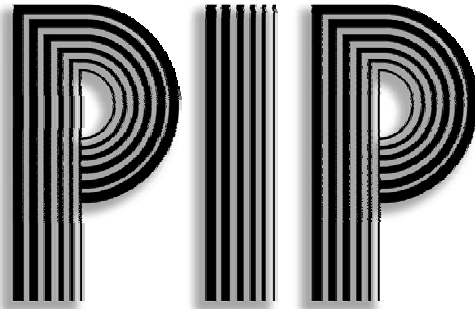


AN OVERVIEW OF THE PROCESS INDUSTRY PRACTICES CONSORTIUM*

PIP - A Way to Achieve Significant Savings
On Capital Projects & Maintenance Related Work,
Reduce the Costs for Maintaining Internal Company Standards,
& Improve Knowledge Management Strategies



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PURPOSE

Process Industry Practices (PIP) is a self-funded consortium of process industry companies that share the goal of reducing process plant costs by up to 6% through the development and implementation of common industry practices for projects and maintenance work. Related industries such as power, pulp & paper, and pharmaceuticals will also find the PIP harmonization process and published Practices to be of value in their industries. PIP operates under the umbrella of the Construction Industry Institute, a recognized research unit within the University of Texas at Austin.

This Overview:

- highlights the background and goals of PIP.
- explains the value of PIP.
- introduces PIP to industry owner and contractor companies.
- demonstrates both the practical and financial benefits of PIP.
- explains options for participating in PIP and for accessing the Practices.

SUMMARY

KEY POINTS

Adoption and use of PIP Practices:

- lowers the cost of capital projects and maintenance work with no loss of value.
- compresses schedules by reducing time to develop and employ standards to execute projects and to maintain facilities.
- helps leverage limited technical resources.
- reduces the costs for maintaining internal company standards.

POTENTIAL SAVINGS

PIP members are finding that as widespread adoption of PIP Practices is achieved, significant savings are realized in capital and maintenance projects and in reduced costs for maintaining internal company standards.

BACKGROUND

Plants are built and maintained to the specifications of an array of requirements that are found in numerous technical standards intended to cover all design and equipment requirements. PIP contends that the use of unique internal standards by each company significantly increases the total installed cost (TIC) because variation forces vendors and contractors to design, build, and maintain plants to custom requirements.

In 1992, an industry task group analyzed the internal standards from several companies for typical process control equipment to determine the extent of similarities and differences. The group concluded that an extensive amount of common requirements and consistently minor, inconsequential variation existed in the standards. This discovery ultimately led to the establishment of PIP.

DEFINITIONS

Terms frequently used in the industry, e.g. project standards, are not necessarily based on standard definitions. **Figure 1** lists the definitions used in this Overview.

Society Standards	Published standards from an accredited standards developer. Common examples are API, ACI, ISA, IEEE, NFPA, ASTM, & ASME.
Internal (Owner/ Contractor) Standards/Specifications	Detailed technical requirements for design, procurement, construction, and related maintenance based on the company's experience in the respective engineering disciplines. These specifications are necessarily more detailed than Society Standards, and usually cite an array of Society Standards as a design basis for the specification.
Project-Specific or Site Standards	General project or maintenance standards for common materials and equipment adopted by owners and/or contractors from their own standards.

Figure 1. Definitions Used in This Overview

PROJECT STANDARDS

Most plants are built and maintained to the best standards available to the respective project managers, and design and maintenance engineers. Every facility represents an exceptional degree of engineering optimization and customization, yet most are highly varied in details addressed in design, equipment fabrication, construction, operations, and maintenance. Inconsistent design and construction impact production, profit, and rate of return for the operating investment (plant). Cost, schedule, productivity, and reliability may also be affected. The cost of variation is recurring and yet avoidable.

COST IMPACT

Many executives have been frustrated that their projects are not based on common industry practices. In reality, common practices *did not exist – and PIP is working to change this*. The industry needs a common “sheet of music” -- project standards with harmonized technical details *without differences that provide neither competitive advantage nor benefit to users*. Eliminating needless variation will save the industry money, freeing resources to focus on opportunities that do provide competitive advantage and other benefits.

