

The Hot-Tap & In-Service Welding Solution Buyers' Guide

Table of Contents

How to Use This Guide

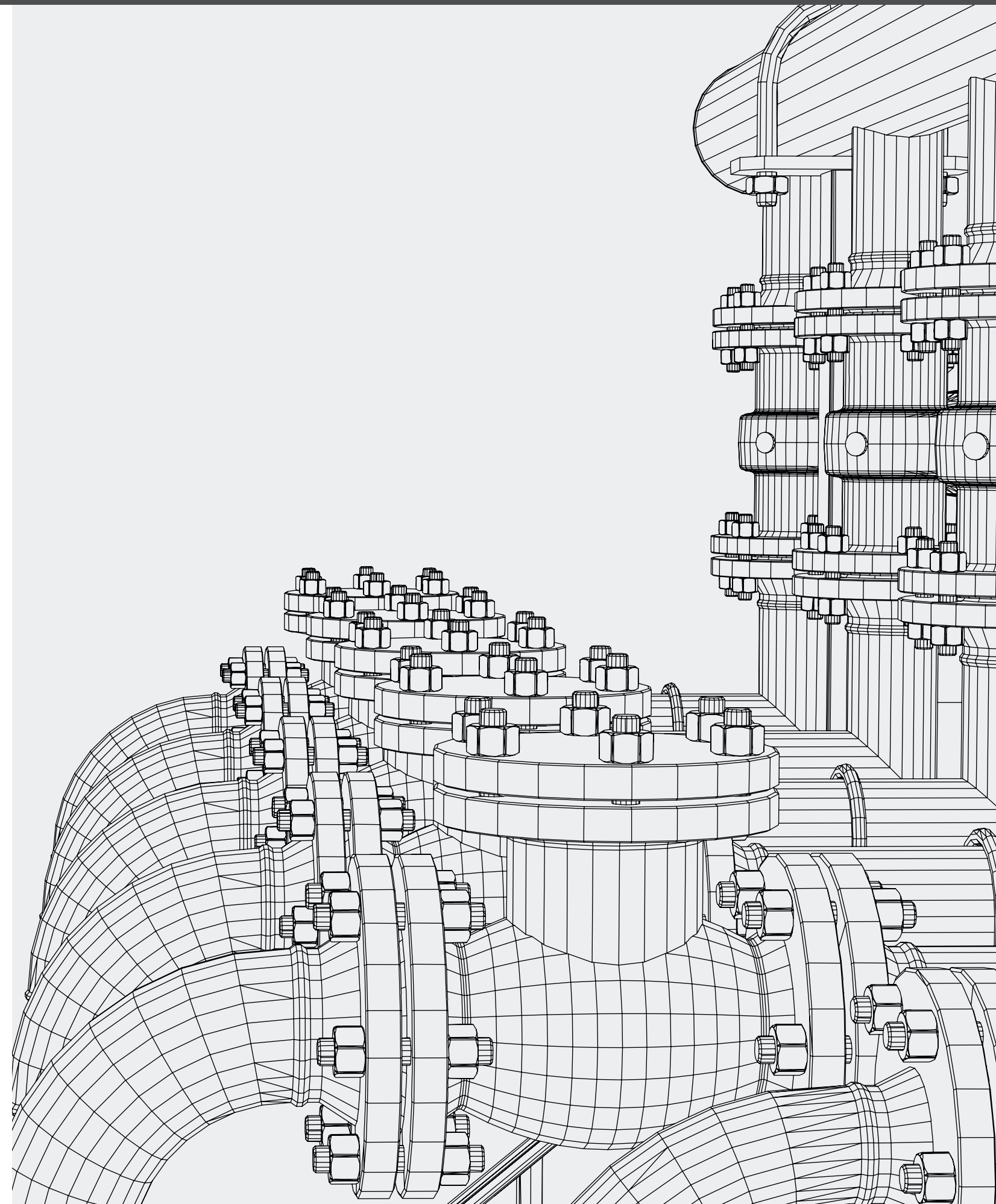
Critical Factors of Hot-Tap and
In-service Welding

In-service Welding Tools for Engineers

The PRCI Hot-Tap Toolbox

Conclusions

Next Steps



How to Use This Guide

Pipeline engineers use Hot-Tap or In-service welding to connect and divert live oil and gas pipes without costly shutdowns. It is an essential but technically demanding procedure that facilitates productivity, competitive growth, and long-term pipeline network integrity.

Midstream Oil and Gas offers big rewards in response to tough competitive choices. It also poses significant risks in the form of liabilities for accidents and severe fines. The Hot-Tap and In-Service Welding Solution Buyers Guide is a resource for senior engineers and executives responsible for choosing the right software solutions for pipeline engineering teams.

The guide's goal is to inform decision-makers about software capabilities to plan and manage Hot-Tap welding operations safely and efficiently. It assumes an insider's understanding of the midstream oil and gas sector. The guide discusses why Hot-Tap is worth the effort and how engineers mitigate the associated risks.

