

A satellite-style map of South America, showing the continent in shades of green and brown, surrounded by blue oceans. The map is positioned on the left side of the slide, with a white and light blue geometric shape overlapping its right edge.

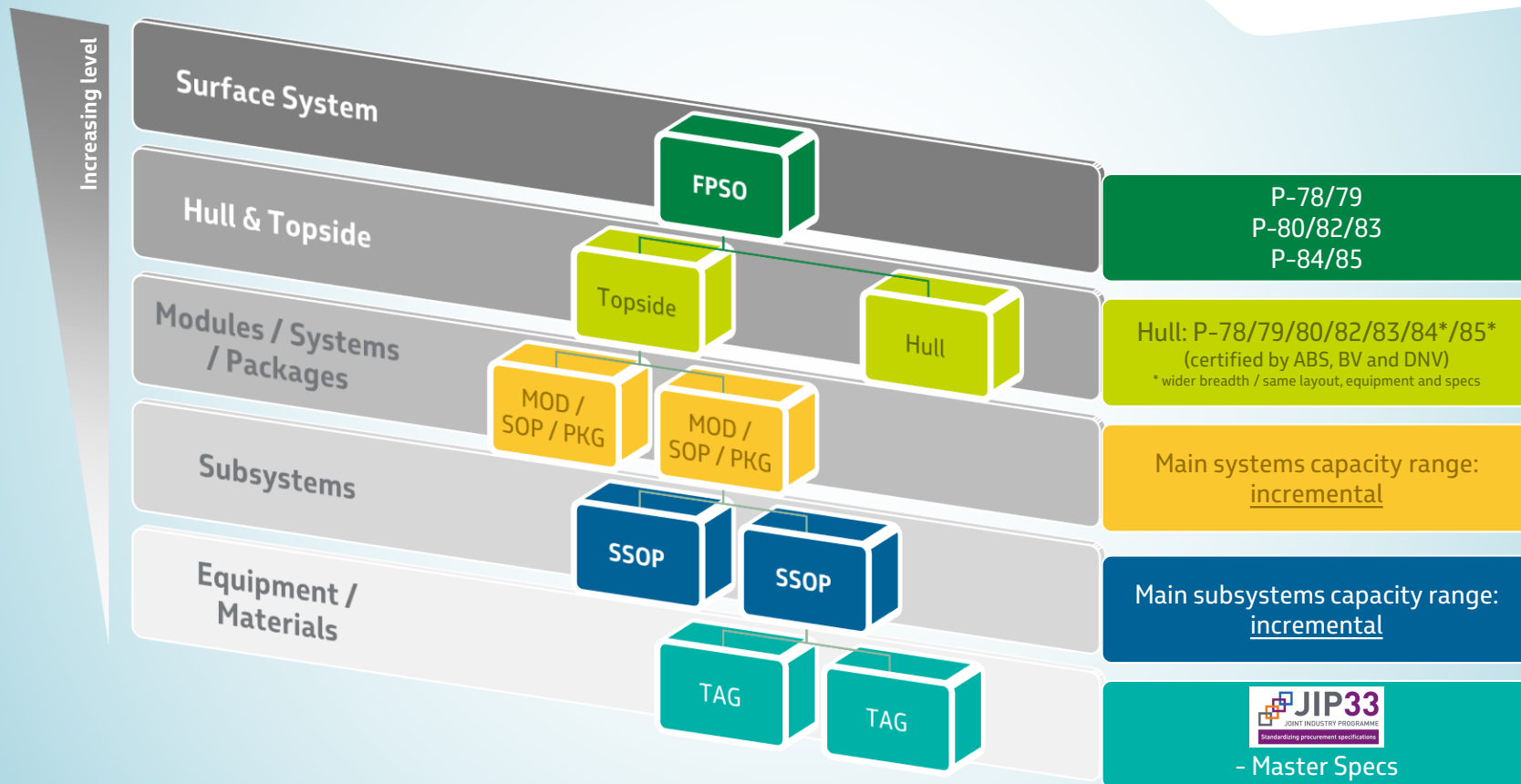
Gilbert Jacob Huber
PETROBRAS Surface Systems Engineering
JIP33 Steering Committee Rep

