

Benefits of participation in standards development and in the use of standards

WSC Academic Week 2010

Geneva

9 July 2010

**Neil Reeve, ISO/TC67 Chair
Shell Standards Manager**

Purpose

This presentation sets out to explain the following:

- Shell Standardization Management
- Shell Participation in ISO/TC 67 and ISO/TC193, ISO/TC28, and other SDOs work
- Benefits of International Standards

Background

- Shell operates in more than 110 countries in 6 continents
- Shell is an international company, trading in an international industry, using international (and national) suppliers under many different regulatory regimes.
- For our projects and operations, Shell prefers to use International Standards (ISO and IEC), and is actively supporting this.
- This presentation concentrates on the technical standards for the equipment to build and operate our facilities.

Company Strategic Standardization Management

Executive Technical Standards Board: All Shell Group Businesses

Transparent standards structure: Policy

Internal standards: Provision of standards (DEPs);
Rationalize local operating company variations

External standards: Input to external standards

Procurement: Variety control: type restriction; vendor selection

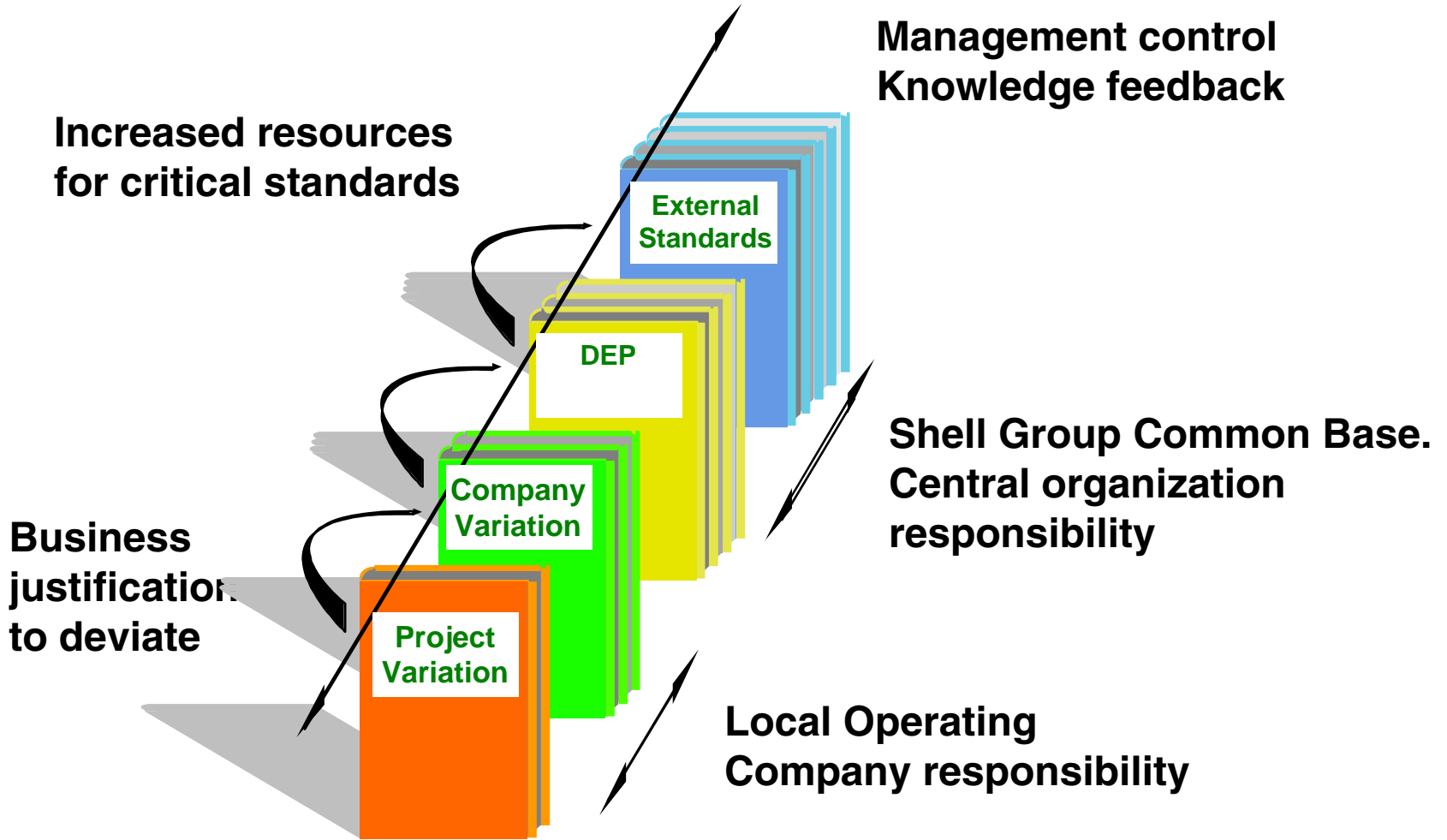
Process Safety: Identify/mandate requirements

Project use of standards: Facilitate ease of use of standards;
Provision of internal and external standards;
CD-ROMs and company website

Supports drive towards ESSA

- Eliminate
- Simplify
- Standardize
- Automate

Shell Transparent Standards Structure



DEP – Design and Engineering Practice

Company Variation – EGGS in USA; ESTGs in Canada; ERDs in Oman etc

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Shell Technical Standards Policy

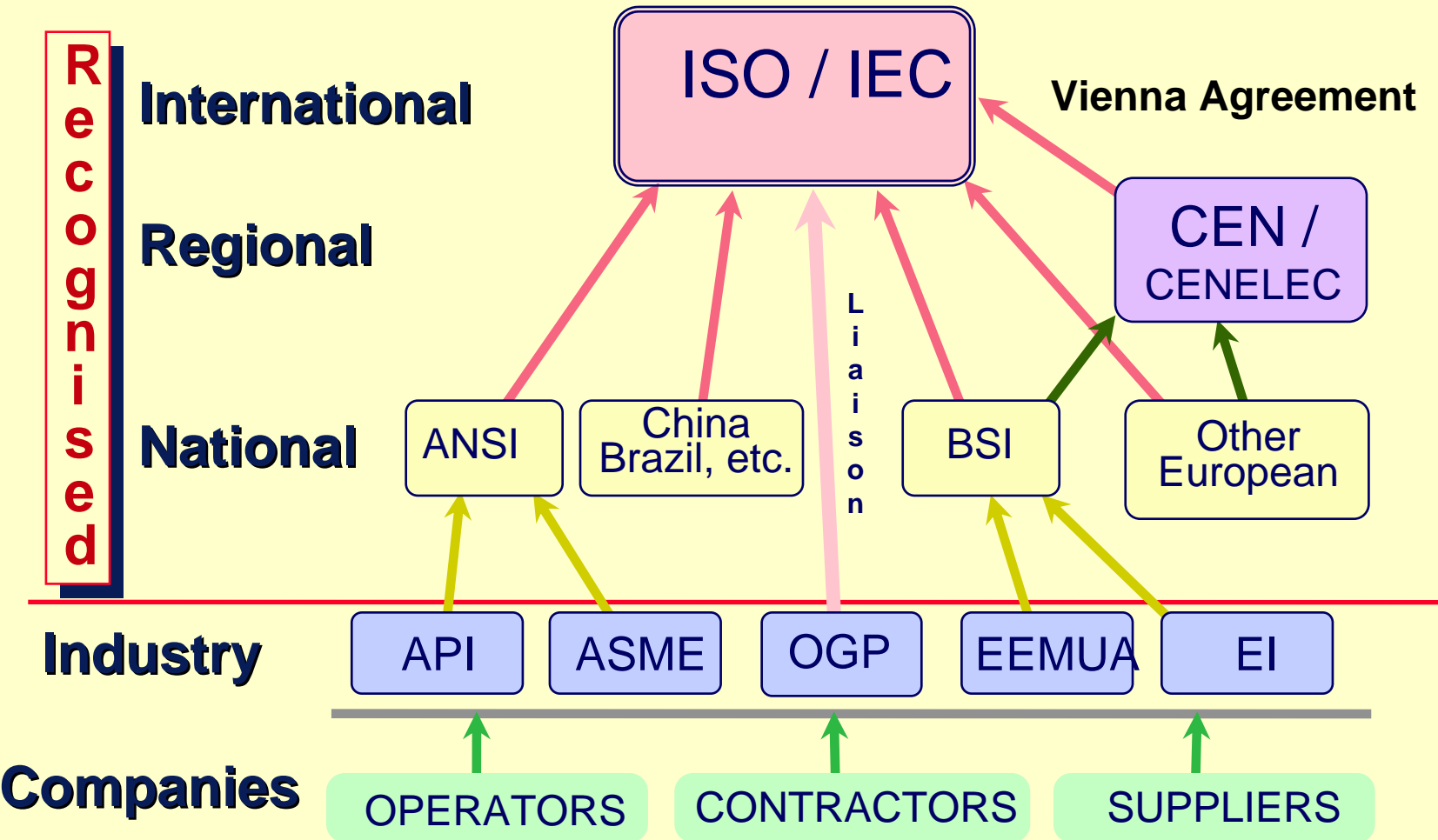


In our DEPs and Technical Standards:

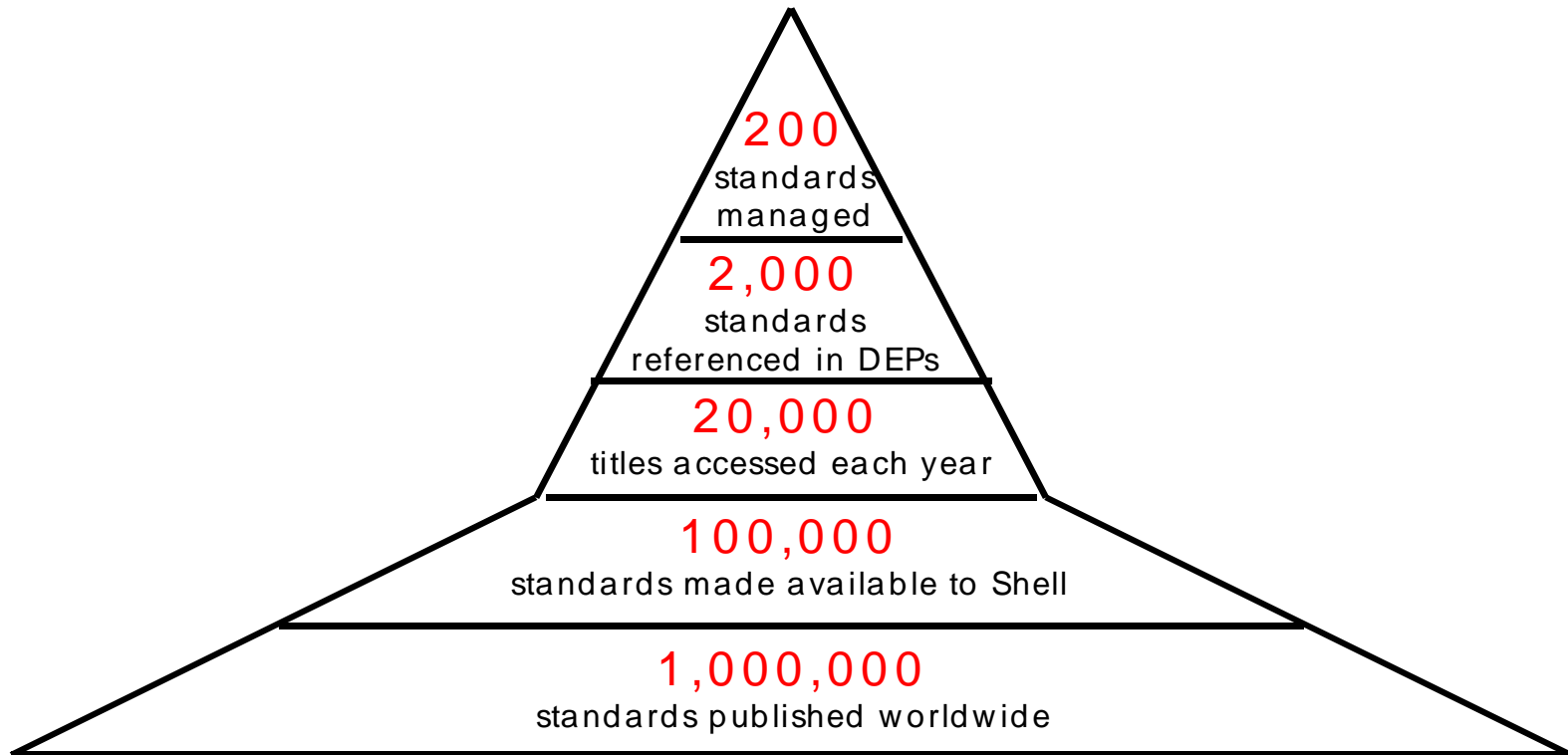
- Maximise use of common industry standards (ISO/ IEC if possible)
- Minimise additional company requirements
- Ensure variations justified (technical and commercial)
- Ensure continuous improvement (feedback from users)
- Influence external standards bodies. Participate actively in the technical committees and working groups of key external standards

Benefits are maximised when all companies use the same common industry standards

Standardization Bodies - Relationships



Focus on key external standards



Shell participation in external standards work

Shell Group representation on key external standards committees at:

- **International level (priority):** ISO/TC 67, ISO/TC193, ISO/TC28; IEC
 - 15 project leaders; experts in many Work Groups
- **Industry level:** API's three main standards committees (CSOEM, COPM, CRE); ASTM; ASME; EI; EEMUA; CINI; NFP; NACE; OCIMF; ACI; SIGTTO, ..
 - 15 project leaders; experts in many Work Groups
- **Regional Level:** CEN: CEN/TC12, CEN/TC19

ISO/TC 67 Vision



Members of ISO/TC 67

29 Participating (P) Members:

Argentina, Bahrain, Belgium, Brazil, Canada, China, Denmark, Finland, France, Germany, Indonesia, Iran, Italy, Japan, Kazakhstan, Korea, Mexico, Netherlands, Norway, Portugal, Qatar, Romania, Russian Federation, South Africa, Spain, Sweden, Ukraine, United Kingdom, USA

30 Observer (O) Members:

Australia, Austria, Azerbaijan, Bulgaria, Colombia, Croatia, Cuba, Czech Republic, Ecuador, Egypt, Hong Kong, Hungary, India, Ireland, Libya, Malaysia, Moldova, Mongolia, Nigeria, Oman, Poland, Saudi Arabia, Serbia, Singapore, Slovakia, Switzerland, Thailand, Trinidad and Tobago, Turkey, Viet Nam

ISO Standards for use in the oil & gas industry

ISO 10418 Basic surface safety systems (Cor)
ISO 10423 Wellhead & christmas tree equipment (Rev)
ISO 13533 Drill-through equipment (BOPs)
ISO 15355 Hoisting equipment - care/maint (Rev)
ISO 15355 Hoisting equipment - specification (Rev)
ISO 13626 Drilling and well-servicing structures
ISO 13702 Control & mitigation of fire & explosion
ISO 13703 Offshore piping systems
ISO 14224 Reliability/maintenance data
ISO 14692 GPP piping, Parts 1-4
ISO 14693 Drilling equipment

ISO 15156-1 Selection of cracking resistant materials for use in H₂S environments
ISO 15156-2 Cracking-resistant steels and cast irons for use in H₂S environments
ISO 15156-3 Cracking-resistant alloys for use in H₂S environments
ISO 15138 HWAC
ISO 15344 Emergency response (Amd)
ISO 15663 Life cycle costing, Parts 1-3
ISO 17776 Assessment of hazardous situations
ISO 20815 Production assurance and reliability management (New)
ISO/TS 27469 Method of test for offshore fire dampers (New)
ISO/TS 29001 Sector-specific quality management systems

ISO 19900 Offshore structures - general requirements
ISO 19901-1 Metocean design and operating considerations
ISO 19901-2 Seismic design
ISO 19901-4 Geotechnical and foundation design
ISO 19901-5 Weight control
ISO 19901-6 Marine operations (New)
ISO 19902 Fixed steel offshore structures
ISO 19903 Fixed concrete offshore structures
ISO 19904-1 Floating offshore structures

ISO 3977-5 Gas turbines - procurement
ISO 10428 Sucker rods (Rev)
ISO 10431 Pumping units (Rev)
ISO 10434 Bolted bonnet steel gate valves
ISO 10437 Special-purpose steam turbines
ISO 10438 Lubrication, shaft-sealing and control-oil systems, Parts 1-4
ISO 10439 Centrifugal compressors
ISO 10440-1 Rotary-type positive-displacement process compressors (oil-free)
ISO 10440-2 Rotary PD packaged air compressors
ISO 10441 Flexible couplings - special
ISO 10442 Integrally geared air compressors
ISO 13631 Reciprocating gas compressors
ISO 13691 High speed enclosed gear units
ISO 13704 Calculation of heater tube thickness (Cor)
ISO 13705 Fired heaters for general service
ISO 13706 Air-cooled heat exchangers