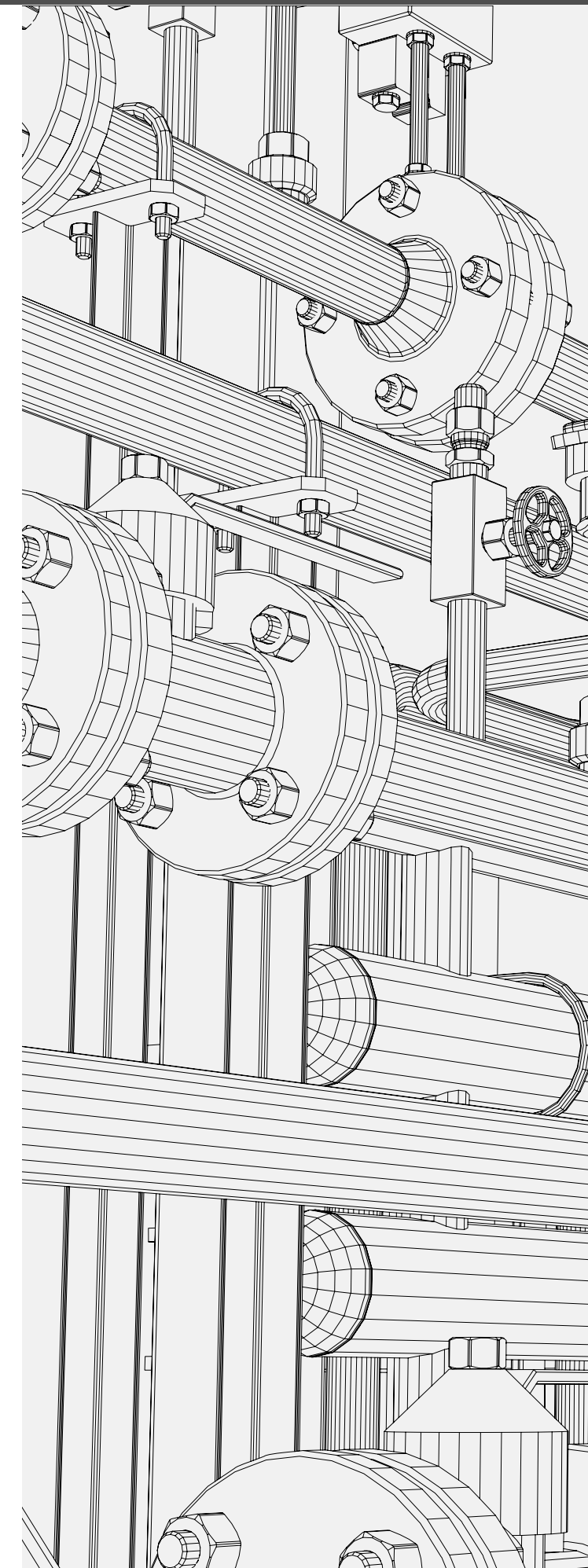
“The guide discusses why Hot-Tap is worth the effort and how engineers mitigate the associated risks.”

