

Information | Analytics | Expertise



OPTIMIZING INTERNAL STANDARDS FOR COST

IHS Engineering

Company Benefits from Standards

- **Cost Reduction - Increase Business Efficiency**
- **Simplify design and procurement; Variety Control**
- **Interchangeability of equipment**
- **Promote stable and global market**
- **Improve Technical Integrity**
- **Safety, Health and protection of the Environment**
- **Maximize availability, minimize lost revenue**
- **Establish a Common Technology Base**
- **Technology transfer / Sharing best practice / Remove barriers to trade**
- **Support Legislation where linked**
- **Safety and Environmental Regulations (e.g. Process Safety Mngt, US)**
- **Procurement Legislation (e.g. European Directives)**

What is Driving Up Costs in Engineering?

Some Sobering Statistics...

\$38B

Unnecessary cost of equipment purchases due to suboptimal internal standards

100%

Increase in engineering hours required when using internal standards vs. industry standards

50%

of engineering workforce eligible for retirement in next five years

8.2

years for a new hire to step into the shoes of a retiring engineer

30%

of total R&D spend is wasted duplicating research and work previously done

13

unique data sources are used to find answers to each engineering challenge

42%

of time spent seeking information — time that could be used to solve problems.

56%

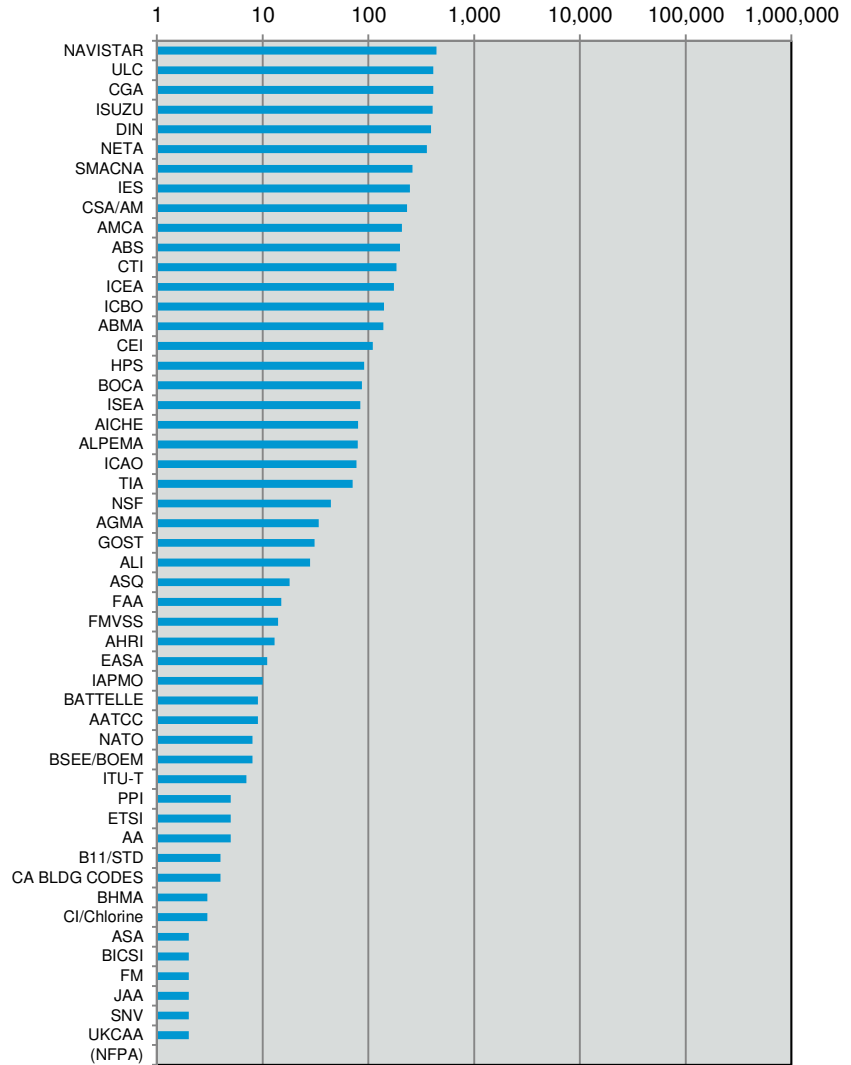
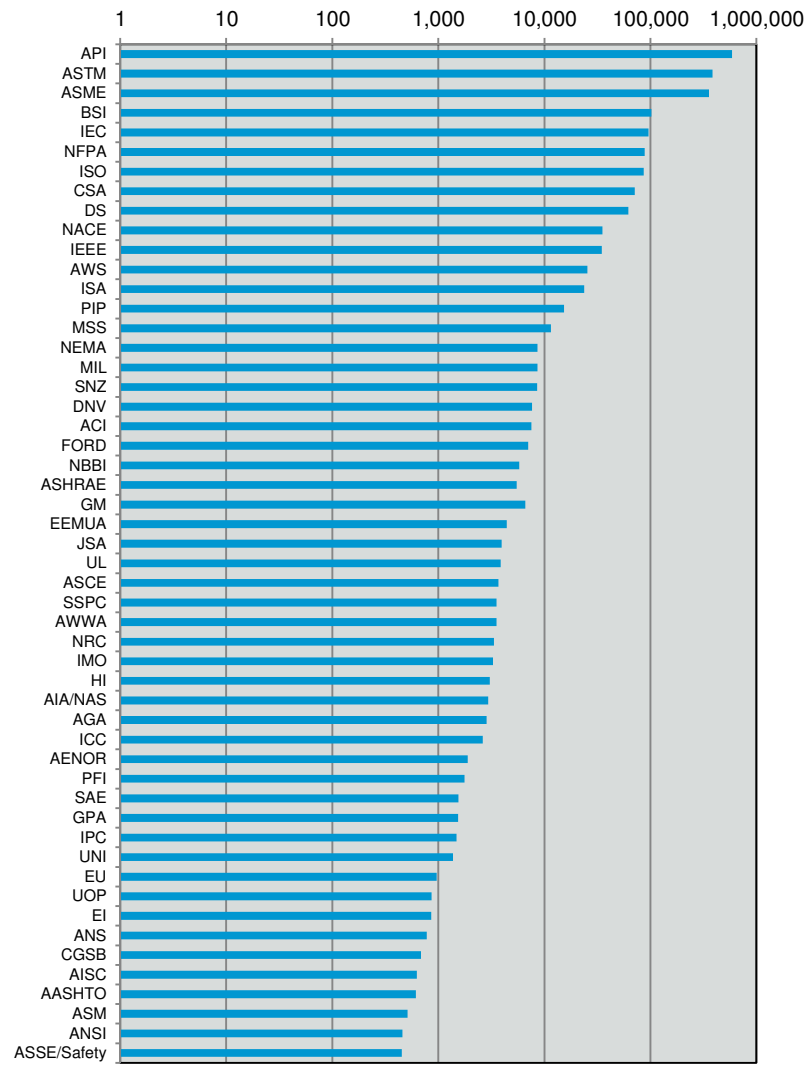
of the time workers can't find the information required to do their jobs