ISO 13707 Reciprocating compressors
ISO 13709 Centrifugal pumps (Rev)
ISO 13710 Reciprocating positive displacement pumps
ISO 14691 Flange couplings - general (Rev)
ISO 15547-1 Plate & frame type heat exchangers
ISO 15547-2 Brazed aluminium plate-fin type heat exchangers
ISO 15649 Piping
ISO 15761 Steel valves DN 100 and smaller
ISO 16812 Shell & tube heat exchangers
ISO 17292 Metal ball valves
ISO 21049 Centrifugal and rotary pumps shaft sealing
ISO 23251 Pressure-relieving and depressuring systems (Amd)
ISO 23936-1 Thermoplastics (New)
ISO/TS 24817 Composite repair of pipework
ISO 25457 Flares details (New)
ISO 28300 Venting of storage tanks (New)

ISO 13624-1 Marine drilling riser systems (New)
ISO 13625 Marine drilling riser couplings
ISO 19901-7 Station-keeping systems for floating offshore structures (Rev)

ISO 13628-1 Subsea production systems
ISO 13628-2 Subsea flexible pipe systems
ISO 13628-3 Subsea TFL pumpdown systems
ISO 13628-4 Subsea wellhead and tree equipment
ISO 13628-5 Subsea control umbilicals (Rev)
ISO 13628-6 Subsea production controls

ISO 13628-7 Completion/workover riser system
ISO 13628-8 ROV interfaces
ISO 13628-9 ROT intervention systems
ISO 13628-10 Bonded flexible pipe
ISO 13628-11 Flexible pipe systems for subsea and marine applications (Cor)

ISO/TR 10400 Calculations for OCTG performance properties
ISO 10405 Care/usa of casing/tubing
ISO 10407-1 Drill stem design
ISO 10407-2 Inspection and classification of drill stem elements (New)
ISO 10414-1 Field testing of water-based fluids (Rev)
ISO 10414-2 Field testing of oil-based fluids
ISO 10416 Drilling fluids - lab testing (Rev)
ISO 10417 Subsurface safety valve systems
ISO 10424-1 Rotary drill stem elements
ISO 10424-2 Threading and gauging of connections
ISO 10426-1 Well cementing (Rev)
ISO 10426-2 Testing of well cements

ISO 10426-3 Testing of deepwater well cement
ISO 10426-4 Preparation and testing of atmospheric foamed cement slurries
ISO 10426-5 Shrinkage and expansion of well cement
ISO 10426-6 Static gel strength of cement formulations (New)
ISO 10427-1 Blow spring casing centralizers
ISO 10427-2 Centralizer placement and stop-collar testing
ISO 10427-3 Performance testing of cement float equipment
ISO 10432 Subsurface safety valves
ISO 11960 Casing and tubing
ISO 11961 Drill pipe (Rev)
ISO 13500 Drilling fluids (Rev)
ISO 13501 Drilling fluids - processing systems evaluation

ISO 15053-1 Measurement of viscous properties of completion fluids
ISO 13503-2 Measurement of properties of proppants (Amd)
ISO 13503-3 Testing of heavy brines
ISO 13503-4 Measurement of stimulation & gravelpack fluid leakoff
ISO 13503-5 Measurement of long term conductivity of proppants
ISO 13678 Throat compounds (Rev)
ISO 13679 Connection testing
ISO 13680 CRA seamless tubes for casing and tubing (Rev)
ISO 14310 Packers and bridge plugs (Rev)
ISO 15136-1 Progressing cavity pump systems (Rev)
ISO 15136-2 Progressing cavity pump systems - drive heads
ISO 15463 Field inspection of new casing, tubing and plain end drill pipe

ISO/TR 15464 Gauging and inspection of casing, tubing and line pipe threads (New)
ISO 15546 Aluminium alloy drill pipe
ISO 16070 Lock mandrels and landing nipples
ISO 17078-1 Side-pocket mandrels
ISO 17078-2 Flow control devices for side-pocket mandrels
ISO 17078-3 Latches, seals & interface data for side-pocket mandrels & flow control devices (New)
ISO 17078-4 Side-pocket mandrels and related equipment (New)
ISO 17824 Sand control screens (New)

ISO 3183 Steel pipe for pipeline transportation systems
ISO 13623 Pipeline transportation systems (Rev)
ISO 13847 Pipeline welding
ISO 14313 Pipeline valves
ISO 14723 Subsea pipeline valves (Rev)
ISO 15589-1 Cathodic protection for on-land pipelines
ISO 15589-2 Cathodic protection for offshore pipelines
ISO 15590-1 Pipeline induction bends (Rev)
ISO 15590-2 Pipeline fittings
ISO 15590-3 Pipeline flanges
ISO 21809-1 Pipeline reliability-based limit state design
ISO 21329 Test procedures for pipeline mechanical connectors
ISO 21809-1 External polyolefin coatings for pipelines (New)
ISO 21809-2 Fusion-bonded epoxy coatings (Cor)
ISO 21809-3 Field joint coatings for pipelines (New)
ISO 21809-4 Polyethylene coatings (2-layer PE) pipelines used (New)



Standards in brown issued in 2008
 Standards in green are a priority for 2009 issue
 Many of these standards are adopted by API, CEN and other recognised standards bodies

ISO TC67 has published 143 standards.

API has adopted 70 of these as joint API / ISO standards.

CEN has adopted 122 of these as joint European EN ISO standards.

China (49), Gulf Region (48), Kazakhstan (59), Russia (11) etc. have also adopted many of these ISO stds.

Example: Shell uses these as the basis for their company standards

INTERNATIONAL
STANDARD

ISO
13709

First edition
2003-07-01

**Centrifugal pumps for petroleum,
petrochemical and natural gas industries**

*Pompes centrifuges pour les industries du pétrole, de la pétrochimie et
du gaz naturel*

**Centrifugal Pumps for Petroleum,
Petrochemical and Natural Gas
Industries**

**ANSI/API Standard 610
Tenth Edition, October 2004**

**ISO 13709: 2003, (Identical) Centrifugal pumps for
petroleum, petrochemical and natural gas industries**

Identical standards published by ISO and API



**Helping You
Get The Job
Done Right.™**



Reference number
ISO 13709:2003(E)

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The Document Policy Group at 303-389-2295.

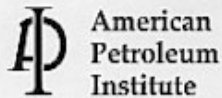
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The Document Policy Group at 303-389-2295.

Air-Cooled Heat Exchangers for General Refinery Service

API Standard 661, Fifth Edition
March 2002

ISO 13706: 2000, Petroleum and Natural Gas Industries—Air-cooled Heat Exchangers



Helping You
Got The Job
Done Right.™



EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 13706

April 2000

ICS 75.180.20

English version

Petroleum and natural gas industries - Air-cooled heat exchangers (ISO 13706:1998)

Industries du pétrole et du gaz naturel - Echangeurs de chaleur refroidis à l'air (ISO 13706:1998)

Erdöl- und Erdgasindustrien - Luftgekühlte Wärmetauscher (ISO 13706:1998)

This European Standard was approved by CEN on 15 April 2000.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

..... and CEN



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Steenant, 36 B-1050 Brussels