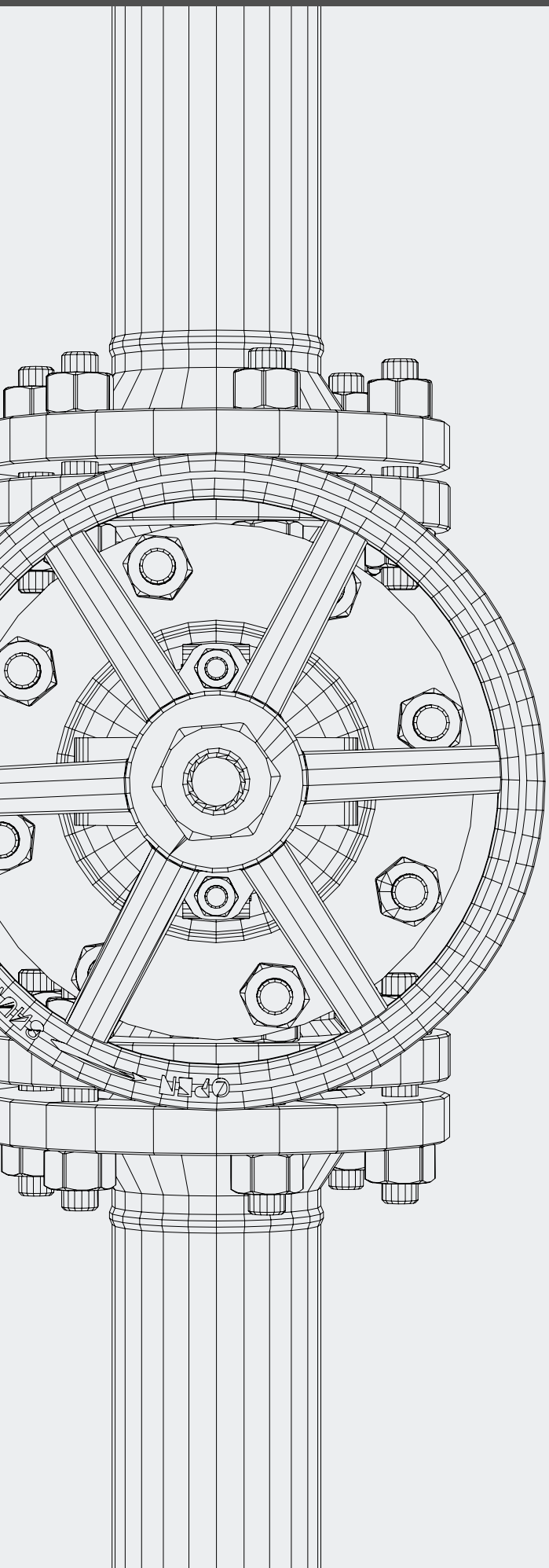


Critical Factors of Hot-Tap and In-Service Welding

Operators employ Hot-Tap to minimize the loss of revenue due to unnecessary shutdowns during pipeline repairs. With accurate calculations, welding can be done routinely on steel pipelines while the product flows within. Welding secures or seals components by creating a pool of molten metal at the seam, which also impacts pipe material adjacent to the weld, collectively known as the Heat-affected Zone. Once this melt-zone cools and solidifies, it fuses the pieces securely, but this may also pose an integrity risk later in the life of the pipe.

Safety is vital to the success of every operation, particularly when welding pipes full of combustible fluids. However, the industry is more competitive than ever, and welding engineers seek to balance the risk against the cost of lost revenue. To that end, Hot-Tap is an excellent tool to work on pipelines with minimum loss of product flow, as long as you do it safely.





The nature of welding onto an operating pipeline makes it susceptible to failure in two ways: Burn-through and Hydrogen Cracking. Both of which you can prevent with careful analysis. Your engineering calculations must include inputs for welding electrode choice, the welding heat input, pipeline operating conditions to avoid either type of defect.

The more slowly you weld, the more heat you put into the material by the welding arc. So the ideal welding parameters and the steel base material's heat conductivity and chemical composition are essential variables. In planning to Hot-Tap a pipeline, the model based on all of these inputs gives you a go/no-go from which you can proceed with the project or the insights to refine your parameters.

“... the ideal welding parameters and the steel base material's heat conductivity and chemical composition are essential variables.”



In-Service Welding Tools for Engineers

Any solution for Hot-Tap calculation and analysis must account for factors in the following four dimensions:

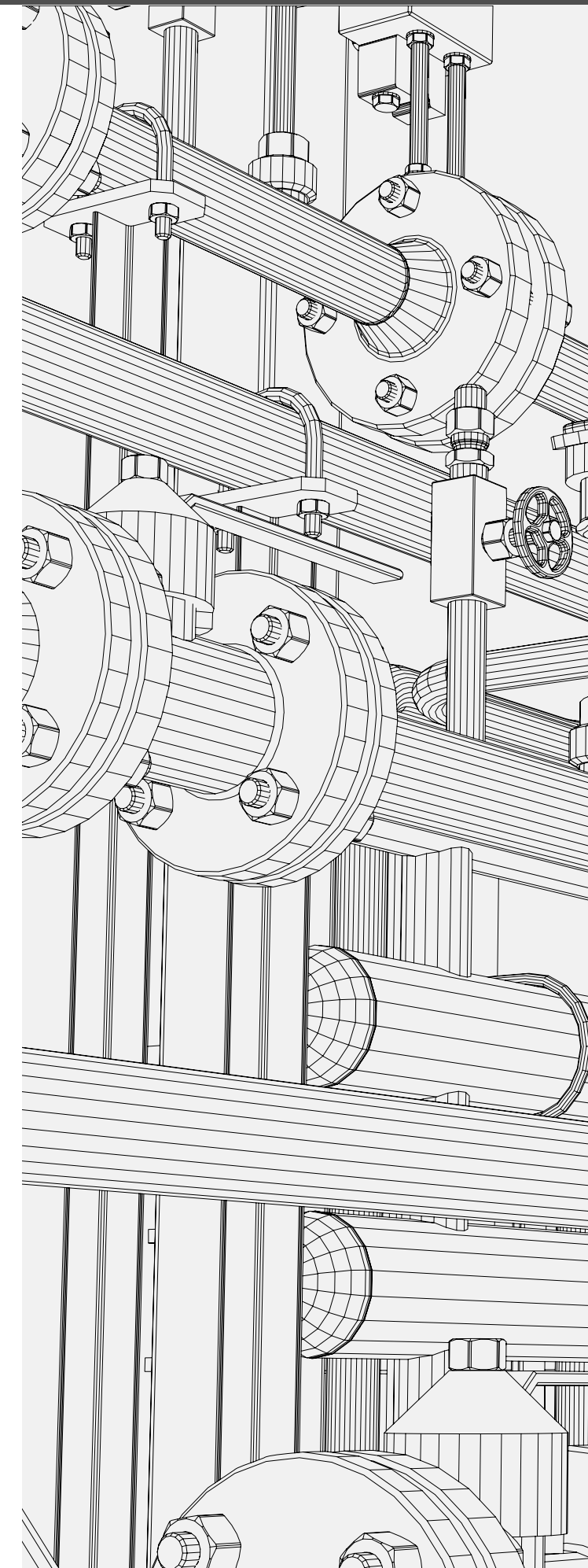
- Operational Safety
- Industry Standards
- Cost Controls
- Data-driven Modelling