PIP GOAL

MISSION

PIP’s mission is to increase the value of the Engineering-Procurement-Construction (EPC) process and enhance achievement of safety, health, and environmental objectives. The increase in value will be accomplished through ensuring the availability of common practices for the detailed design, procurement, construction, operation, and maintenance of process facilities. Achieving this mission will eliminate needless variation and thereby simplify routine project and maintenance work processes. PIP relies on commonality, a new systematic application, different from numerous ad hoc company efforts to create minimum standards to reduce customized design, confusion, and rework.

VISION

PIP's vision is to deliver substantial reduction in TIC and maintenance costs by voluntary adoption and use of common practices for detailed design, procurement, construction, and maintenance of process facilities. PIP Practices would be implemented essentially "as is" among owner and contractor companies.

ELIMINATING VARIATION

Most business managers are well aware of the cost savings that result from standardizing work processes, tools, parts, and materials. Use of a consistent method promotes continuous improvement. Lack of a consistent method leads to random results. PIP provides consistency for the EPC process.

VALUE

ESTIMATED INTERNAL SAVINGS

PIP Member Companies report that they conserve technical resources by reducing maintenance of internal company and project-specific standards. Consider one analysis:

A formal benchmark study conducted among several large chemical companies in the late 1990s concluded that the average annual cost to develop and maintain internal company specifications was in the range of 0.02-0.04% of sales. For a company with \$10 billion annual sales, this results in annual internal standards expenditures of \$2-4 million.

PIP does not claim to eliminate the need for internal company and project-specific standards. PIP does assert, however, that shared maintenance of a set of common industry practices requires much less company time. PIP members have reported that 1/3 of the internal costs for developing and maintaining internal standards have been eliminated. Further, the technical resources can be used on performing higher value work, reducing costs, and generating more revenue. The PIP harmonization process can be a key adjunct to "knowledge management strategies," especially with the loss of technical resources in the industry.

Recent Member Company reported successes include:

- valve inventories reduced by 40%.
- estimated savings up to 1.6% of TIC and 2 weeks on schedules through use of Piping Practices.
- \$250,000 per year savings on annual maintenance of internal standards.

ESTIMATED VALUE ON PROJECTS

A PIP workshop involving owners, engineering contractors, constructors, and vendors analyzed a large completed project. The published result, *Measuring the Value*, is available at pip.org. The findings indicate that the ultimate potential TIC savings could be greater than 6%.

PIP STRUCTURE, PROCESS, AND STATUS

ORGANIZATION

PIP's membership target includes owner companies and EPC contractors. The current list of Member Companies is available at pip.org/membercos/index.html. More than 300 volunteers from Member Companies participate in the harmonization, development, and maintenance of PIP Practices. PIP employs a Director and a small staff who are all employees of The University of Texas at Austin.

A Steering Team, comprised of a senior engineering management representative from each Member Company, guides PIP as its governing body.

PIP has eight active Function Teams harmonizing Practices in the following engineering disciplines:

- **Civil, Structural, Architectural**
- **Coatings, Insulation, Refractory**
- **Electrical**
- **Machinery**
- **P&ID**
- **Piping**
- **Process Control**
- **Vessel (including heat exchangers and tanks)**

In many cases, the Function Teams organize and work through Task Teams to draft and revise individual Practices.

In addition to the Steering Team and the Function Teams, additional standing committees established by and reporting to the Steering Team include the Legal, Marketing, Work Processes, Strategic Planning, and Globalization committees and teams.

PRACTICE FRAMEWORK

PIP Practices are similar in nature, scope, and content to the internal standards that most large process industry companies maintain. PIP harmonizes the Member Companies' detailed, non-proprietary technical requirements into Practices. *PIP is not a standards developer*. There is little overlap between PIP Practices and traditional industry Society Standards. Like company standards, many Practices reference existing industry Society Standards. Figure 2 illustrates how PIP Practices relate to Society Standards and replace internal company standards.