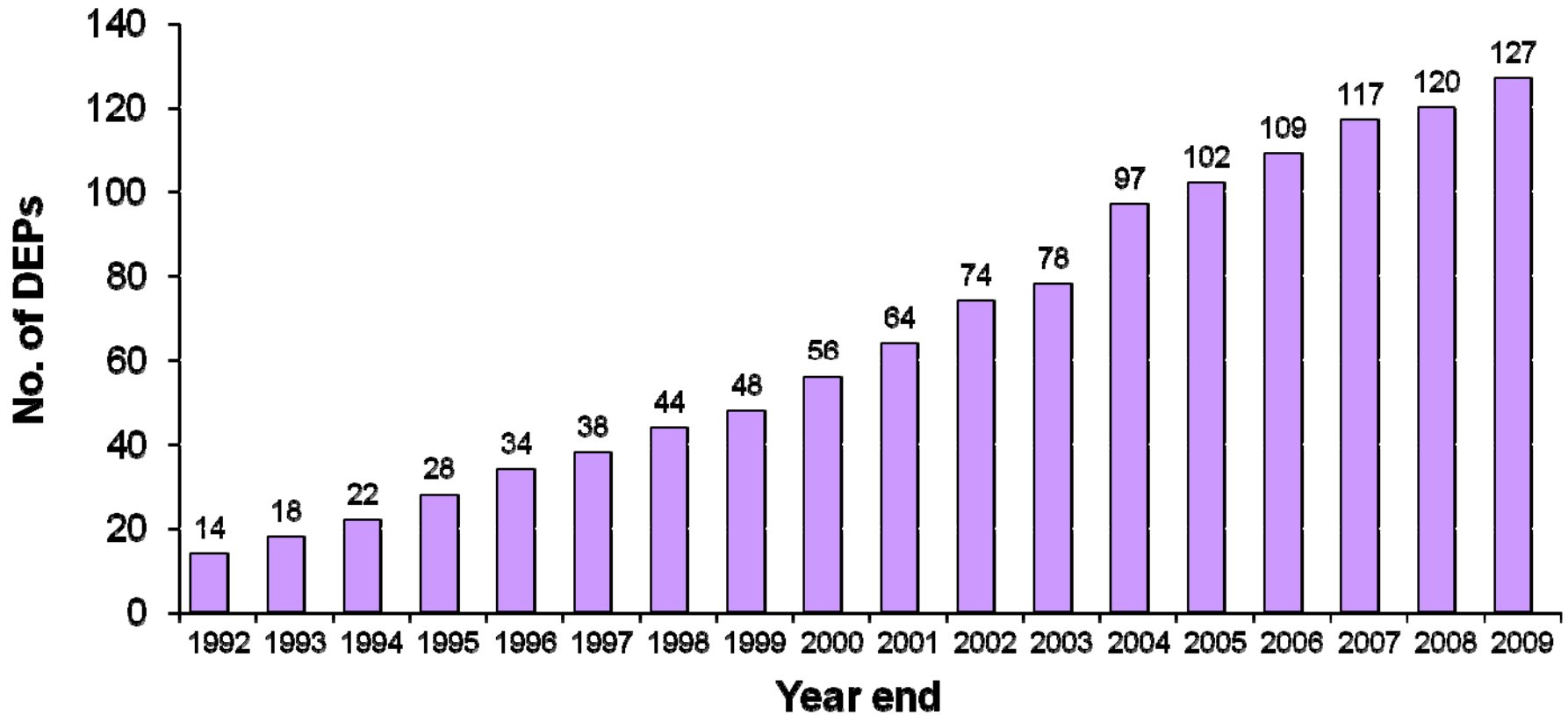
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Ref. No. EN ISO 13706:2000 E

Trend towards transparency - Benefit of external standards efforts

(Total number of DEPs = 367)

Number of DEPs based on external standards



Company benefits from standards

Cost Reduction - Increase Business Efficiency

- Simplify design and procurement in Projects; Variety Control
- Interchangeability of equipment
- Promote stable and global market

Enhance Technical Integrity

- Safety, Health and protection of the Environment
- Maximise availability, minimise lost revenue

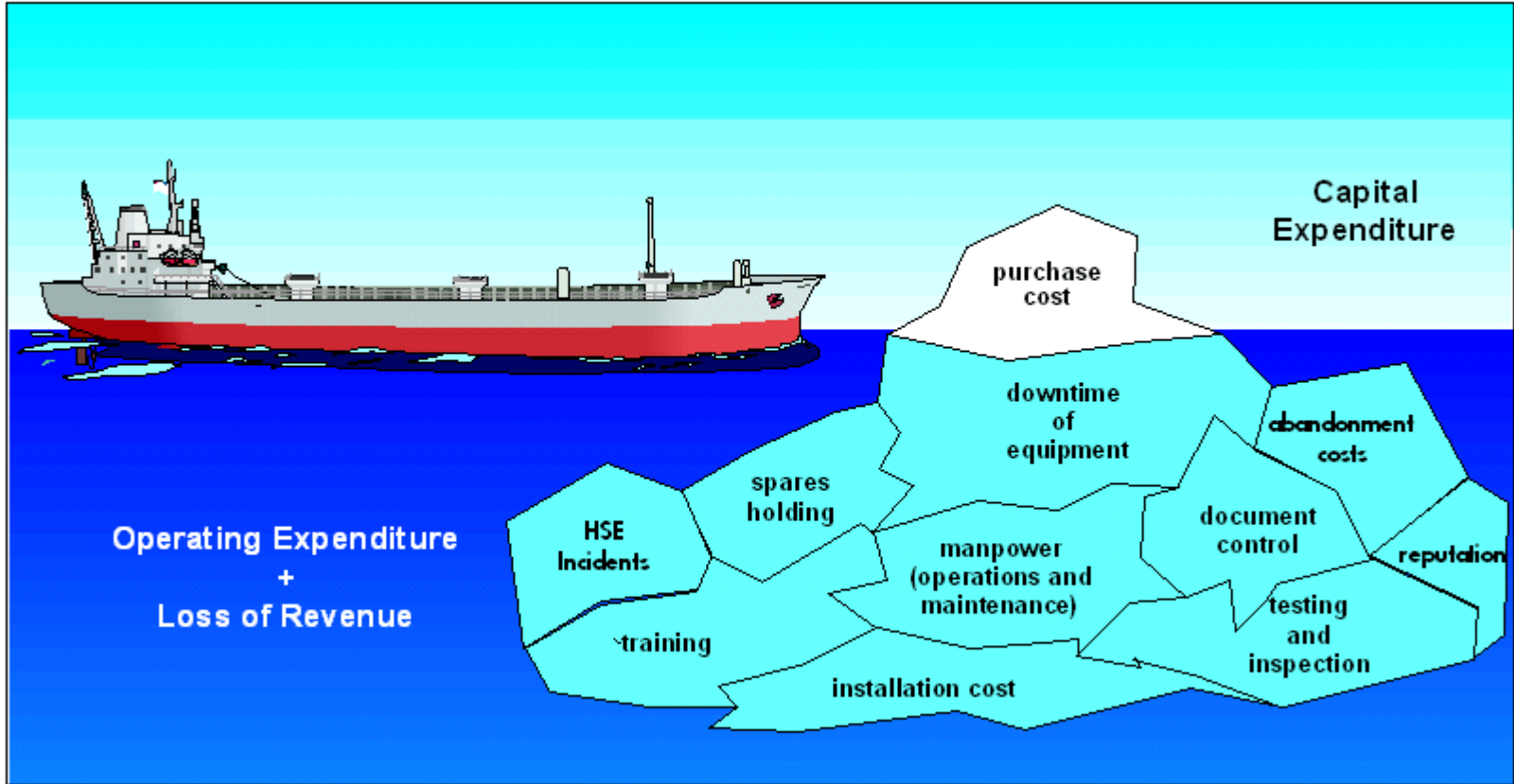
Establish a Common Technology Base

- Technology transfer / Sharing best practice / Remove barriers to trade (WTO)

Support Legislation, where linked

- Safety and Environmental Regulations (e.g. Process Safety Management)
- Procurement Legislation (e.g. European Directives)
- Essential Requirements (e.g. ‘New Approach’ European Directives)

Total Cost of Ownership



Cost/Benefit example from 2000



27 FOCUS ITEMS FOR ISO/TC67

SUBSURFACE

- ISO 10432 (SSSV)
- ISO 11960 (Casing & Tubing)
- ISO 11961 (Drillpipe)
- ISO 13680 (GRA Casing & tubing)
- ISO 10426-1,2 (Well cements)
- ISO 13500 (Drilling fluids)

SUBSEA SYSTEMS

- ISO 13628-1 (Subsea systems)
- ISO 13628-2 (Flexible pipe)
- ISO 13628-4 (Subsea wellhead & christmas tree)
- ISO 13628-6 (Subsea production controls)

OFFSHORE STRUCTURES

- ISO 13819-2 (Offshore structures)

