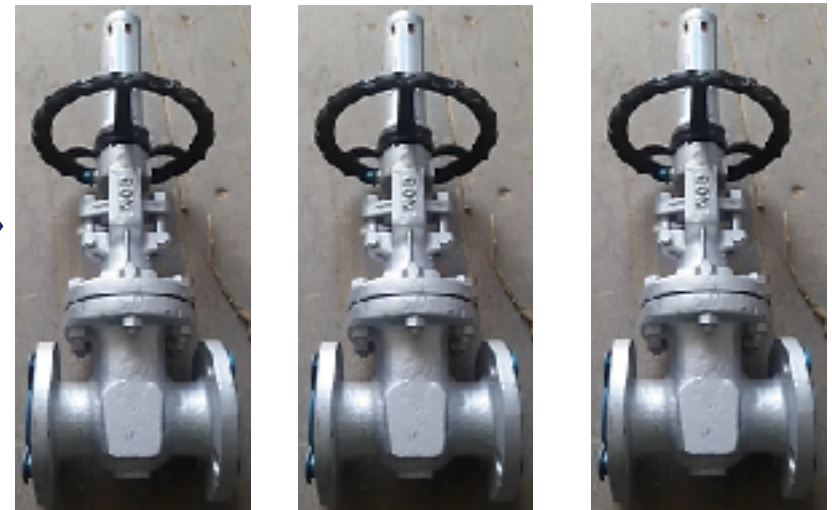
<b>Item</b>	<b>Hydraulic Actuated Ball Valve</b>
<b>Issue</b>	<b>Valve not closed completely</b>
<b>Root Cause</b>	<b>Misalignment between Actuator and Valve</b>

# Paint Issue

## Original Paints (Example)



## Standardized Paint (Example)



Item	Paint for Valves
Issue	Several paint types to same valve depend on the temp. & insulation, etc in project specification. JGC proposed to standardize paint as much as possible.

**Minimize Recurrence, What is the Approach?**

# WHAT IS TECHNICAL APPROACH?

LL (Lesson Learned) System

Manufacturer Survey Program

Critical Piping Valves

JGC Engineering

# LL (Lesson Learned) System

## *What in Database?*

- Manufacturer Survey Records (incl. PO technical & quality conditions)
- NCRs and MERs
- Communication Records especially for Job troubles

## *When updated?*

- Everyday

## *How many manufacturers in DB?*

- More than 300 in last 10 years and keeping on increased

## Manufacturer Survey Program (1/3)

### To whom?

- Valve Manufacturers'
- Their Casting and Forging sub-suppliers

### How?

- Desk survey (Profiles, Procedures and Sub-suppliers, etc.)
- Factory survey (More than 100 check points)

### When?

- Every 1<sup>st</sup> Order Placement
- Every 5 Years Re-validation

## Manufacturer Survey Program (2/3)

= Survey Comment Feed Back to Manufacturers =

### Excellent manufacturers

- A few and minor survey comments only

### Typical manufacturers

- Some mandatory improvements requested
- Those improvements, basically, as PO conditions

### Others

- ...no way to suggest improvements
- ...no response to survey comments
- ...no time to improve by placing PO

**JGC window is always open, when manufacturers request (ex. audit).**

## Manufacturer Survey Program (3/3)

**JGC never has,  
“Approved Manufacturer List”**

### Why?

Quality 1st concept on worldwide projects:

- Project by project basis for manufacturer selection  
(Same as end-users. They have AML. However, no end-user accepted JGC without evaluation AML manufacturers. Thus, “project by project basis”.)
- Daily updated LL System DB
- Maybe referenced manufacturer list

# Critical Piping Valves

## Defined by?

- Valve design (ex. Wedge gate vs Expanding gate)
- Material (ex. CF8M vs CF8C, CS vs Nickel Alloys, Solid vs Cladding)
- Rating and Size (ex. 600# , >NPS 24)

## Consequence?

- Different selection from non-critical valves
- Strict evaluation (incl. casting & forging sub-suppliers)
- Limited manufacturers can be awarded (known 1<sup>st</sup> class basis)

## JGC Engineering Skills

**Evaluate the project requirements with Manufactures practice, and communicate with end-user at FEED & early EPC**

### *What is real production range?*

ex. 36" globe valve in process document is possible?

### *What is best engineering as per project specification?*

ex. Alternative and proposal (such as primer paint for manufacturers)

**Technical Approaches are effective, but . . .**

## 5. ADAPTIVE APPROACH

### JGC's success in Construction Site Safety Performance

- Pearl GTL PJ in Qatar 2008:  
72,000,000 LTI Free
- IGC Habshan 5 PJ Abu Dhabi 2011:  
100,000,000 LTI Free
- Barzan PJ in Qatar 2014:  
130,000,000 LTI Free



Because establishment of **Safety/Quality Culture**.

If **Safety/Quality Culture** is established in manufacturer shop, quality improvement is expected and continual.

# WHAT IS ADAPTIVE APPROACH?

- Heart warming Atmosphere
- By All people in Manufacturers
- Think of What “Quality “ means
- Change our understanding, behavior and attitude for  
*Quality Culture*

How?

- Morning exercise and TBM (Tool Box Meeting)
- Management directly talk with people, etc
- Quality Work Shop



Quality Culture is not built in a Day

# QUALITY FORUM

## What is Quality Forum?

- Forum to share quality improvement activities among our manufacturers, and promote their KIZUKI (\*) for their further quality improvement.

## Participating Partners in 2017

- 4 end-users and 32 manufacturers  
(piping incl. valve, pressure vessel, rotary and furnace, etc)



**\*KIZUKI**  
= collectively meaning  
“notice, feel something,  
instinct and intuition”

## 6. SUMMARY

- Even one valve trouble can cause big loss of money and a waste of time for both EPC contractor and Manufacturers, which should be zero.
- Both continual technical and adaptive approach are important for Quality Culture (zero trouble) for all people in Manufacturers.

(JGC window is always open when manufacturers requests such as a manufacturers survey or a quality work shop)

**JGC expects high qualified valves from your  
1<sup>st</sup> class excellent manufacturers in Italy.**

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