

Materials Standards Workshop

- Identify International Standards Needs in the Global Oil & Gas Industry, and
- Establish a new work item proposal for development of an international (ISO) standard for Materials Selection

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1 – The Company – Relevant Activities



COMPANIES IN THE GROUP



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- ❑ Petrobras Distribuidora S/A BR (*), distributing oil byproducts
- ❑ Petrobras Energía Participaciones S.A.
- ❑ Petrobras Química S/A - PETROQUISA (*), operating in the petrochemical industry;
- ❑ Petrobras Gás S/A - GASPETRO (*), subsidiary responsible for trading Brazilian and imported natural gas.



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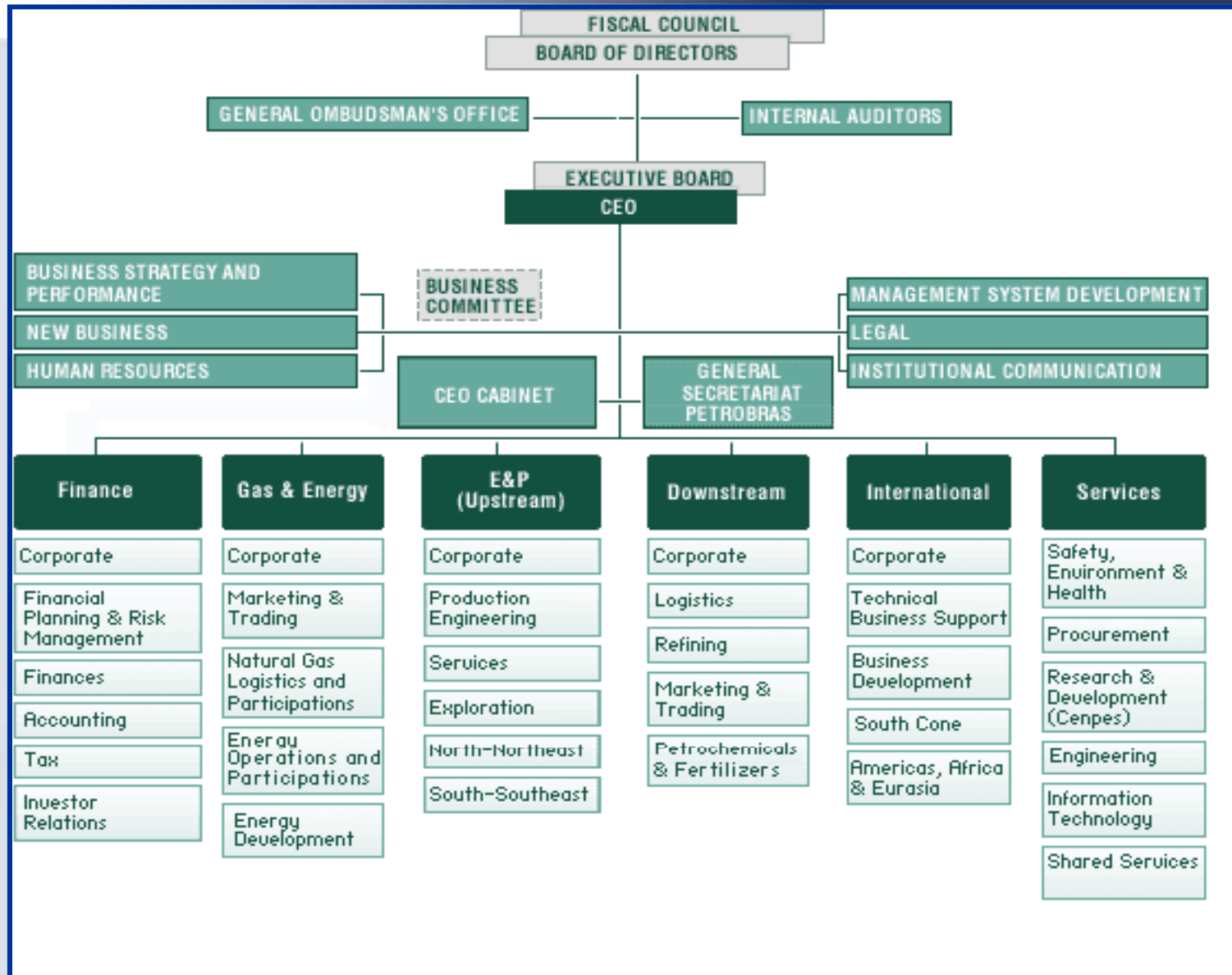
- Petrobras Transporte S/A - TRANSPETRO (*), its purpose is to build and operate our transportation network.
- Downstream Participações S.A, to facilitate asset exchange between Petrobras and Repsol-YPF.
- Petrobras International Finance Company - PIFCo
- Downstream Participações S.A, to facilitate asset exchange between Petrobras and Repsol-YPF.