OFFSHORE TOPSIDES

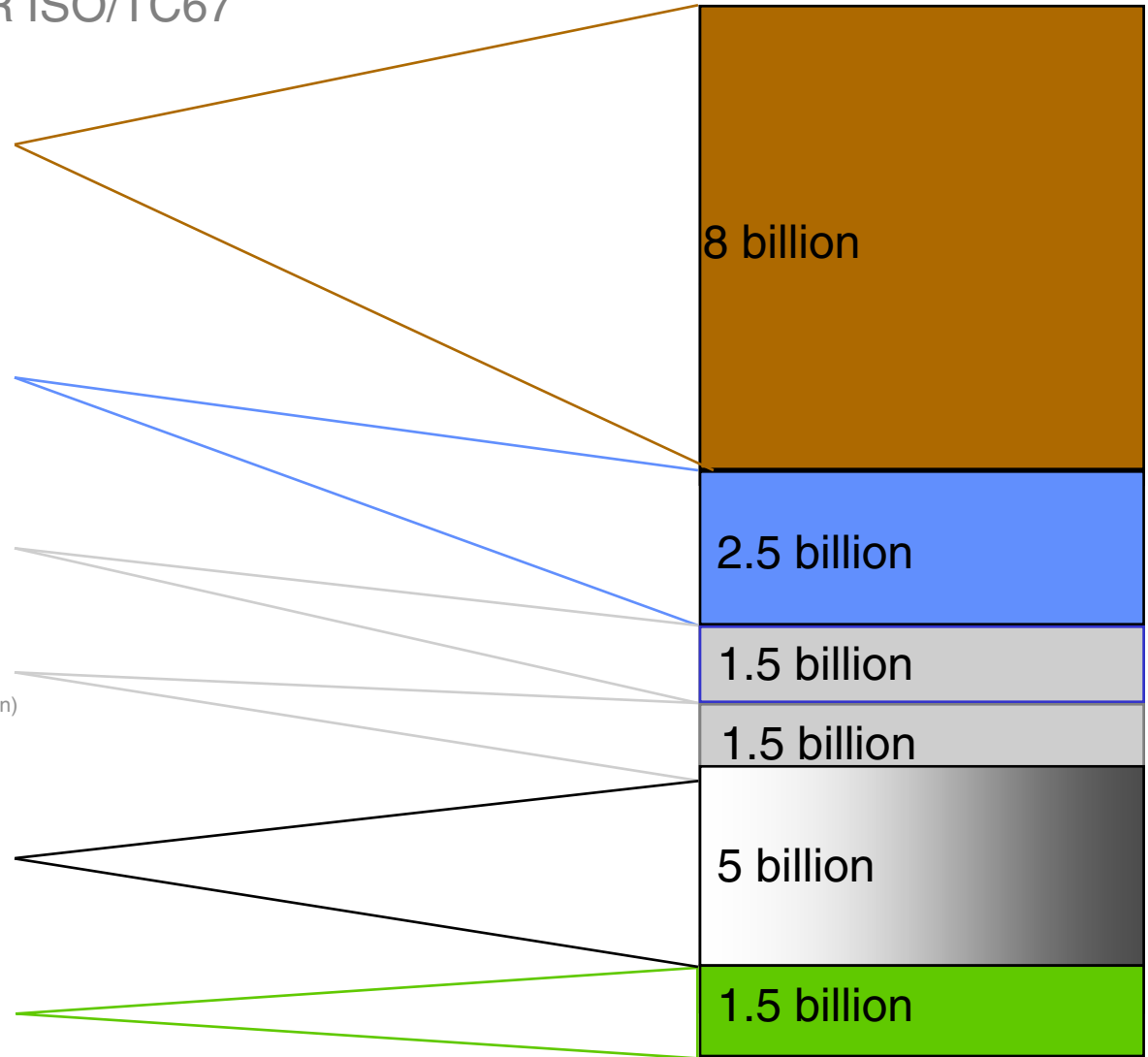
- ISO 10423 (Wellhead & christmas trees)
- ISO 13535 (Hoisting equipment)
- ISO 13702 (Control and mitigation of fire & explosion)
- ISO 13703 (Piping systems)

PIPELINES

- ISO 13623 (Pipelines)
- ISO 3183-3 (Linepipe)
- ISO 13847 (Pipeline welding)
- ISO 14313 (Pipeline valves)

PROCESS FACILITIES

- ISO 10437 (Steam turbines)
- ISO 10439 (Centrifugal compressors)
- ISO 10441 (Flexible couplings - special)
- ISO 13706 (Air-cooled heat exchangers)
- ISO 13707 (Reciprocating compressors)
- ISO 13709 (Centrifugal pumps)
- ISO 14691 (Flexible couplings - general)



TOTAL US \$ 20 billion
p.a.

Cost/Benefit example from 2000

Total worldwide industry expenditure covered by the
27 ISO/TC67 Focus List Standards = US \$ 20 billion p.a.
(Shell share 10% = US \$ 2 billion)

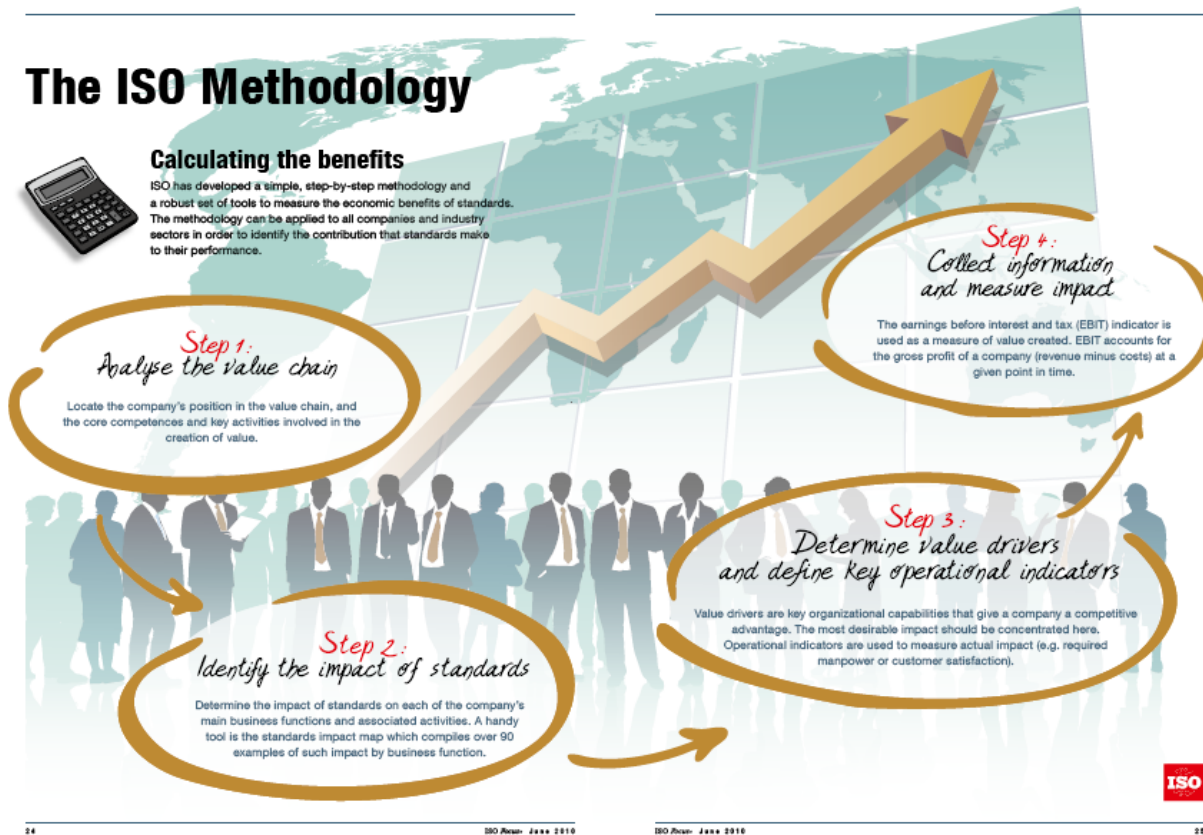
If only 1% is saved by the use of the ISO standards, then

BENEFIT = US \$ 200 million p.a.

Investment to achieve this is COST = US \$ 8 million p.a.

Hence RETURN = $\frac{\text{BENEFIT}}{\text{COST}} = \frac{200}{8} = 25 : 1$

Economic benefits of standards



Research in economic benefits

- Shell supports ISO's efforts to develop a methodology to quantify the economic benefits of standardization.
- We would be pleased to participate further.
- Keep it simple.

Conclusions

- Standards are a corporate asset, and not a corporate liability
- Shell will maintain a standards system
- Shell needs and uses international standards
- Shell participates in developing international standards

—

Thank you for your invitation to the
WSC Academic Week, in Geneva,
to share this with you

neil.reeve@shell.com

www.iso.org

www.ogp.org.uk

www.ifan.org

Back-up

Context - In Shell we use both Group Standards and Technical Standards

Group Governance

- **Group Standards**
 - mandatory across Shell, signed by CEO
 - examples: Finance, HSSE (includes AIPSM Standards), IM, Disclosure
- **Group Manuals**
 - mandatory instructions on implementation of Group Standards
 - examples: AIPSM Application Manual; DEM 1 and DEM 2
- **Group Guides**
 - Non-mandatory guidance on good practice

Industry/Engineering

- **Technical standards**
 - Internal standards**
 - DEPs (Design and Engineering Practices)
 - Local Shell company standards
 - Project specifications
 - External standards**
 - International Standards (e.g. ISO, IEC standards)
 - national standards (e.g. BS, DIN standards)
 - industry standards (e.g. API, ASTM standards)
- **Regulations**
 - Legal force; may or may not refer to standards

The basics – What are the DEPs?