Optimize Internal Standards



Standards usage in the oil & gas industry

Large number of standards bodies, significant usage across them



ASTM issued over 600 new, revised, and reaffirmed standards in the first 3 months of 2016 alone

IEC maintains an inventory of more than 6,000 standards and technical recommendations. More than 10% of these are updated each year.

And these are just two of the dozens of standards developing organizations providing relevant standards for Oil & Gas



Complex and Over-Lapping World of Standards

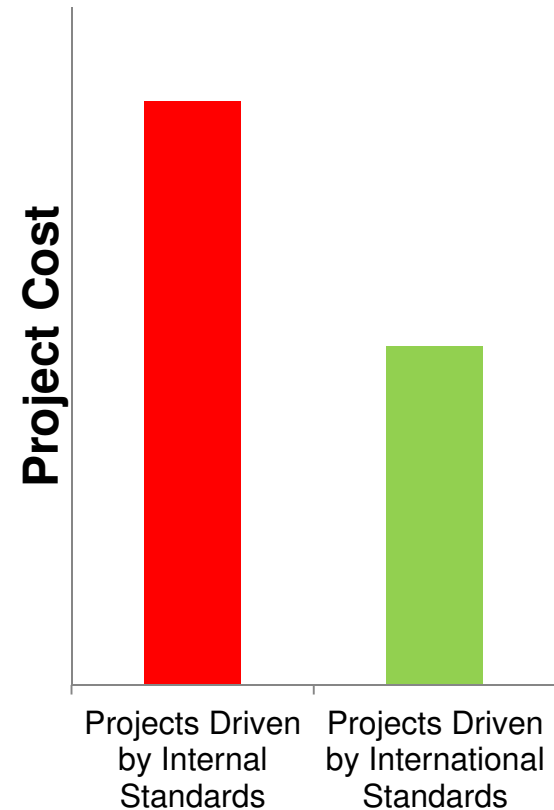
System	Related Standards
Subsea	Tree forgings - 184 Wellheads - 501
Piping	Pipes – 384 Fittings – 169 Flanges – 69 Valves – 328 Induction bends - 9
Corrosion management	Pipe systems - 77 Fittings/Flanges - 28 Structural - 113 Coating Systems - 314 ICCP - 253
Rotating equipment	Turbine - 2059
Topside	HIPs - 261

Internal Standards Come at a Cost

To close gaps in industry standards, operators create their own internal standards.