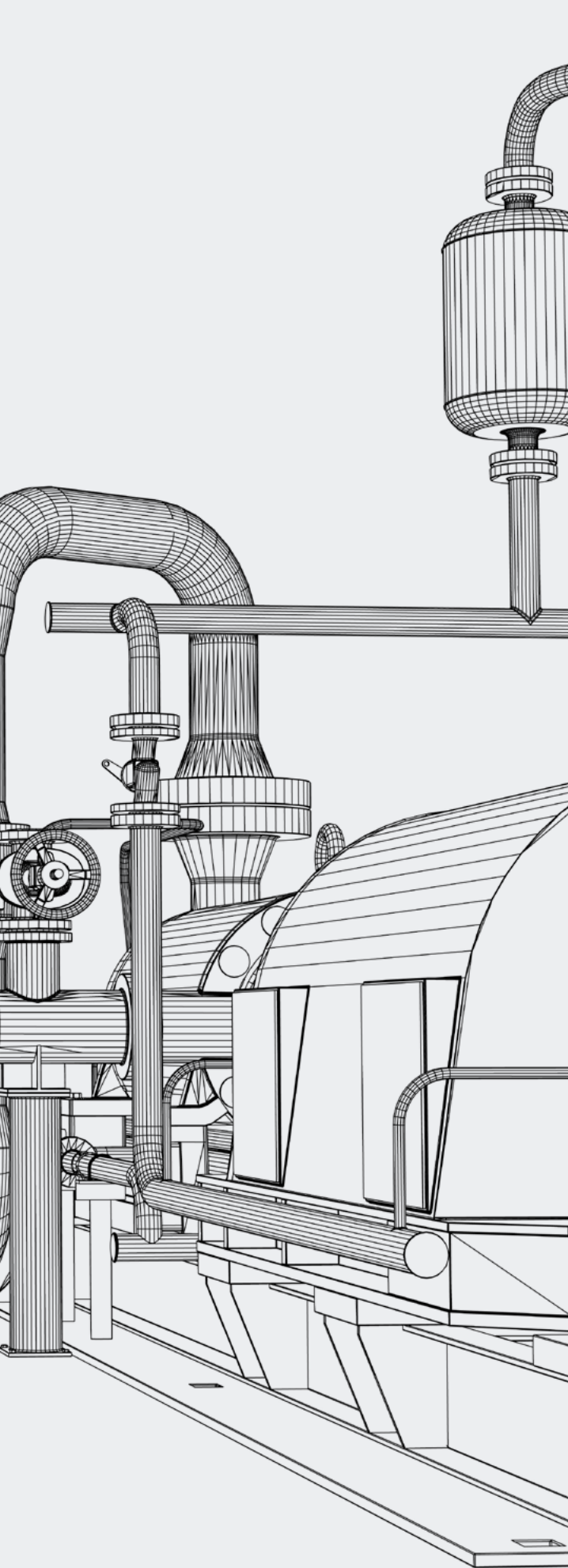
Operational Safety

The welding crew, the integrity of the pipeline, the local community, and the environment all warrant protection during any pipeline repair activity. Safety in Hot-Tap welding depends on removing heat from the pipe wall to ensure the welders do not penetrate the pipe wall with the welding arc. At the same time, they must ensure the integrity of the completed repair by depositing the weld without hydrogen cracks. Doing Hot-Tap welding properly in the first instance limits future risks in the Heat Affected Zones. Software solutions offer the most value by ensuring the operation stays within safety limits to prevent Burn-through and Hydrogen Cracking.

Industry Standards

The fundamental importance of safety in pipeline welding the standards are explicit and laid out with precision in a host of rules and guidelines. Software solutions must support compliance with API 1104, API 1107, ASME Section IX, BS4515, BS6990, and CSA Z662.





Cost Controls for OpEx and CapEx

Software solutions must balance risk against the operational and capital expenses throughout the pipeline lifecycle. When performed safely, the cost of Hot-Tapping compares favorably against the alternative, which would interrupt product-flow during a repair or branch connecting operation.

Data-driven Modelling

Today's software models give engineers the ability to produce exceptional data-driven outcomes. The ability to update the Thermal Analysis model with real-world data gives engineers and welders better control to balance risk, cost, and industry standards.

Additionally, a data-driven approach offers the potential to store and exchange data as part of a broader pipeline engineering Integrated Data Environment. A data-driven methodology produces more consistent implementation of best practices and knowledge retention within the organization. As part of an Integrated Data Environment, data modeling for Hot-Tap and In-service welding provides superior risk management, cost controls, and standards compliance.

"Today's software models give engineers the ability to produce exceptional data-driven outcomes."