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PETROBRAS IN NUMBERS



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Petrobras presents exploration, production, and supply area data which, among other numbers, are the pride of our country. A few of these figures are highlighted below.

Data referring to the year 2005

EXPLORATION

64 rigs (42 offshore)

PRODUCTIVE WELLS

14.061 (1.258 offshore)

PRODUCTION PLATFORMS

97 (73 fixed; 24 floating)

REFINERIES

16

PIPELINES

30.343 Km

TANKER FLEET

125 (50 belonging to Petrobras)

GAS STATIONS

6.933 active (766 of its own)

FERTILIZERS

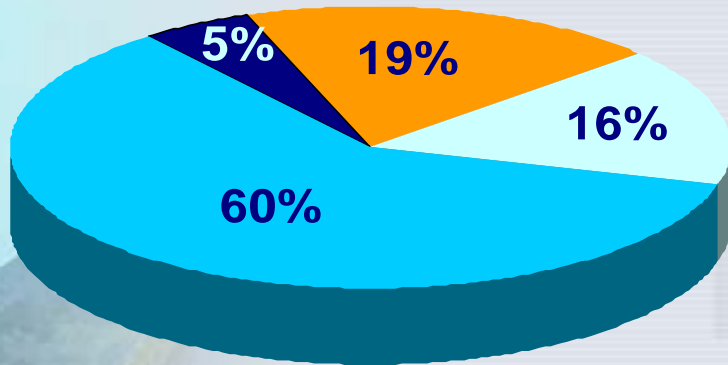
3 plants: 1,852 metric tons of ammonia and 1,598 metric tons of urea



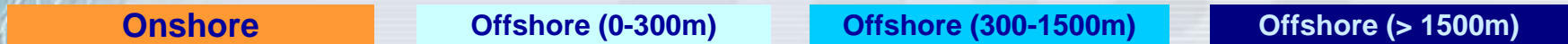
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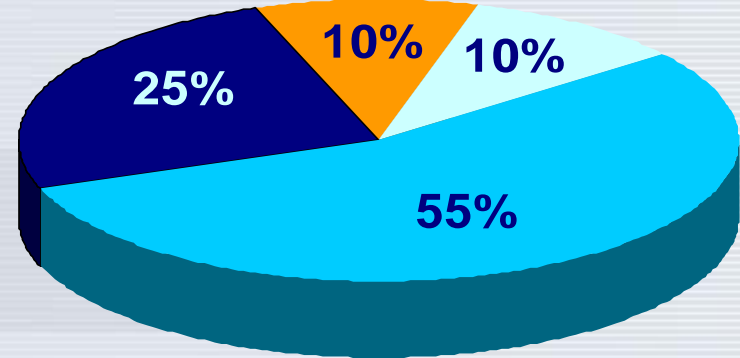
Production 2006



**2.039.000 boed - Brazil
(246.000 boed- foreign)**

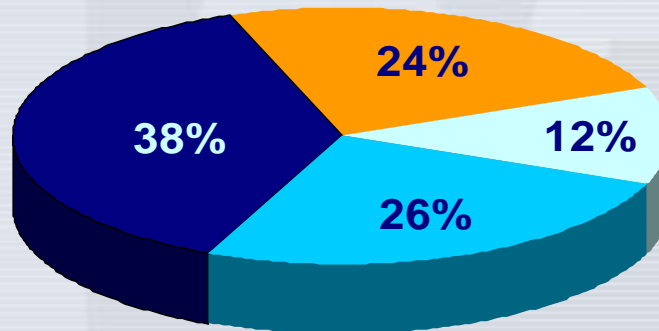


Proved Reserves (SPE) 2006



**13,75 billions boe - Brazil
(1,27 billions boe - foreign)**

**Present Exploratory Area
160.500 km²**



→ 64% areas in deep and high-deep waters

YIELD FROM REFINERIES(2006)

1,786 million barrels a day - Brazil and 102 thousands barrels a day - foreign



WHERE WE ARE



PETROBRAS



The company performs abroad, by and large, through the International Business Area. The International Area's assets, operations, and business currently cover 18 countries. There are six Business Units, which perform as companies in Argentina, Angola, Bolivia, Colombia, the United States, and Nigeria. And there are activities in another twelve countries: Venezuela, Mexico, Ecuador, Peru, Uruguay, Paraguay, Tanzania, Iran, Libya, Equatorial Guinea, Turkey and China.