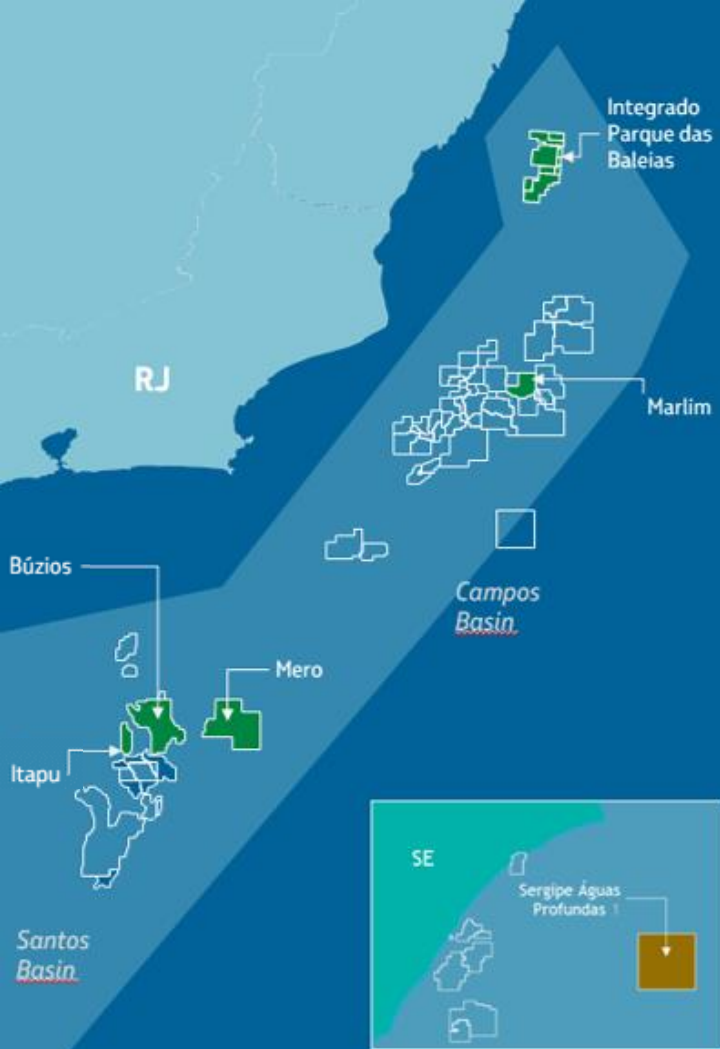
PETROBRAS & JIP33

- Adoption Journey -

GOOD NEWS




















Standardization Strategy









FPSO Portfolio

19 new FPSOs into operation (2023-28)
7 with JIP33 specs

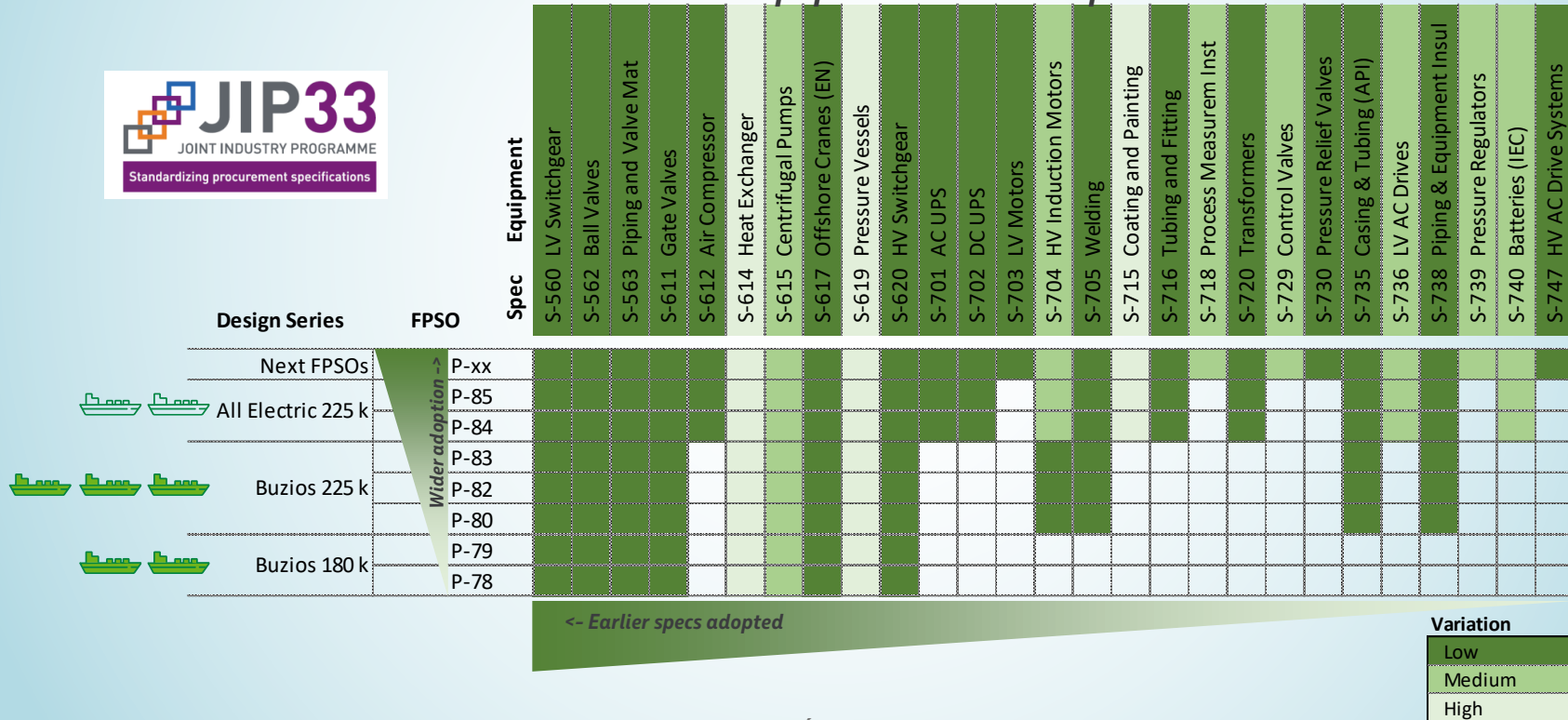
2023	2024	2025	2026	2027	2028
 Itapu P-71 150 kbpd WI Petrobras: 100%	 Mero 3 Mal. Duque de Caxias 180 kbpd WI Petrobras: 39%	 Búzios 6 P-78 180Mbpsd WI Petrobras: 89%	 Búzios 9 P-80 225Mbpsd WI Petrobras: 89%	 Búzios 11 P-83 225 kbpd WI Petrobras: 89%	 Atapu 2 P-84 225 kbpd WI Petrobras: 68%
 Marlim 2 Anna Nery 70 kbpd WI Petrobras: 100%	 Búzios 7 Alm. Tamarandé 225 kbpd WI Petrobras: 89%	 Búzios 8 P-79 180 kbpd WI Petrobras: 89%	 Búzios 10 P-82 225 kbpd WI Petrobras: 89%	 Revit Albacora 120Mbpsd WI Petrobras: 100%	 Sépia 2 P-85 225 kbpd WI Petrobras: 55%
 Búzios 5 Alm. Barroso 150 kbpd WI Petrobras: 89%	 IPB Maria Quitéria 100 kbpd WI Petrobras: 100%	 Mero 4 Alexandre de Gusmão 180 kbpd WI Petrobras: 39%		 SEAP 1 120 kbpd WI Petrobras: 68%	
 Marlim 1 A. Garibaldi 80 kbpd WI Petrobras: 100%				 SEAP 2 120 kbpd WI Petrobras: 86%	
 Mero 2 Sepetiba 180 kbpd WI Petrobras: 39%					

	Owned (EPC) (under construction / installation)		Owned (EPC) (to be contracted)
	Leased (under construction / installation)		Leased (to be contracted)

 **JIP33** specs




JIP33 Adoption Status

27 Specs adopted in 7 FPSOs
 >USD 1.2 bi in equipment with JIP33 specs





Adoption at Petrobras

Petrobras Design Series	FPSO
 All Electric 225 kbpd	P-85 P-84
 Buzios 225 kbpd	P-83 P-82 P-80
 Buzios 180 kbpd	P-79 P-78