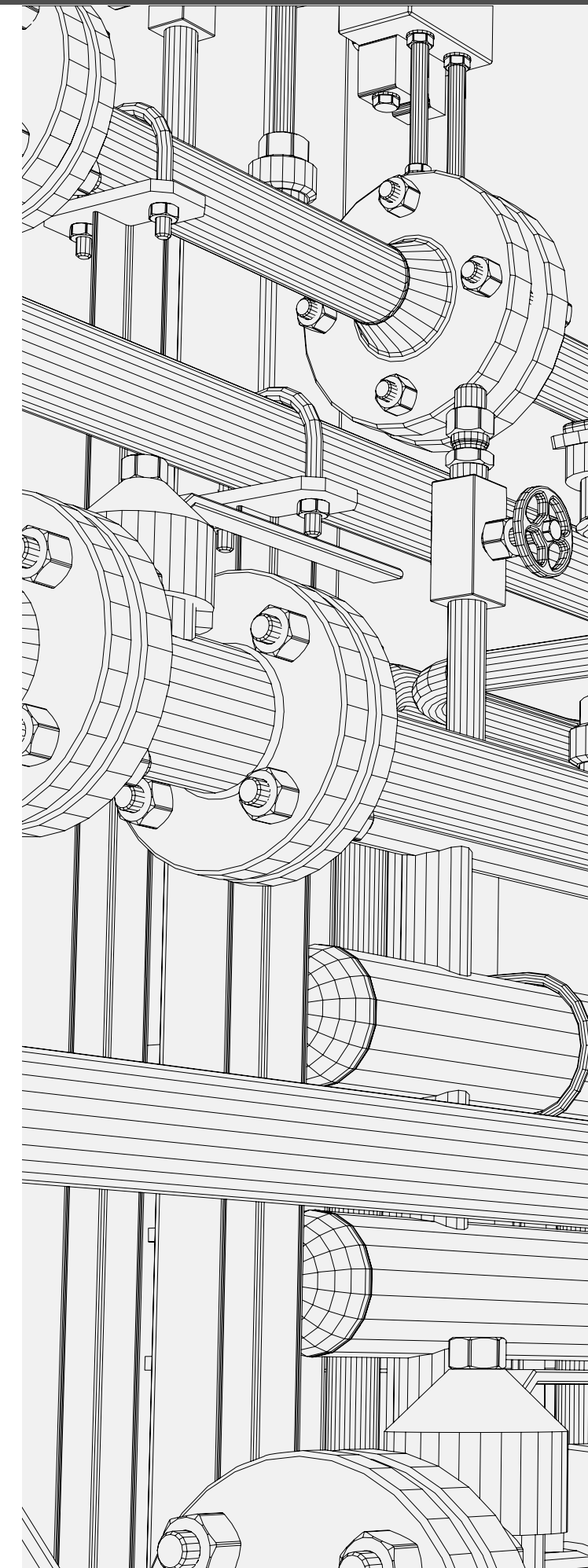


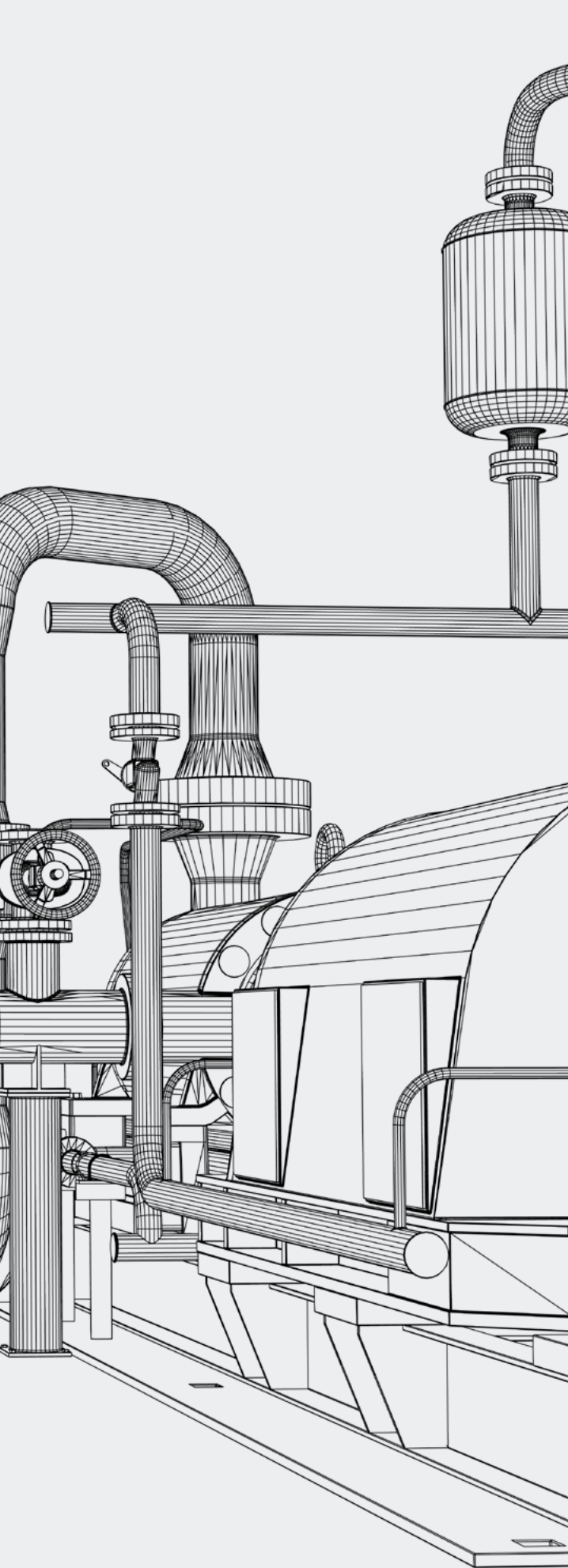
The PRCI Hot-Tap Toolbox

PRCI Hot Tap Toolbox (HTTB) is short for the PRCI Thermal Analysis Model for Hot Tap Welding software. PRCI developed HTTB as an engineering tool for welding calculations and thermal analysis that models heat input and predicts cooling rate for a given weld location when tying a new pipe into an existing line while it's in-service. It determines how much heat input goes into a pipe's mass while liquid or gas flows through it under pressure and supports the development and/or selection of in-service welding procedures that reduce the risk of burn-through, hydrogen cracking, and other adverse outcomes.

The software improves welder safety and integrity of the heat-affected zone. Welder safety is a key consideration since there is a risk of the welding arc causing the pipe wall to be penetrated allowing the contents to escape. Additionally, the integrity of the pipeline following the weld, since welds made in-service cool at an accelerated rate due to flowing contents removing heat from the pipe wall.

The calculations and analyses produced by HTTB minimize the time and risk associated with tying into an existing pipeline as you do the work while the product is still flowing. The software models and analyzes parameters such as the amount of heat input and determines the safe maximum. It allows you to tie into the pipe quickly and divert the flow while repairing it or connecting a new branched section of the pipeline network.





How HTTPB addresses Hot-Tap challenges:

Reducing in-service welding-related risk

HTTPB improves safety charts so your engineers and welders can avoid issues that cause blowouts and hydrogen cracks.

Promoting company-wide Standard Operating Procedures

HTTPB is the industry standard backed by PRCI designed as a Pipeline Engineering solution for whole organizations. It gives you confidence that, if audited, you will have the proper support to ensure that you are making a safe weld. It provides checks to qualify your welding procedures in compliance with API 1104, API 1107, ASME Section IX, BS4515, BS6990, and CSA Z662.

Maximizing Pipeline Integrity and longer Pipeline Lifecycles

With HTTPB, you minimize the risk of hydrogen cracking during in-service welding, which increases the service life of your pipes. So you can reduce future pipeline maintenance OpEx and CapEx while you maximize future revenues and enhance asset value.

Exploiting the potential within the data

HTTPB integrates real-world Hot Tapping scenarios to model cooling rates more accurately. You retain information beyond the careers of individual employees and share it consistently across your organization.

“With HTTPB, you minimize the risk of hydrogen cracking during in-service welding, which increases the service life of your pipes.”