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Furthermore, the Company, through its Financial and Supply Area (Business and Financial Representations), or its subsidiaries abroad, participates in the international oil and byproduct trade, including in the main world energy exchanges and in over the counter operations.



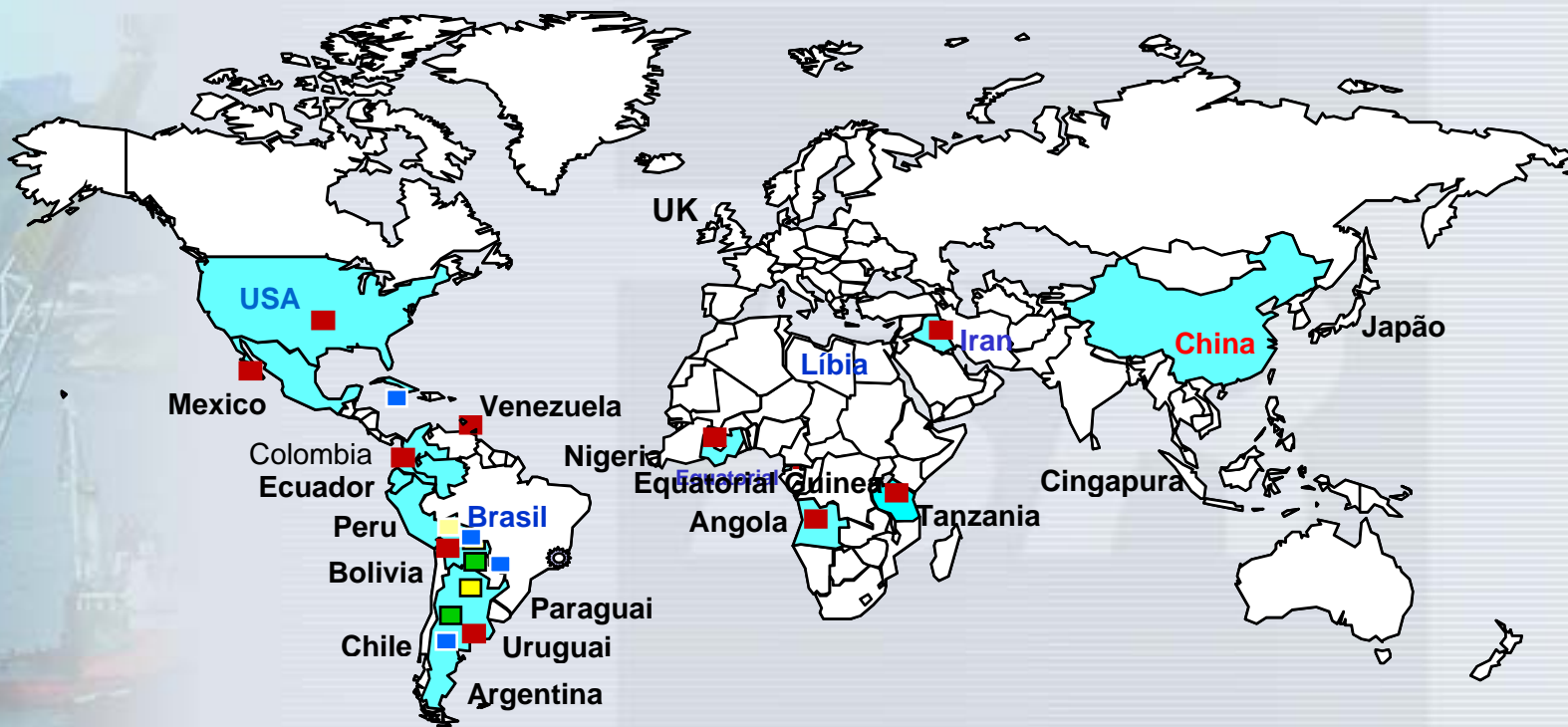
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PETROBRAS in the world

A Strong International Presence



Activities:

- Exploration and Production
- Refining
- Distribution and Commercialization
- Gas and Energy



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2 – Strategy for work with standards and inhouse company specifications.