Wider adoption ↑



Spec	Equipment
S-560	LV Switchgear
S-562	Ball Valves
S-563	Piping and Valve Mat
S-611	Gate Valves
S-612	Air Compressor
S-614	Heat Exchanger
S-615	Centrifugal Pumps
S-617	Offshore Cranes (EN)
S-619	Pressure Vessels
S-620	HV Switchgear
S-701	AC UPS
S-702	DC UPS
S-703	LV Motors
S-704	HV Induction Motors

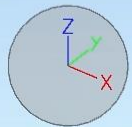
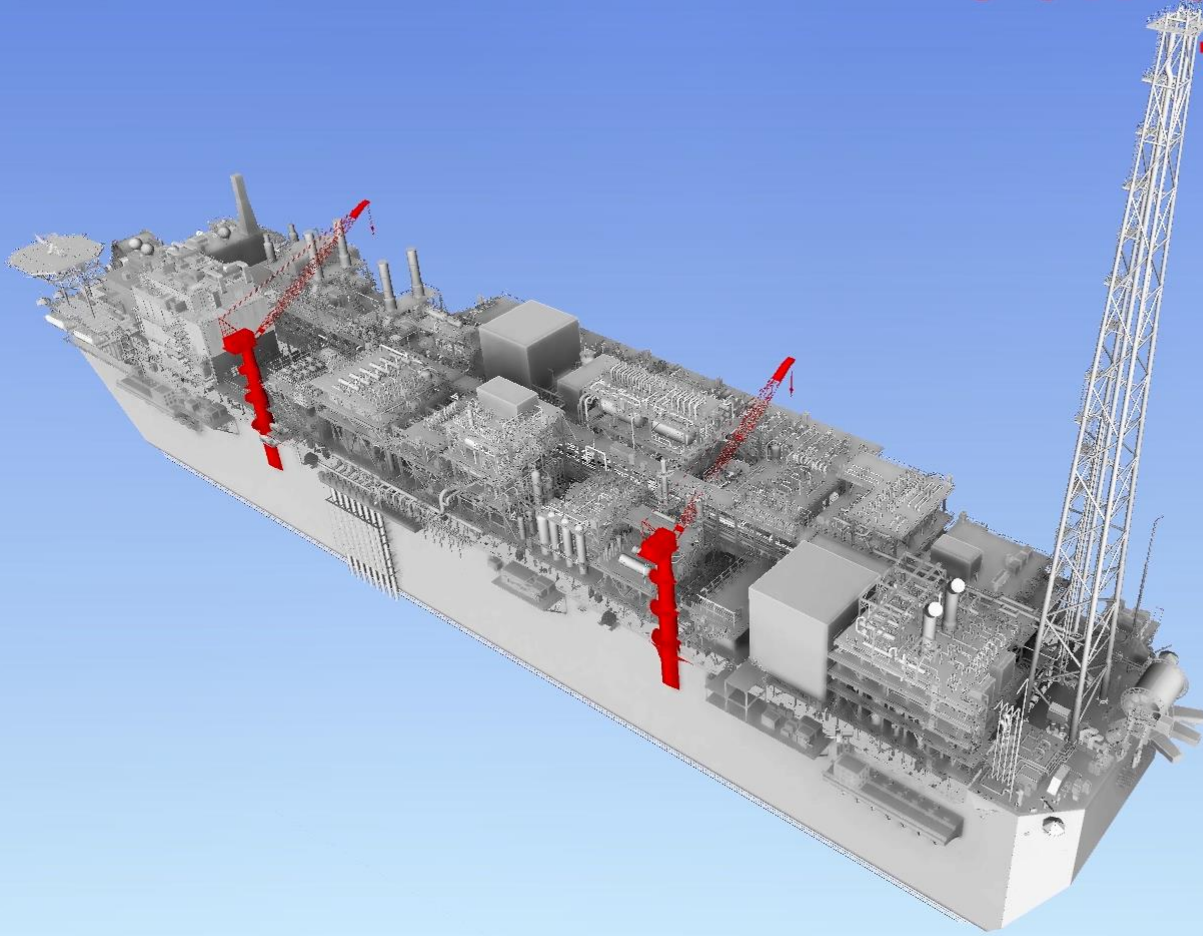
Spec	Equipment
S-705	Welding
S-715	Coating and Painting
S-716	Tubing and Fitting
S-718	Process Measurem Inst
S-720	Transformers
S-729	Control Valves
S-730	Pressure Relief Valves
S-735	Casing & Tubing (API)
S-736	LV AC Drives
S-738	Piping & Equipment Insul
S-739	Pressure Regulators
S-740	Batteries (IEC)
S-747	HV AC Drive Systems