The Design Engineering Practices are made for cross-business, application e.g. Upstream & Downstream:

- Engineering
 - Concept selection guidelines
 - Pre-engineering (selection/variety control; reliability/integrity; purchasing specifications)
 - Life-cycle cost optimised
- Construction (preservation, commissioning, inspection, testing)
- Operation/maintenance

Governance by Shell Executive Technical Standards Board (ETSB)

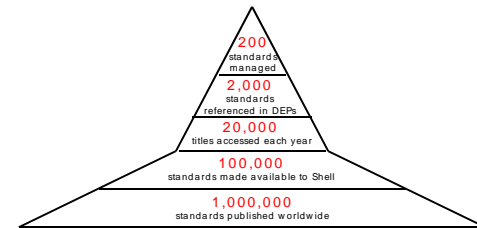
DEP facts

- 367 DEPs
 - Road map for use of the most appropriate external standards
 - 120 are endorsements, amendments/ supplements to external standards
 - 2000+ external standards referenced
- 2000+ website users per day
(DEPs, external standards, MESC)
- Written in same editing style as external standards
 - Contain a combination of shalls and shoulds
- DEPs updated based on criticality: learnings and pace of change

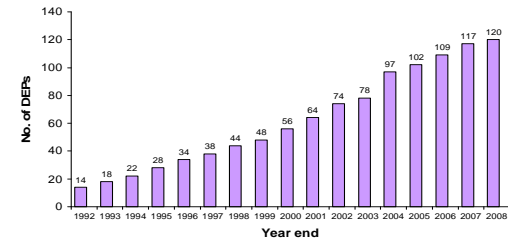
DEPs are approved by Executive VP Projects and Technology

Administered by Shell Standards Team

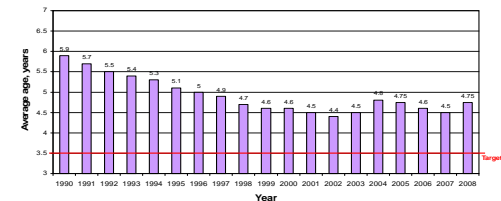
Focus on key external standards



No. of DEPs based on External Standards



DEPs average age

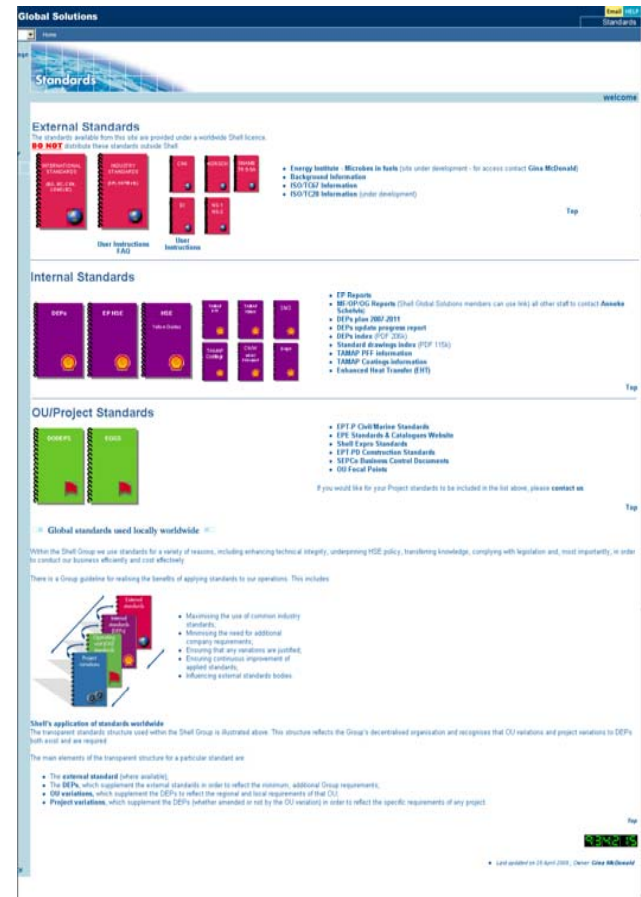


..... still much to do.....

The complexity of our technical governance is simplified through a single point of access

Shell Technical Standards intranet site:

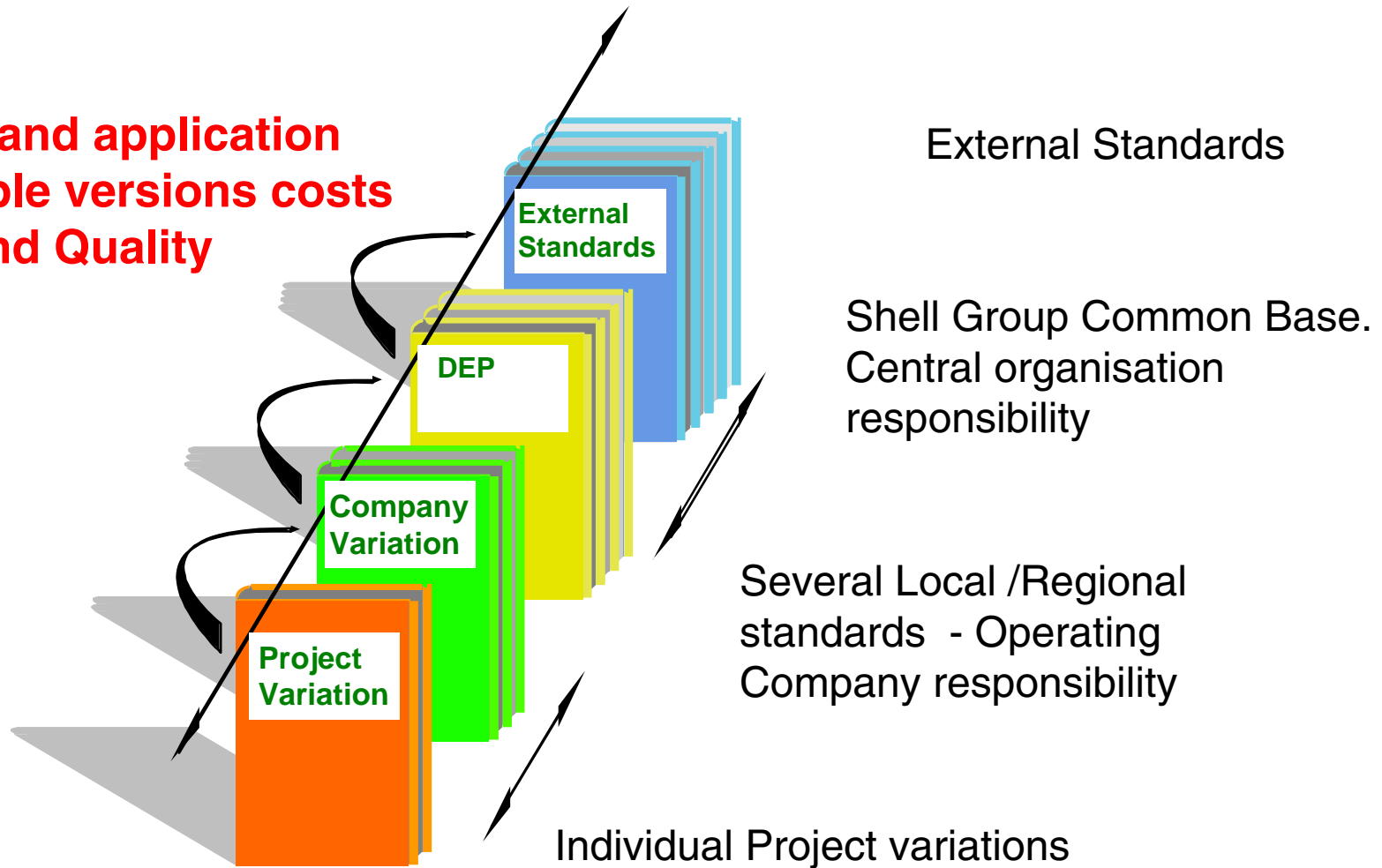
- Access for all Shell staff worldwide to the internal company technical standards;
- 100,000 external standards from the main standards organizations used by Shell;
- Communication to build shared vision
- Accessed by 2000+ users per day