2.1 – PETROBRAS Technical Specification (as by ISO/IEC Guide 2)

Document that prescribes technical requirements to be fulfilled by a material, equipment, installation or service.

It is applied to a specific project and identified so.

ET – H₂S



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2.2 – PETROBRAS Technical Standard (as by ISO/IEC Guide 2)

Document, established by consensus of PETROBRAS Units and approved by CONTEC/SC – Technical Standardization Commission / Specialized Subcommission.

It is applied repeatedly in every project.

N-1706

STANDARDS

- **NUMBER OF STANDARDS (DEC/2006)**

- Portuguese = 843
- English = 262
- Spanish = 74
- Total = 1179

- **AREAS COVERED BY THE STANDARDS**

SC-01 Chemical Products and Fluid Systems for Oil Exploration and Production

SC-02 Tanks & Vessels

SC-04 Civil Construction

SC-05 Marine Installations and Operations

SC-06 *Electricity*

SC-08 *Fired Heaters*

SC-09 *Thermal Insulation and Refractory
Materials*

SC-10 *Instrumentation and Industrial
Automation*

SC-11 *Machines*

SC-12 *General Design Standards*

SC-13 *Oil & Gas Pipeline*

SC-14 Painting and Anti-Corrosive Coatings

SC-15 Cathodic Protection

SC-16 Industrial Safety

SC-17 Industrial Piping

SC-20 Laboratory Methods

*SC-21 Materials and Equipment for Drilling and Oil
Production*

SC-22 Utilities Equipment

*SC-23 In-Service Inspection of Systems and
Equipment*

SC-26 Welding

- SC-27 Non-Destructive Testing*
- SC-28 Explosives & Starters*
- SC-30 Reservoirs*
- SC-31 Telecommunication*
- SC-32 Quality Systems*
- SC-33 Data Processing & Telecommunication*
- SC-34 Environment*
- SC-35 Occupational Health*
- SC-36 Reliability and Industrial Risks*
- SC-37 Well Safety*
- SC-38 Energetic Efficiency & Alternative Energy*



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3 – Which existing codes and main standards PETROBRAS currently use for materials technology and inhouse company and projects specifications.

Table 3.1 – 1 st Examples

1	2	3	4
PROCESS/SERVICE CLASS	EQUIPMENT	PETROBRAS T. SPEC (ET) / T. STANDARD (N-) (Follows and complements 4)	CODES / MAIN STANDARDS (Linked requirements for Design, Material Selection, Fabrication, Assembly and Inspection)
Storage of Liquids / Atmospheric	Atmospheric Tank	ET + N-270	API Std.650
Storage of Liquids and gases / Low - pressure	Low - Pressure Tank	ET	API Std.620
Separation of Oil-Gas-Water/H ₂ S Content	Separator (Pressure Vessel Shell)	ET + N -1706	ASME Code Section VIII + NACE MR 0175
Hydrotreatment / Hydrogen Service	Reactor (Pressure Vessel Shell)	ET + N-1704	ASME Code Section VIII + API RP 941



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Notes:

API Std. 650 – Welded Steel Tanks

API Std. 620 – Design of Welded Low-Pressure Tanks

ASME Code Section VIII – Pressure Vessel

NACE MR 0175 – Sulfide Stress Cracking Resistant Metallic Materials for Oilfield Equipment

API RP 941 – Steels for Hydrogen Service

Table 3.2– 2 nd Examples

PROCESS/SERVICE CLASS	EQUIPMENT	PETROBRAS T. SPEC (ET) / T. STANDARD (N-) (Follows and complements 4)	CODES / MAIN STANDARDS (Linked requirements for Design, Material Selection, Fabrication, Assembly and Inspection)
Heating / Oil and Heavy Fractions	Fired Heater	ET + N-1671	ISO 13705 / API Std.560
Steam Production / Power	Water - Tube Boiler	ET	ASME Code Section I
Steam Production / Well injection	Steam Generator	ET + N-2252	ASME Code Section I + API RP 11T
Cooling / Fluid Cooling or Condensing	Air Cooler	ET + N-1858	ISO 13706 / API Std. 661



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Notes:

ISO 13705/API Std. 560 – Fired Heaters for General Refinery Services

ASME Code Section I – Power Boilers

API RP 11T – Installation and Operation of Wet Steam Generator

ISO 13706/API Std. 661 – Air-Cooled Heat Exchanger

Table 3.3 – 3 rd Examples

1	2	3	4
PROCESS/SERVICE CLASS	EQUIPMENT	PETROBRAS T. SPEC (ET) / T. STANDARD (N-) (Follows and complements 4)	CODES / MAIN STANDARDS (Linked requirements for Design, Material Selection, Fabrication, Assembly and Inspection)
Fluid Transfer / Refinery and Terminal	Piping	ET + N-76	ASME B31.3; ASME B31.4 or ASME B31.8
Fluid Transfer / Offshore Production Platform	Piping	ET + N-2839	ASME B31.3 + API RP 14E
Fluid Transport / Onshore outside Refinery and Terminal	Pipeline ou Gasline	ET + N-1744	ASME B31.4 or ASME B31.8
Fluid Transport Offshore	Pipeline ou Gasline	ET	API RP 111 or DNV OS-F-101



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Notes:

ASME B31.3 – Process Piping

ASME B31.4 – Pipeline Transportation Systems for Liquid

ASME B31.8 – Gas Transmission and Distribution Piping Systems

API RP 14E – Design of Offshore Production Platform Piping Systems

API RP 1111 – Design, Construction and Operation of Offshore Hydrocarbon Pipelines

DNV OS-F-101 – Submarine Pipeline Systems



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4 – Proposals for future harmonisation and/or international standards work

4.1 – Proposal: Company Standards

Set of Company (PETROBRAS, Exxon, Shell, Hydro, Total and others) Technical Standards – same occasion →

OGP/SC → all companies (to get knowledge in common).

4.2 – Proposal: ISO Standards


Transform, as priority, the following Standards into IS:

- a) API Std. 650;
- b) API Std. 620;
- c) API B31.3;
- d) API B31.4;
- e) API B31.8;
- f) API RP 14E;

- g) API RP 1111;
- h) DNV OS-F-101;
- i) API RP 2A WSD;
- j) API RP 2A;
- k) AWS D1.1.

4.3 – Proposal: ASME Code – Boilers and Pressure Vessels

ISO TC 11 - Boilers and Pressure Vessels adopts:

ISO/TS 16528 (ISO/CD 16528 Parts 1 & 2) - Boilers and Pressure Vessels – Registration of Codes to Promote International Recognition  ASME Code may be registered as internationally recognized.



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4.4 – Proposal: ISO TC 67 Working Groups (WGs)

4.4.1 – Standards listed in 4.2.1 →

Various WG in TC 67.

4.4.2 – ISO/TC 67/ WG 8 – Materials, Corrosion Control, Welding and Non-Destructive Examination (HDE)

→ Will provide advice to ISO/TC 67 listed in 4.4.1, on requirements of design, materials selection, fabrication, assembly and inspection, in order to determine the gaps and overlaps.

Table 3.4 – 4th Examples

1	2	3	4
PROCESS/SERVICE CLASS	EQUIPMENT	PETROBRAS T. SPEC (ET) / T. STANDARD (N-) (Follows and complements 4)	CODES / MAIN STANDARDS (Linked requirements for Design, Material Selection, Fabrication, Assembly and Inspection)
Offshore Production	Fixed Platform	ET + N-1852 , + N-1678 ,	API RP 2A WSD API RP 2A ANSI/AWS D 1.1 ASME - Boiler and Pressure Vessel Code - Section IX
Offshore Production	Floating Platform	ET	according to the Classification Society



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Notes:

API RP 2A WSD - Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms - Working Stress Design

API RP 2A - Recommended Practice for Planning, Designing, and Constructing Fixed Offshore Platforms

AWS D1.1 - Structural Welding Code – Steel

ASME Sec. IX - Welding and Brazing Qualifications



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PETROBRAS to install new fixed platforms