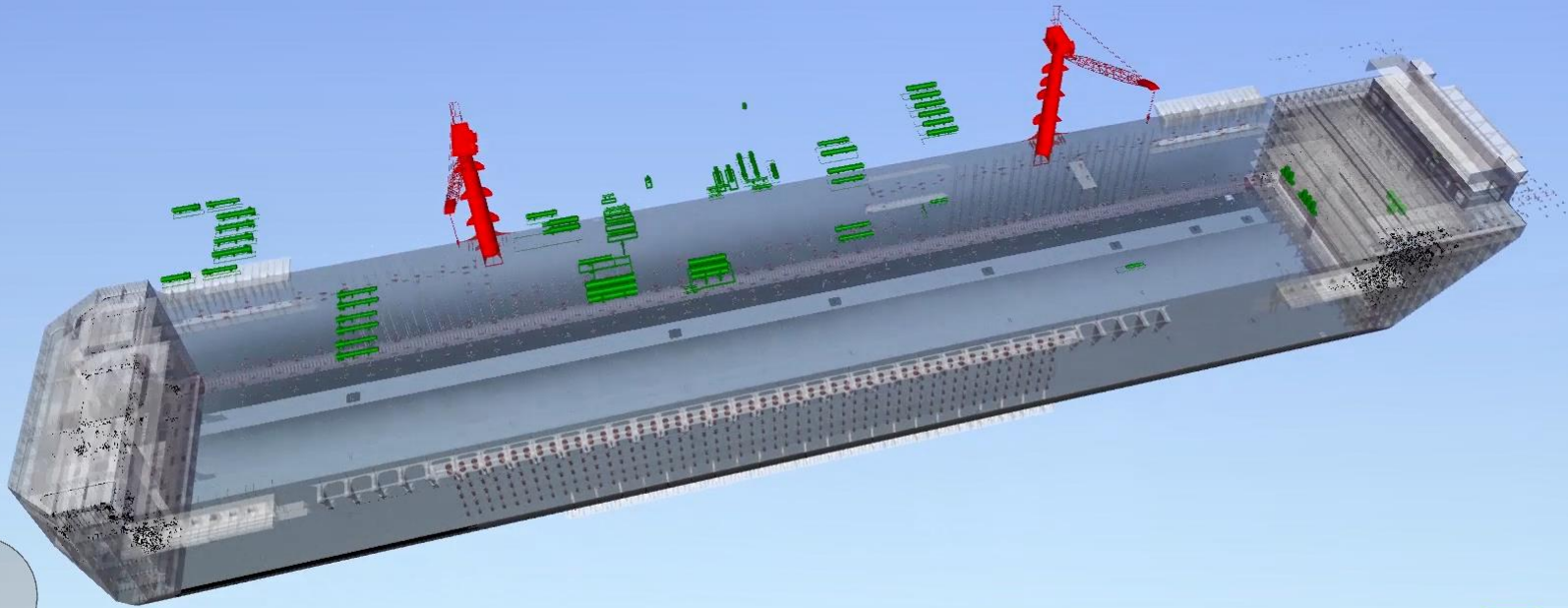
S-617 Offshore cranes to EN Standard

14 units, 40t, 100% electric



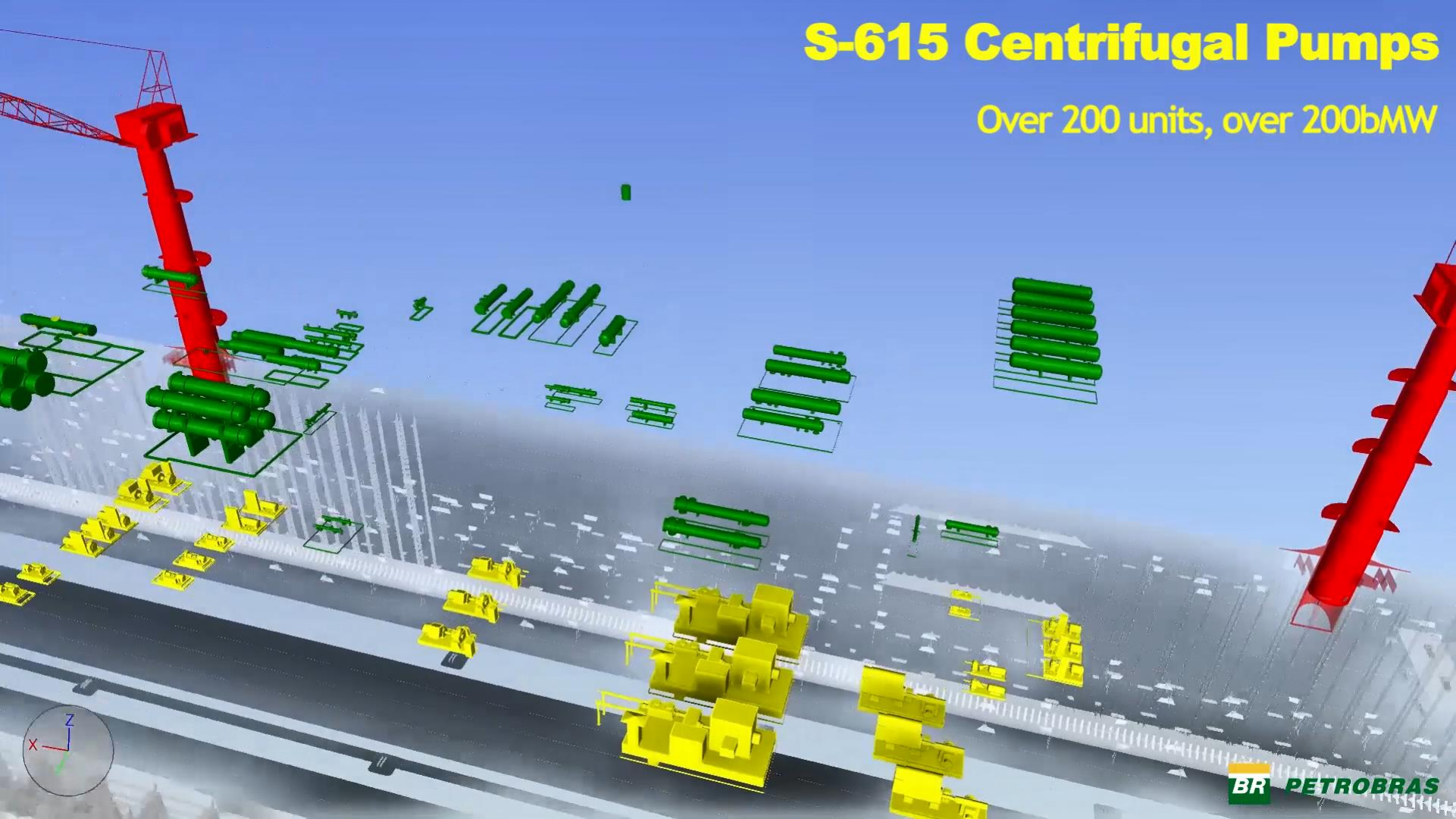
S-614 Shell and Tube Heat Exchangers

Over 500 units, over 2MW capacity