<http://sww.shell.com/standards>

...and there are regional / local variations

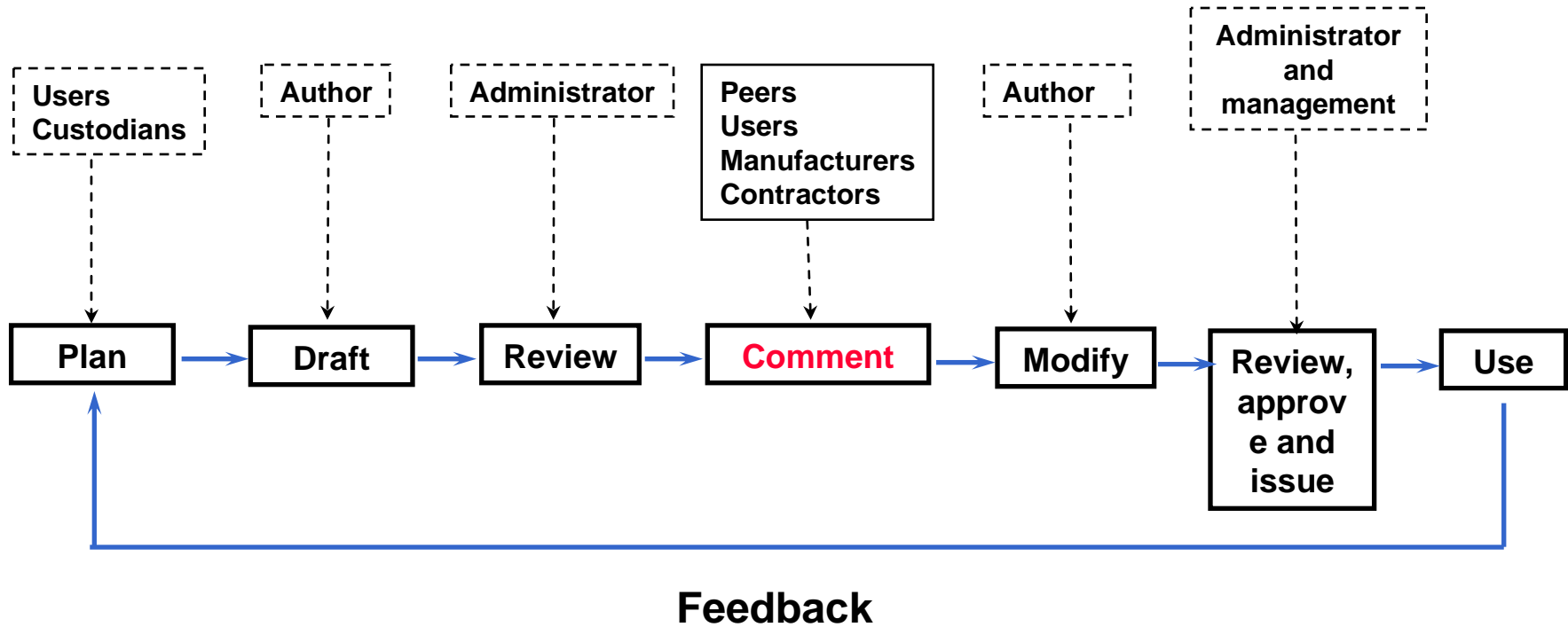
Upkeep and application of multiple versions costs \$\$\$\$\$ and Quality



Move to one set of global, cross-business standards

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DEP making process



Shell Technical Standards e-mail box

- DEPs licenses, internal & external users comments
- External Standards inquiries
- MESC and TAMAP inquires

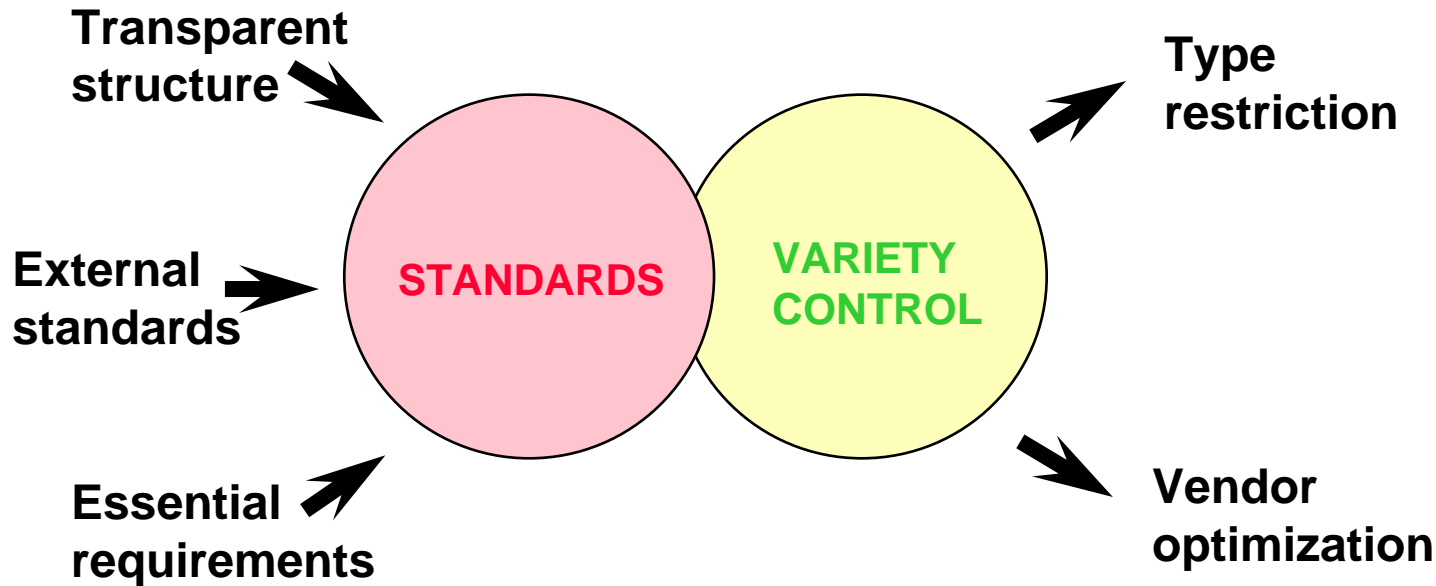
2010 DEPs Revision Programme

Objectives:

- Simplification
- Ease of Project Application
- Increased commercial incentives
- Maintain Corporate Technical Knowledge
- Efficient & effective global governance

Move to align with Control Frameworks

Standards + Variety Control = Standardization



A catalogue such as MESC is a key enabler for standardization

Two standardization examples

30% price savings on electric cable, and 50% stock reduction.

30% price savings on valves, and 80% stock reduction.

ISO/TC 67

Title: Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries

Scope: Standardization of the materials, equipment and offshore structures used in the drilling, production, transport by pipelines and processing of liquid and gaseous hydrocarbons within the petroleum, petrochemical and natural gas industries. Excluded: aspects of offshore structures subject to IMO requirements (ISO / TC 8).

ISO/TC 67 statements

Mission:

To create value-added standards for the oil and natural gas industry

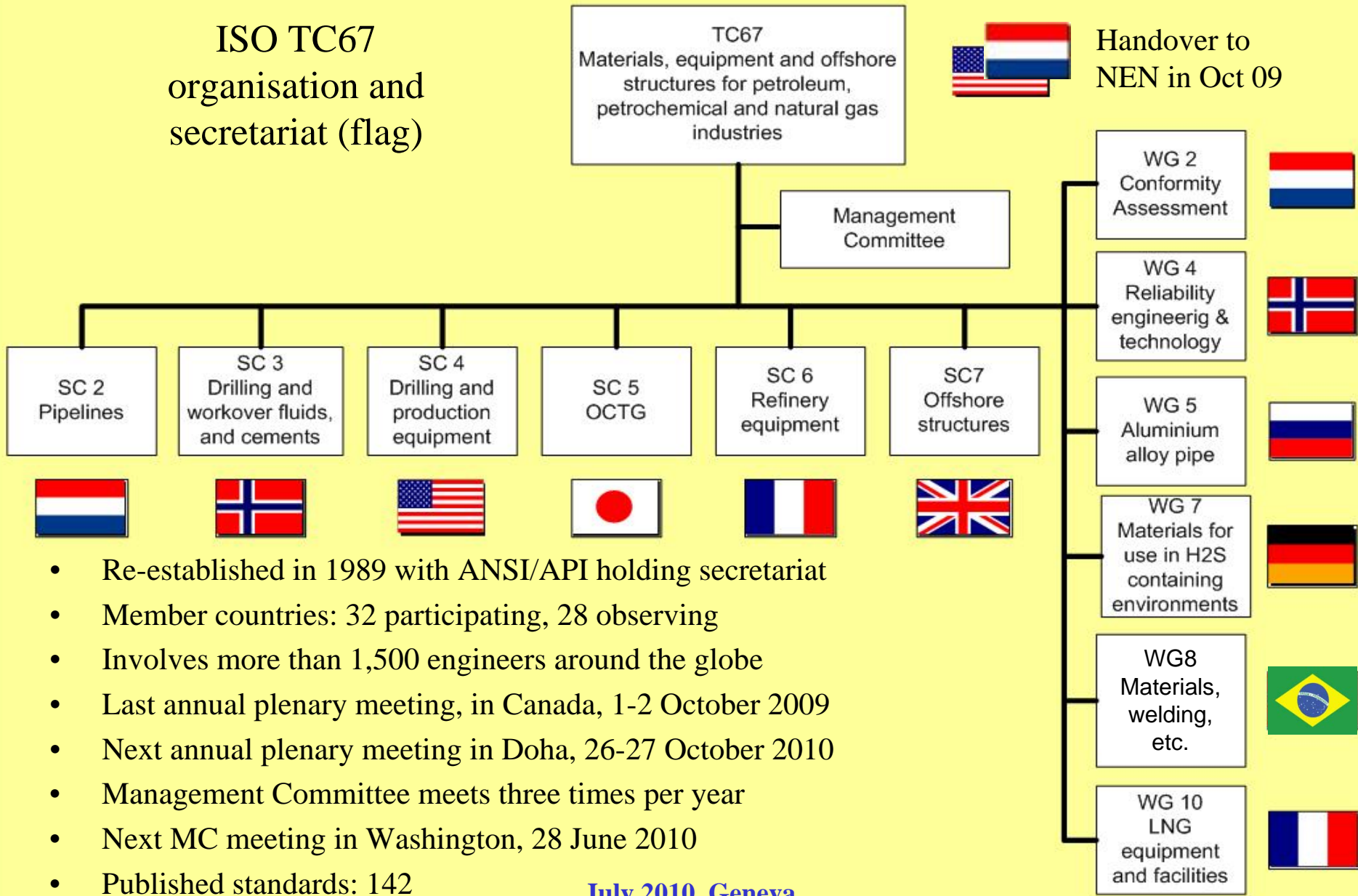
Vision:

Global standards used locally worldwide

Goals:

- Prepare standards required by this industry
- Prepare standards that could be adopted worldwide by bodies such as API and CEN
- Publish standards that enable companies to minimize their specifications
- Deliver standards to the target dates on the agreed work programme

ISO TC67 organisation and secretariat (flag)



Handover to
NEN in Oct 09

- Re-established in 1989 with ANSI/API holding secretariat
- Member countries: 32 participating, 28 observing
- Involves more than 1,500 engineers around the globe
- Last annual plenary meeting, in Canada, 1-2 October 2009
- Next annual plenary meeting in Doha, 26-27 October 2010
- Management Committee meets three times per year
- Next MC meeting in Washington, 28 June 2010
- Published standards: 142
- Current work programme: 71 standards (new + revisions)

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Recent change in ISO/TC67 Secretariat

- ANSI/API (USA) have relinquished the Secretariat of ISO/TC67 after 20 years service
- ISO have allocated this Secretariat to NEN (the Netherlands) – July 2009
- Effective from October 2009:
 - Neil Reeve – Chair (Shell)
 - Harold Pauwels – Secretary (NEN)

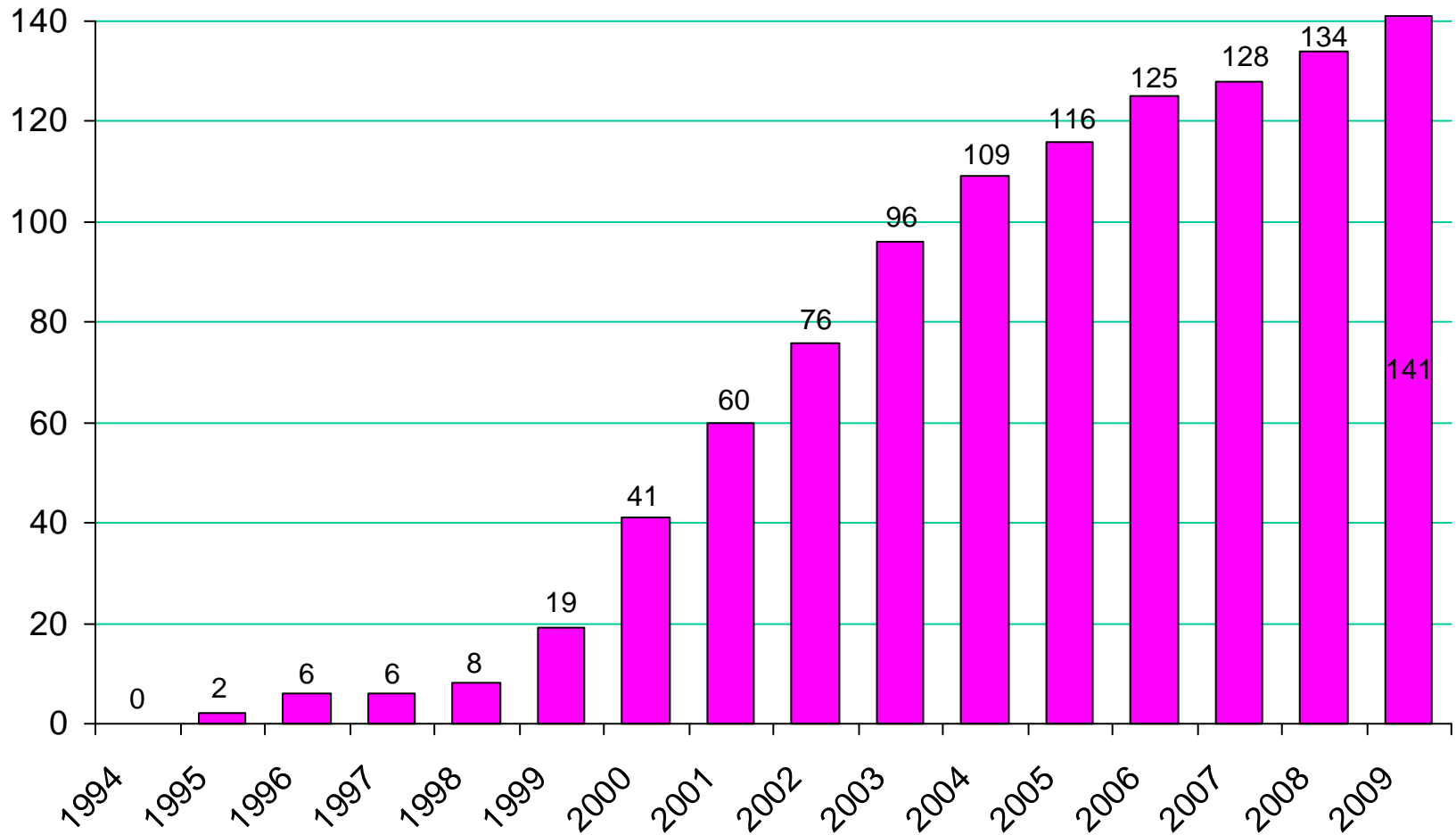
Recent changes in ISO/TC67

- New Work Group 8 on Materials (Brazil)
- New Work Group 10 on LNG (France)
- Upcoming change in Subcommittee 2 Secretariat
- Steadily increasing membership (new: Bahrain, Belgium, Iran, Kazakhstan and Sweden)
- Steadily increasing participation (Brazil, China, Russian Federation)
- Accelerating national adoption
- More than half the portfolio has been revised at least once or is in revision

ISO/TC 67 accomplishments:



Cumulative number of documents published



Note: excluding "fasttrack"ISOs

Way forward

- ISO/TC67 has a solid portfolio of standards for equipment for our industry.
- They are developed by experts from oil companies, manufacturers, certification bodies and regulators from all over the world.
- Increasingly, they are used by companies and accepted by regulators around the world.
- “Cooperation, not competition” in standards.