These internal standards are incredibly valuable, but also drive increased cost:

- Bespoke requirements
- Out-of-date references
- Project engineers can't scale
- Rationale not documented and lost
- Over-engineering
- Lack of supplier feedback



Source: IHS Research

The Case for Optimizing Internal Standards: Examples of the Cost

Over-Specification:

- API standard pumps cost about 3X ANSI standard pumps, and are appropriate when pumping flammable oil. However, many internal standards call for using API pumps more broadly, even for pumping cooling water and condensate.
- Standards call for nickel alloy when 316L SS is appropriate, or tantalum when titanium is appropriate

Customization:

- Proprietary specs that require customized equipment, which can cost 5 - 10x 'off the shelf' equipment, with unclear benefit.

Lack of Consistent Standards Quality:

- Out of date references to industry standards driving unnecessary customization and rework
- Lack of clarity in deviations from referenced industry standards, creating extra engineering time on each project
- Unclear acceptance criteria: “the execution of application programs in such a manner as to avoid interfering with the basic cycle time of any application”
- Unclear origin and rationale for requirements,

Standards Optimization

- Background

“if we can use an international standard with minimum change we will”

“We don’t want to write our own standards”

“If we can reduce our standard from 100 pages to 10 we will”

Other majors are controlling costs by limiting valve selection, typically one valve per category per size (except for small bore valves). The cost implications for this are suggested to be considerable

Life cycle costs can be reduced by as much as 20% as there is less inventory to carry with spares being able to be bought in “Bulk”

Valves continue to fail costing \$000’s if not \$000,000’s to correct when plant has to be stopped even though the correct procedures for selection have been followed

Standards Optimization

- *Approach*

Optimization of internal - Valves Standard (valve selection)

- High level review at both technical and editorial perspective, and in comparison to formal standards
- Identify areas for improvement to define the use and presentation of the document as well as how others in the peer group approach valve selection
- Final report of recommendations

Standards Optimization

- Potential Benefits

For a typical small plant with relatively simple processing unit, costs for 4000 valves is estimated to be \$9.5 million

For a major operator with annual capital expenditure of \$2.45 billion and assuming that 7% of onshore spend and 4% of offshore spend is on valves that would give a total of \$133.5 million per year or \$667.8 million over 5 years.

The research suggests if overpaying on valves by 10-50% is correct, “Oil & Gas Major” are paying \$33.4 million per year more than they need to (\$166.9 million over 5 years) assuming an average 25% uplift

That is just the procurement saving not accounting the knock on benefits of low stocks, warehousing etc. There would be additional savings on terminals, well sites/gathering networks and downstream/petrochem plants.

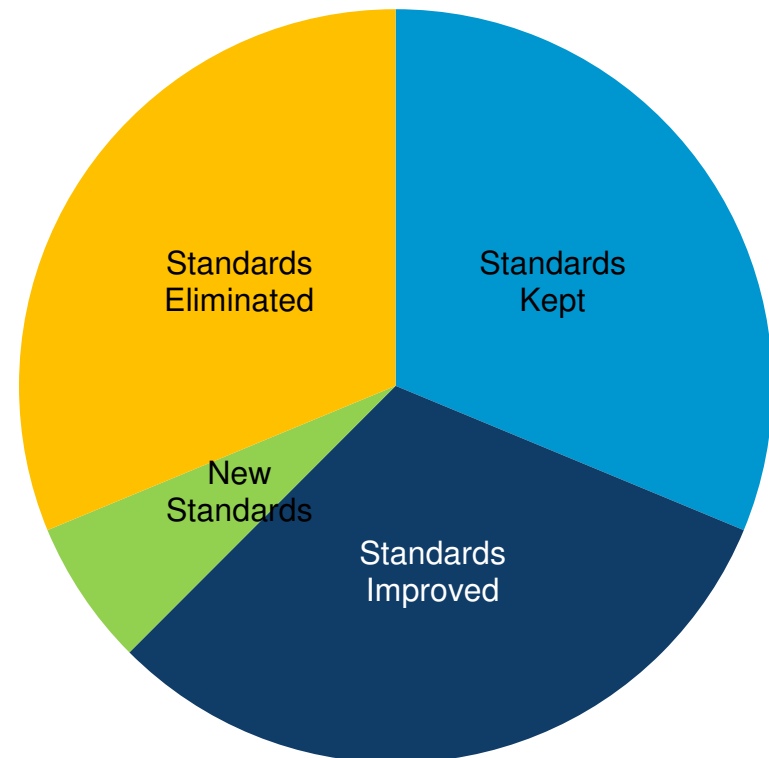
Imperative: Every Operator Needs to Do 2 Things