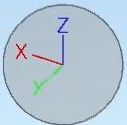
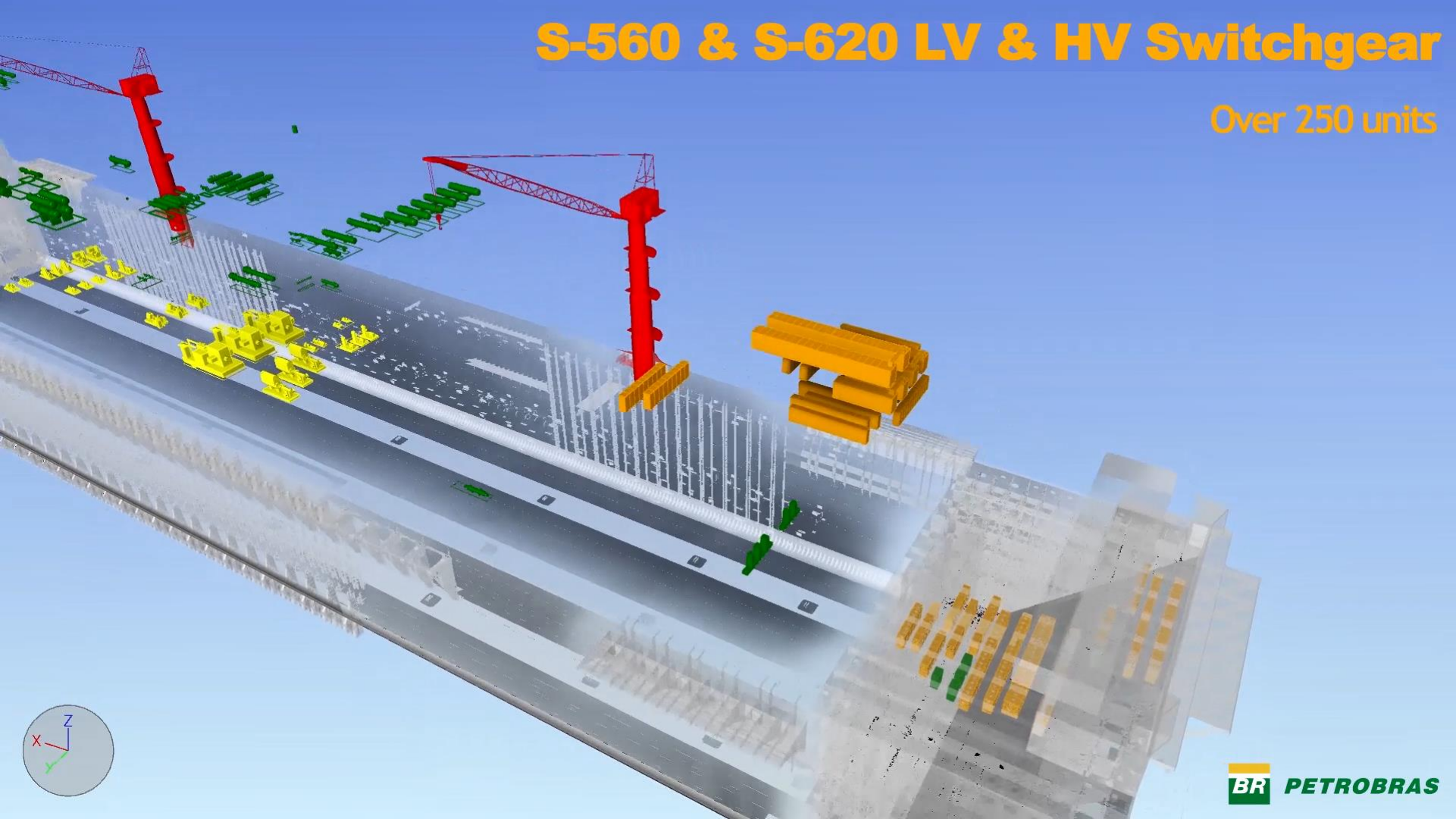
S-615 Centrifugal Pumps

Over 200 units, over 200bMW



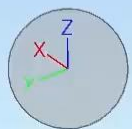
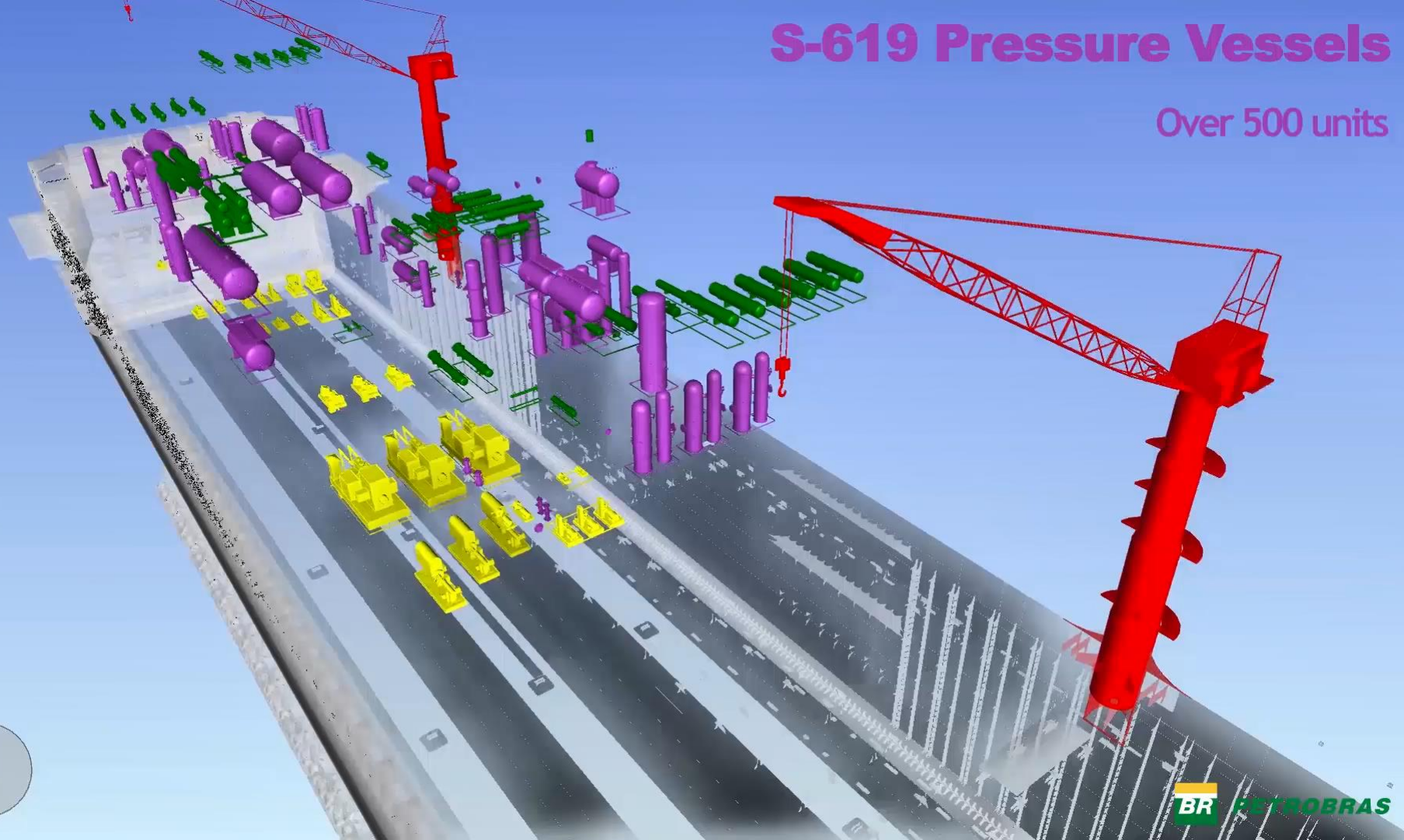
S-560 & S-620 LV & HV Switchgear