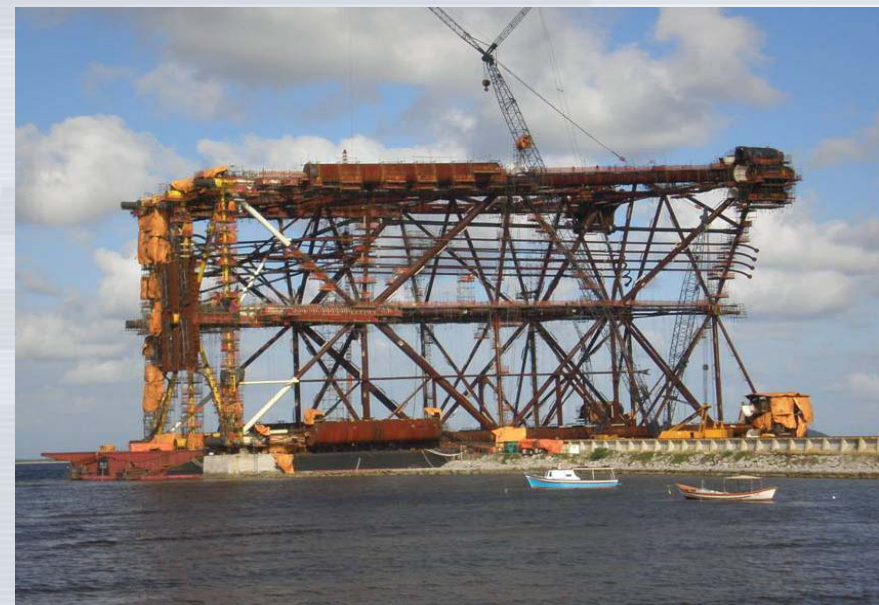
Its standards should be revised

Preference to base them on International Standards



Carapeba

First cycle: 1980-88



PRA-1

New cycle: 2004-2006



The End



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N-1852

REV. F

ENGLISH

JAN / 2008

OFFSHORE STRUCTURES - FABRICATION AND ERECTION OF FIXED UNITS

Procedure

This Standard replaces and cancels its previous revision.

The CONTEC - Authoring Subcommittee provides guidance on the interpretation of this Standard when questions arise regarding its contents. The Department of PETROBRAS that uses this Standard is responsible for adopting and applying the clauses thereof.

Technical Requirement: a provision established as the most adequate and which shall be used strictly in accordance with this Standard. If a decision is taken not to follow the requirement ('non-conformity' to this Standard) it shall be based on well-founded economic and management reasons, and be approved and registered by the Department of PETROBRAS that uses this Standard. It is characterized by the verb forms "shall," "it is necessary..." "is required to..." "It is required that..." "is to..." "has to..." "only..." is permitted," and other equivalent expressions having an imperative nature.

Recommended Practice: a provision that may be adopted under the conditions of this Standard, but which admits (and draws attention to) the possibility of there being a more adequate alternative (not written in this Standard) to the particular application. The alternative adopted shall be approved and registered by the Department of PETROBRAS that uses this Standard. It is characterized by the verbal form "should" and equivalent expressions such as "it is recommended that..." and "ought to..." (verbs of a non-mandatory nature). It is indicated by the expression: [Recommended Practice].

Copies of the registered 'non-conformities' to this Standard that may contribute to the improvement thereof shall be submitted to the CONTEC - Authoring Subcommittee.

Proposed revisions to this Standard shall be submitted to the CONTEC - Authoring Subcommittee, indicating the alphanumeric identification and revision of the Standard, the clause(s) to be revised, the proposed text, and technical/economic justification for revision. The proposals are evaluated during the work for alteration of this Standard.

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Foreword

PETROBRAS Technical Standards are prepared by Working Groups - WG (consisting of specialists from PETROBRAS and its Subsidiaries), are commented by PETROBRAS Units and PETROBRAS Subsidiaries, are approved by the Authoring Subcommittees - SCs (consisting of specialists from the same specialty, representing the various PETROBRAS Units and PETROBRAS Subsidiaries), and ratified by the Executive Nucleus (consisting of representatives of the PETROBRAS Units and PETROBRAS Subsidiaries). A PETROBRAS Technical Standard is subject to revision at any time by its Authoring Subcommittee and shall be reviewed every 5 years to be revalidated, revised or cancelled. PETROBRAS Technical Standards are prepared in accordance with standard PETROBRAS N-1. For complete information about PETROBRAS Technical Standards see PETROBRAS Technical Standards Catalog.

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60 pages and Index of Revisions

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PETROBRAS	N-1678	REV. F	ENGLISH	JAN / 2008
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OFFSHORE STRUCTURES - STEEL

Classification

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PETROBRAS	N-1859	REV. E	ENGLISH	AUG / 2006
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WELDING CONSUMABLE WITH GUARANTEED PROPERTIES

Specification

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