#1: Focus on driving cost out of your own internal standards

- a) Put governance and process controls in place to ensure standards decisions are made in a business context
- b) Prioritize standards that are impacting cost
- c) Drive to industry standards where possible

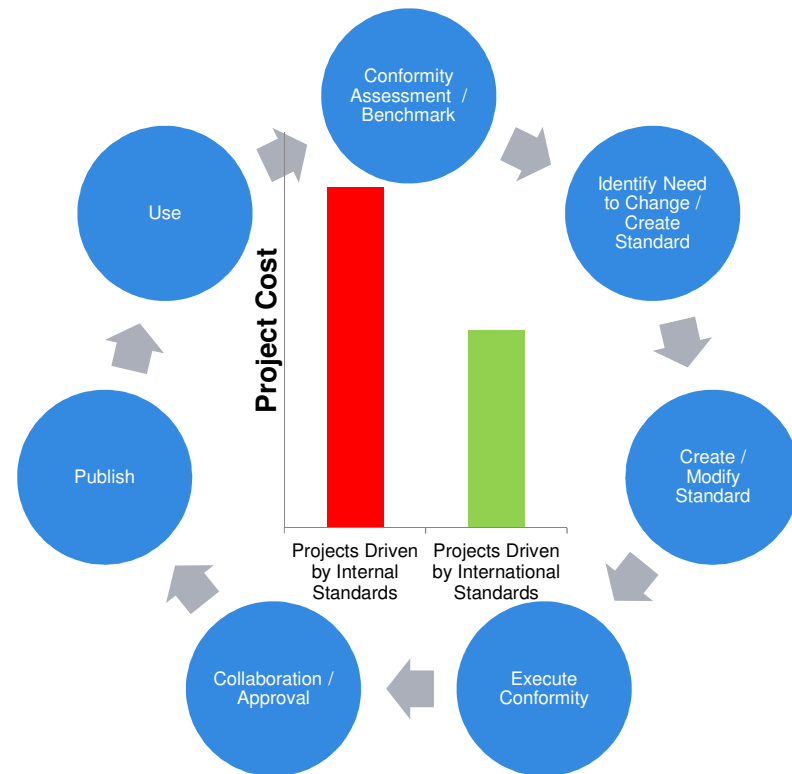
#2: Improve industry collaboration on standardization, in areas of significant industry spend, where industry standards are unavailable, conflicting or don't go far enough.

Internal Standards Potential Outcome to Improve Cost



IHS Offers Complete Solution for Internal Standards Optimization

- 1. Gap analysis** – prioritize internal standards by impact on business / financials
- 2. Conformity assessment** – identify unnecessary cost drivers, engineer them out of the standard, drive towards industry standard adoption
- 3. Turnkey management of internal standards** – hosting, publishing, updates, cross-reference with international standards
- 4. Improve visibility, usage and compliance** with internal standards



IEC Standards Usage - APAC Oil & Gas Operators

Reviewed usage of IEC standards by key APAC based Oil & Gas Operators.

- On average 460 unique IEC standards were accessed by individual Oil & Gas operators over the last 12 months
- The top 7 IEC standards used during the last 12 months were:

IEC 61511-1 02/01/2016

Functional safety – Safety instrumented systems for the process industry sector – Part 1: Framework, definitions, system, hardware and application programming requirements - Edition 2.0

IEC 61511-2 07/01/2003

Functional safety – Safety instrumented systems for the process industry sector – Part 2: Guidelines for the application of IEC 61511-1 - Edition 1.0

IEC 61511-3 03/01/2003

Functional safety – Safety instrumented systems for the process industry sector – Part 3: Guidance for the determination of the required safety integrity levels - Edition 1.0; Incorporates Corrigendum 1: 10/2004



IEC Standards Usage - APAC Oil & Gas Operators

Top standards continued;

IEC 60079-0 06/01/2011

Explosive atmospheres – Part 0: Equipment – General requirements - Edition 6.0; Incorporates Corrigendum 1: 11/2012 and Corrigendum 2: 12/2013; Includes Interpretation 1: 11/2013 and Interpretation 2: 10/2014

IEC 60079-14 01/01/2016

Explosive atmospheres – Part 14: Electrical installations design, selection and erection - Edition 5.0 CORR 1

IEC 60079-17 11/01/2013

Explosive atmospheres - Part 17: Electrical installations inspection and maintenance - Edition 5.0

IEC 60534-4 06/01/2006

Industrial-Process Control Valves - Part 4: Inspection and Routine Testing - Edition 3.0



Thank You!