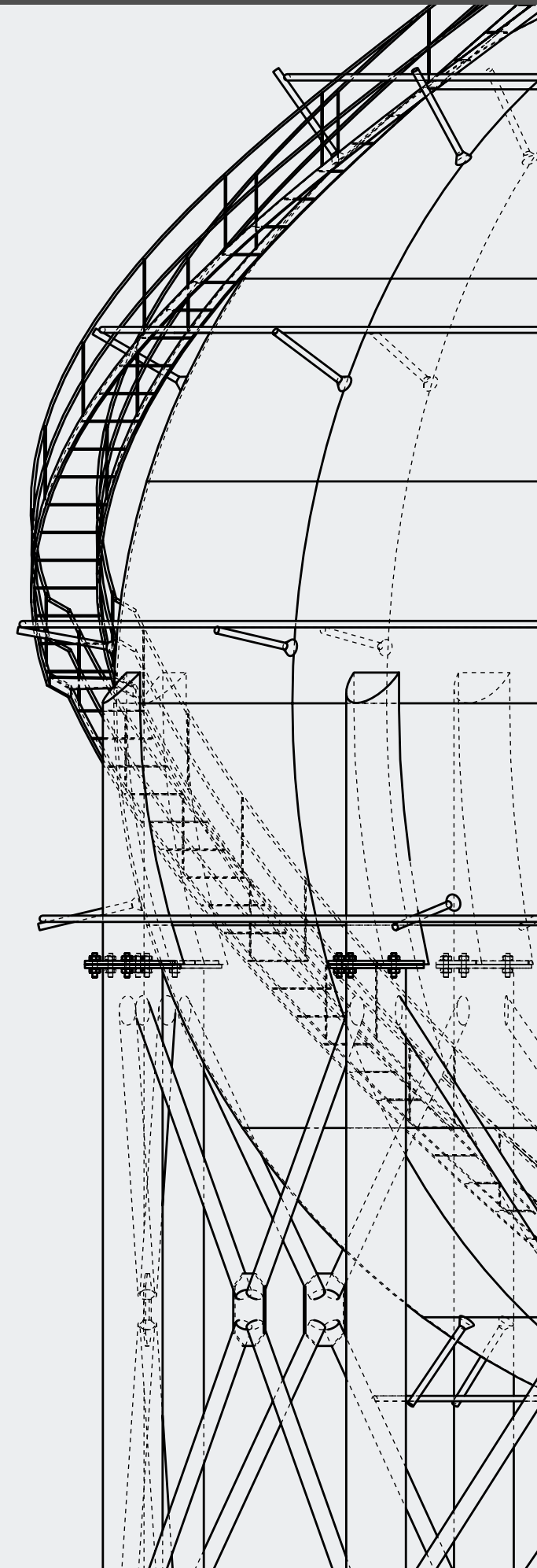


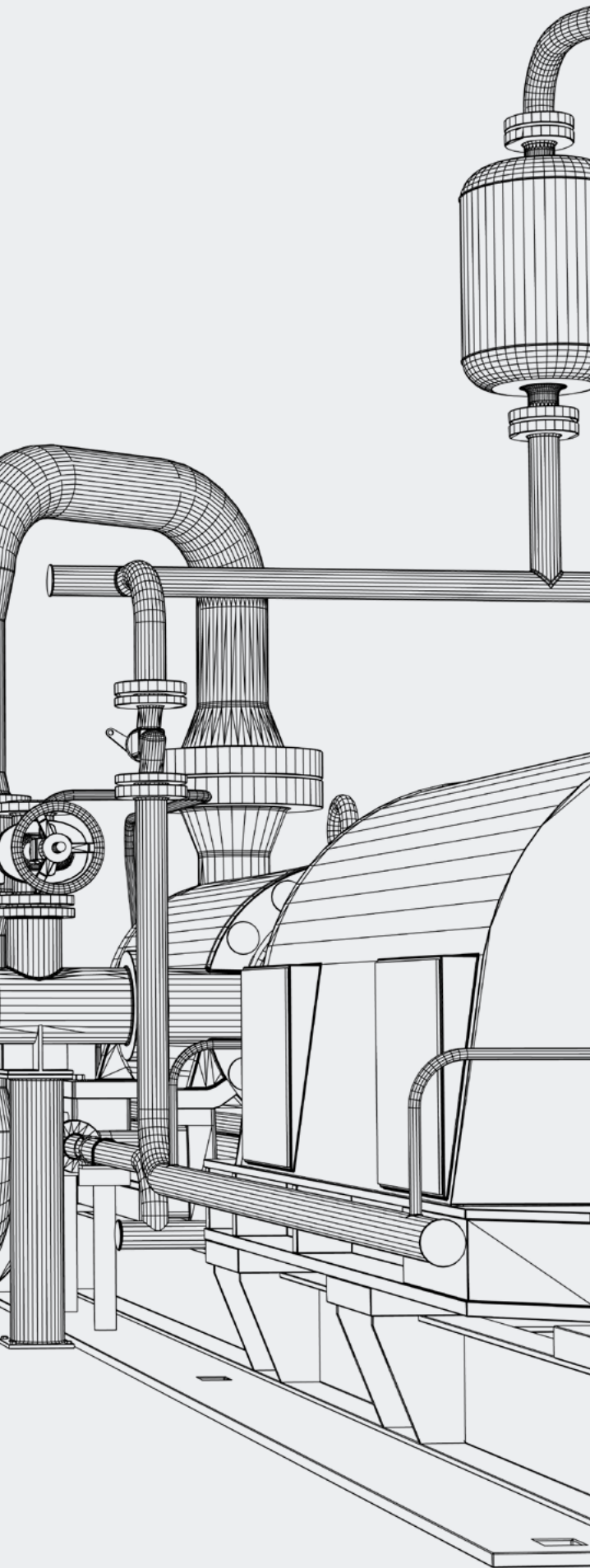
“[HTTB] provides safe parameters and charts for engineers and welders tasked with welding onto in-service pipelines.”

The Origins of HTTP

PRCI's mission is always to benefit the industry. Along with bodies such as API, PRCI sets the industry's standards and practices. It creates software products like Hot-Tap Toolbox on behalf of the industry, for the good of the industry. The organization has invested many years of research into solutions for pipeline engineers.

PRCI developed HTTP as a Thermal Analysis solution that supports risk reduction and safety in the Heat-affected Zone. HTTP is the standard in the industry for Hot-Tap. It was developed from the Edison Welding Institute model for Thermal Analysis for Hot-Tap Welding. It provides safe parameters and charts for engineers and welders tasked with welding onto in-service pipelines.





Conclusions

The PRCI Hot-Tap Toolbox ensures a reliable cooling rate and predictive model for the engineer and welder. Ultimately, HTTPB reduces risk, accelerates project schedules, and reduces long term costs of valuable pipeline assets. Technical Toolboxes provides the technical support for HTTPB, the onboarding resources, and industry training resources through various In-Service Welding Subject Matter Experts.