Over 250 units



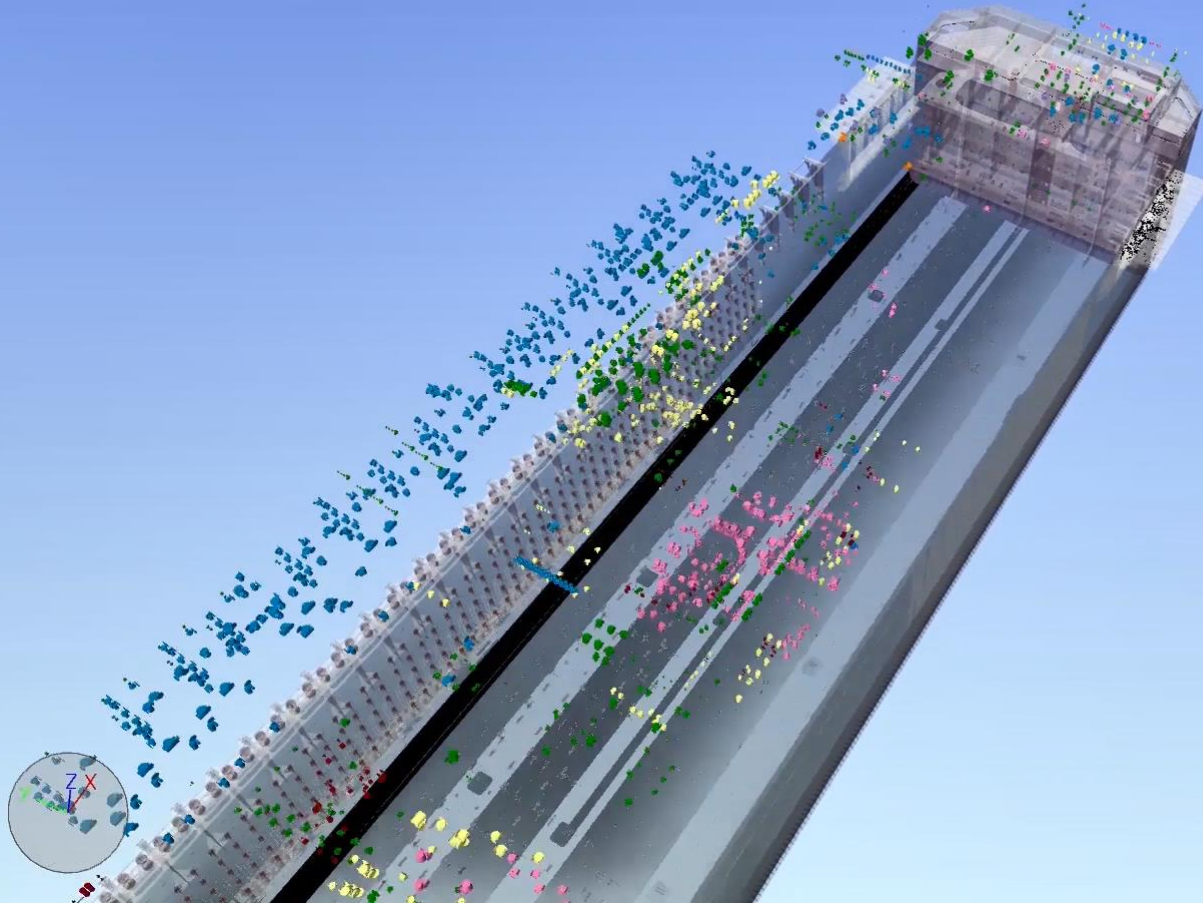
S-619 Pressure Vessels

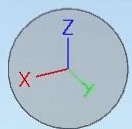