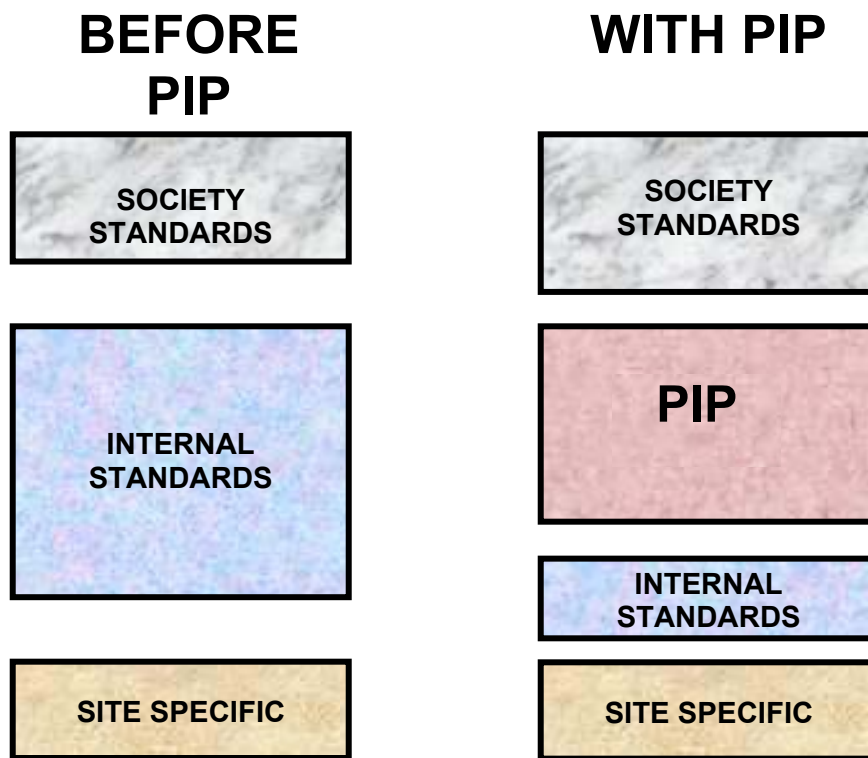


Figure 2. Conceptual Illustration of Implementing PIP

PRACTICES STATUS AND AVAILABILITY

As of January 2005, more than 480 Practices have been published. Approximately 90 additional Practices are under development.

The PIP website (pip.org) provides access to electronic versions of Practices for Member Companies, Subscribers, and Licensees. Interested parties are invited to visit the website for general PIP information and for abstracts/lists of available published Practices in each discipline.

SAMPLE PRACTICES

PIP has made sample Practices available in each engineering discipline area. These can be accessed and downloaded as .pdf files from each discipline webpage.

IMPLEMENTATION

RETAINING COMPETITIVE ADVANTAGE

PIP expects to eliminate unnecessary variation while allowing members to retain competitive advantage and proprietary knowledge. PIP Practices augment internal standards and allow companies to use to the greatest advantage their “operating and maintenance experience” acquired at significant cost over the years. Internal standards then become a more valuable, more concise intellectual asset. In this way, waste is eliminated while competition is not compromised.

UNDERSTANDING THE VALUE OF PIP

In many business applications, there is tension between those who believe in customizing practices and those who believe in standardizing practices. Today, companies more clearly recognize the benefits that result from systematic standardization. PIP shares this vision. Since savings come from efficiency and economy of scale, adopting PIP Practices with addenda (amendments, exceptions, additions), no matter how well intended, counteracts the benefits of standardization. Practices are designed to be used essentially “as is” and the greatest advantage comes from implementing Practices “as is.”

CHALLENGES

Achieving benefits requires that each company acknowledges and overcomes several challenges. The PIP Implementation Task Team has identified potential obstacles to adopting the Practices and barriers to implementation. Overcoming the obstacles to adoption and implementation of PIP Practices requires strategy, communication, and action. Most companies have the technical and management skills needed to meet these challenges. However, a clear understanding of the value of standardization versus customization is needed. PIP strives to expand awareness and promote acceptance of the Practices.