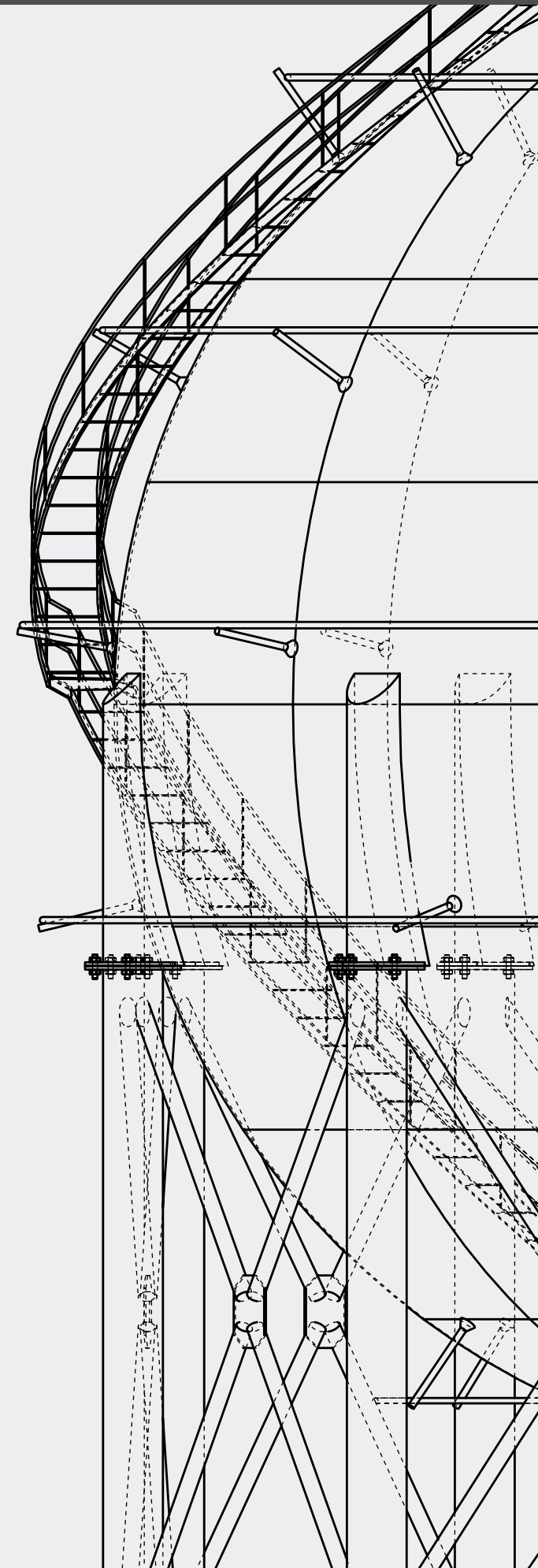
Managing valuable assets, performing routine maintenance, repairs, upgrades using in-service welding techniques is essential for pipeline success. Today, the industry is more competitive than ever, and pipeline engineers must balance the risk against the cost of lost revenue. Pipeline operators minimize income loss due to construction or repair and enhance asset values across their pipeline networks' life cycle with the Thermal Analysis solution delivered by HTTPB.

“Ultimately, HTTPB reduces risk, accelerates project schedules, and reduces long term costs of valuable pipeline assets.”



Next Steps

- Ask us how the solution can help you
- Book a live demonstration to see HTTPB in action
- Check out the Hot-Tap training options available from Technical Toolboxes





Technical Toolboxes
3801 Kirby Drive, Suite 520
Houston, TX 77098

Toll Free: (866) 866-6766
Phone: (713) 630-0505
Fax: (713) 630-0560

info@technicaltoolboxes.com
www.technicaltoolboxes.com

(C) Technical Toolboxes. All rights reserved.



Technical Toolboxes is an Authorized Reseller of PRCI products

PRCI Products:
PRCI AC Mitigation Toolbox
PRCI HDD-TB
PRCI OBS
PRCI RSTRENG
PRCI Thermal Analysis

Technical Toolboxes Products:
Pipeline HUB (HUB^{PL})
AC Mitigation PowerTool
API Inspectors Toolbox
Crossings Workflow
ECDA & Remaining Life
Encroachment PowerTool
HDD PowerTool
Hydrotest PowerTool
Investigative Dig PowerTool
Pipeline Toolbox
RSTRENG+

About Technical Toolboxes

Technical Toolboxes is a leading provider of integrated desktop and cloud-based pipeline software, online resources, and specialized training for pipeline engineering professionals worldwide. We deliver oil and gas industry training courses covering a breadth of topics with industry-recognized instructors. Compare the performance that Technical Toolboxes technology and training can make in pipeline engineering performance and you'll see a measurable difference. Our fit-for-purpose pipeline engineering software platform will help you reduce risk, lower the total cost of operations, and accelerate project schedules. Hundreds of companies rely on our certified, industry-standard technology to enhance their pipeline engineering performance.