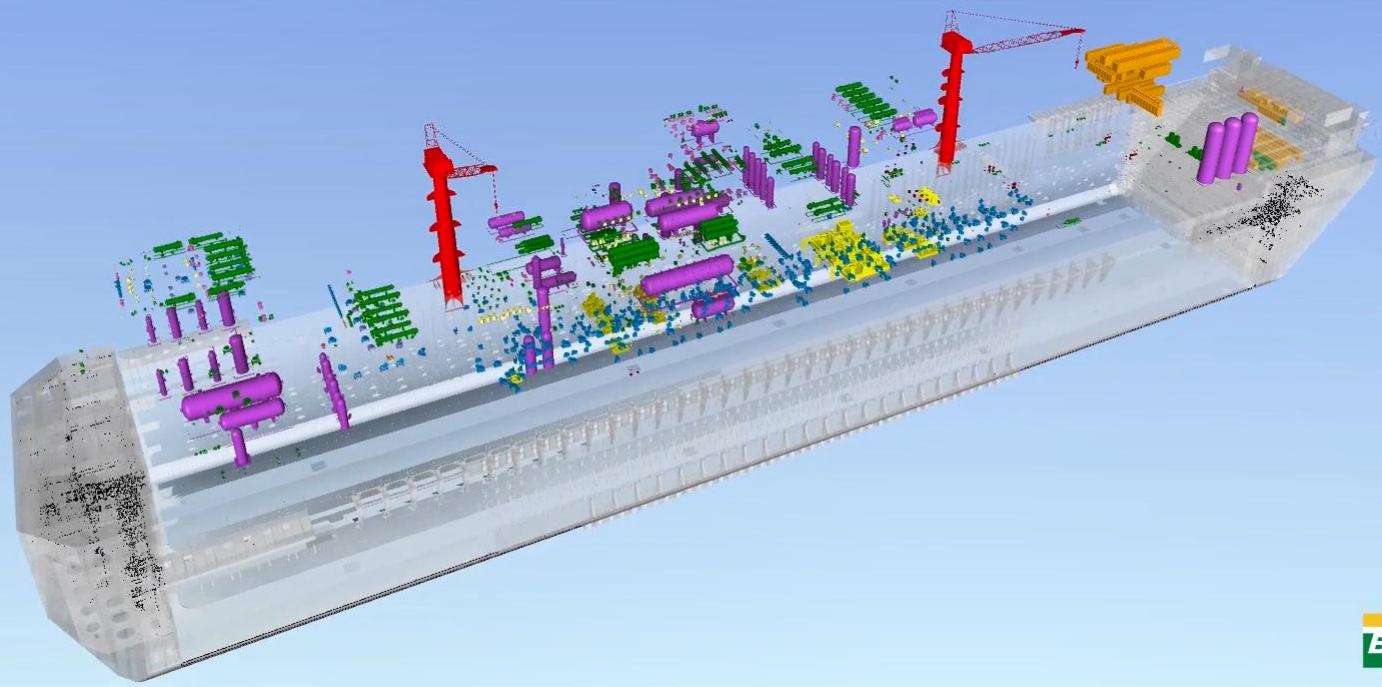
Over 500 units

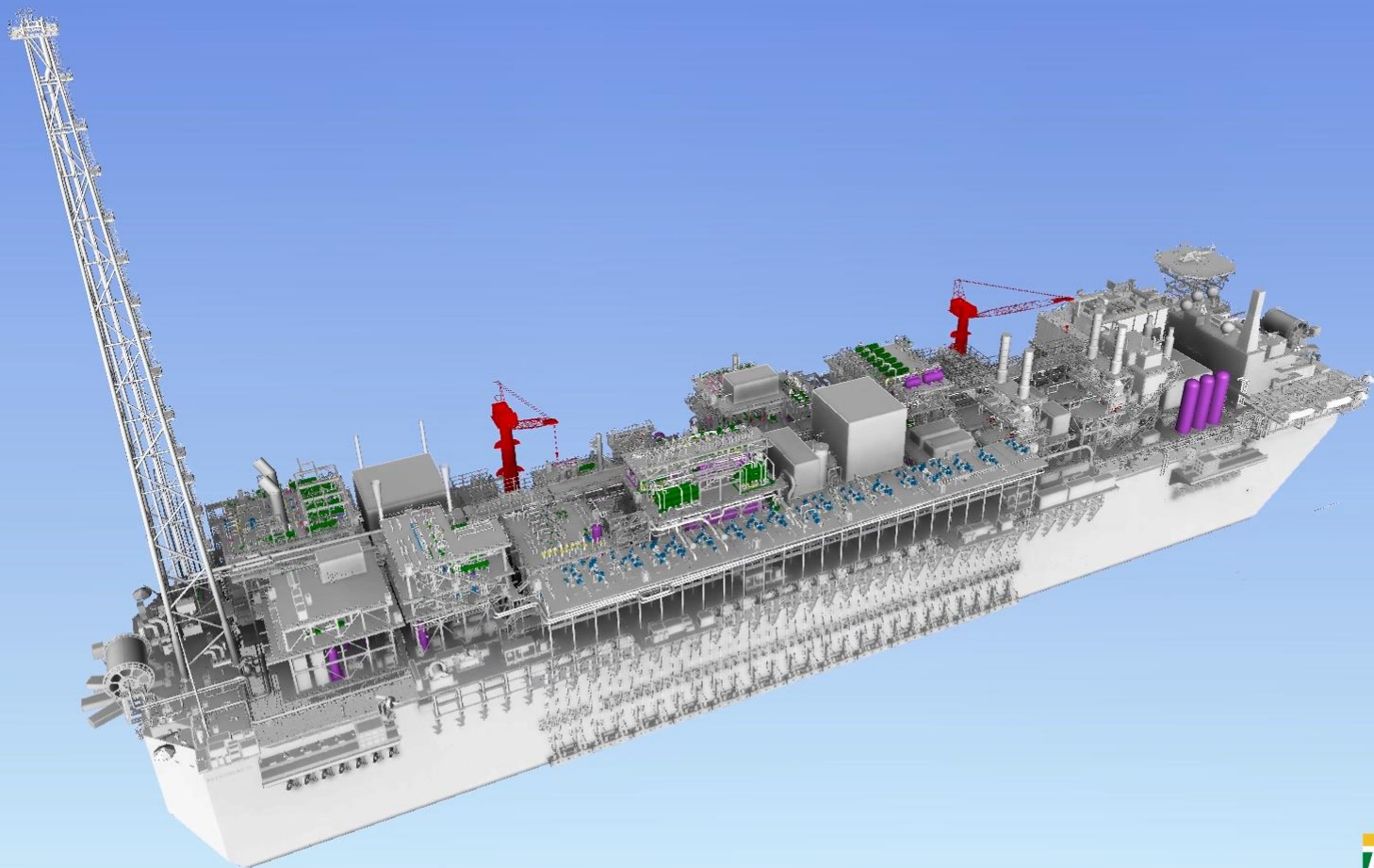
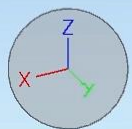


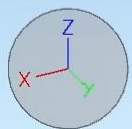
S-562 & S-611 Gate & Ball Valves

Over 27 thousand

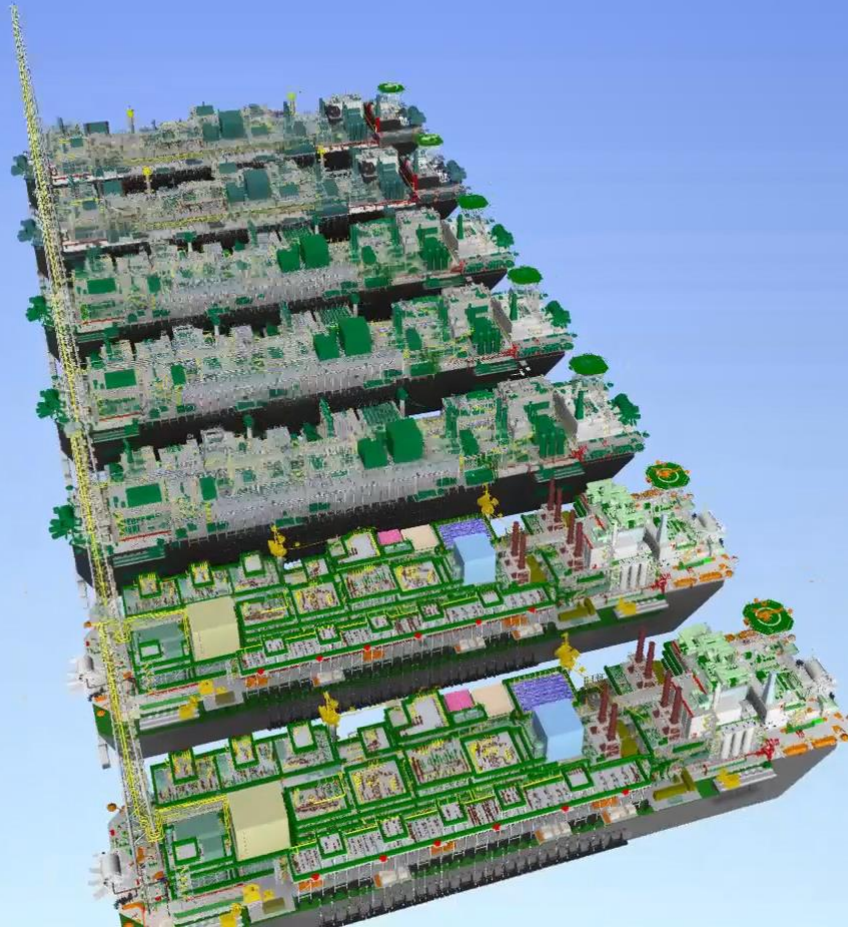








JIP33 specs have been used in 7 FPSOs in 3 design series



CHALLENGES

OUTSTANDING CHALLENGES FOR JIP33 SPEC ADOPTION

- Harmonize aspects of procurement processes (e.g. contract annexes) with JIP33 aligned engineering practices
- Need to increase procurement personnel's engagement with JIP33 adoption across Petrobras' procurement practices
- Need to harmonize quality scales between Petrobras and JIP33 practices
- Need to convince engineers to accept possibly different approaches to address lessons learned, no overlays!

OUTSTANDING CHALLENGES FOR JIP33 SPEC ADOPTION

- Develop policy and processes for more uniform adoption of IOGP standards at Petrobras
- The trade-off issue between CAPEX and OPEX needs to be more deeply addressed at the engineering design level to provide clear guidance to SMEs

Petrobras inquiry for New Projects

EN-13852-1/IOGP S-617

“Content”

Harmonized combination which is a complete description and set of requirements to build the safest, best performing **offshore cranes** available on the market

“Volume”

- EN13852-1:2013 – 96 Pages
- IOGP S-617 - 19 pages
- IOGP S-617L – 19 pages
- IOGP S-617Q - 30 pages
- IOGP S-617D – 22 pages

Total 186 pages

+ referenced harmonized sub standards

EPC #1

“Additional Content”

On top of the «perfect set of requirements» there's added a huge amount of project specific discipline specifications for building hull, topside and process equipment - not relevant for offshore cranes introducing multiple conflicts and sub standard solutions.

“Additional conflicting requirements”
ABS Notation CRC PL++

Project specific discipline specifications: 84
Pages: 3675

EPC #2

“Additional Content”

On top of the «perfect set of requirements» there's added a huge amount of project specific discipline specifications for building hull, topside and process equipment not relevant for offshore cranes introducing multiple conflicts and sub standard solutions.

“Additional conflicting requirements”
ABS Notation CRC PL++

Project specific discipline specifications: 111
Pages: 4757

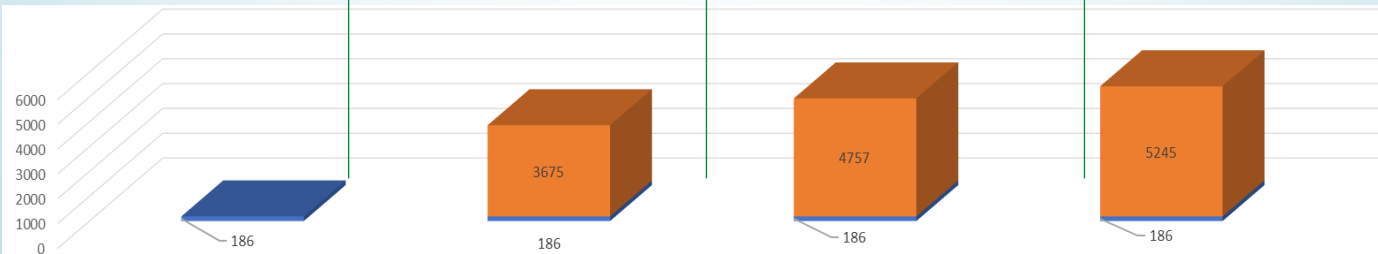
Combined EPC #1 & #2 projects

“Additional Content”

Combined between the projects.
There's difference between the set of specifications forwarded.

“Additional conflicting requirements”
ABS Notation CRC PL++

Project specific discipline specifications: 132
Pages: 5245



Manufacturer Responses to RFIs about JIP33 Impacts

General response (not unanimous):

still early for volume impacts (September 2021)

- CAPEX, OPEX, Lead Time: **Unclear gains & losses**
- Reliability, Safety, Durability, Operation: **Clear improvement**

15 replies by 11 participating companies

- S-560 Low-Voltage Switchgear and Controlgear to IEC 61439-1
- S-562 Valve - Ball to API Spec 6D
- S-611 Valve - Gate to API Spec 600 and API Spec 603
- S-614 Heat Exchangers - Shell and Tube to API Std 660
- S-617 Offshore Crane general purpose to EM13852-1



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