



Enterprise Risk Management

We **Digitally Transform** the whole process: enterprise risk, live barrier health and bowties generated automatically from your PHA / LOPA scenarios and barrier reliability models, built on the test and inspection data you already collect on **every barrier**.



Live Barrier Health



Enterprise Risk Visibility

Single pane of glass on risk across every site, unit and barrier



Hard Savings, Strong ROI

Performance-based MI through **reduced testing**



True Reliability Models

Calculated risk gaps for every barrier, in real time

SCE Barrier MI Program

- ▶ You're **already testing and inspecting** these barriers. aeShield puts that data to work
- ▶ **Every barrier**, not just SIF / IPL instruments: relief valves, rupture discs, restriction orifices, check valves, corrosion monitoring, fire & gas
- ▶ Move from **prescriptive** to **performance-based** Mechanical Integrity
- ▶ Credit **demands as proof tests** and optimize test intervals
- ▶ Stop over-testing good actors; focus on the **bad actors**
- ▶ Deliver **hard savings** with a strong, fast ROI

Understand Your Risk

- ▶ One must **understand** their risk before they can **control** it
- ▶ **Functional Safety Index™**: a live enterprise risk score driven by bypassing, late testing, demands and failures
- ▶ Continuously validate **known risks** from the HAZOP / LOPA
- ▶ Expose **previously invisible risks**: excess demands, late tests, failures and bypasses
- ▶ Real-time **leading indicators** on the health of every barrier
- ▶ Know **when your risk has increased** on your risk matrix

Digitally Transform the Whole Process

Enterprise risk, live barrier health and bowties generated automatically from your PHA / LOPA scenarios and barrier reliability models.

TODAY

Five separate tools, five copies of every tag

Tool 1: PHA

PT-101

Tool 2: LOPA

PT-101

Tool 3: Reliability Modeling

PT-101

Tool 4: Requirements Spec

PT-101

Tool 5: Bowties

PT-101

A tag change must be fixed in five places. Cleanup is slow and costly.

WITH aeShield

One tag-based, revision-controlled platform

PHA

LOPA

PT-101 Reliability Models

Requirements Spec

Bowties (auto-generated)

Change a tag once and every PHA, LOPA, model, requirement and bowtie updates.

Bowties, Generated Automatically

1

From Your Scenarios

Built from your PHA / LOPA scenarios, no redrawing

2

Tag-Linked Barriers

Each barrier linked to its tag and reliability model

3

Live Barrier Health

Updated automatically from live field data

4

Degraded vs. Risk Gap

Tells a degraded barrier from a true risk gap

Build Fast. Never Pay to Type Data Twice.

Expert System & Templates

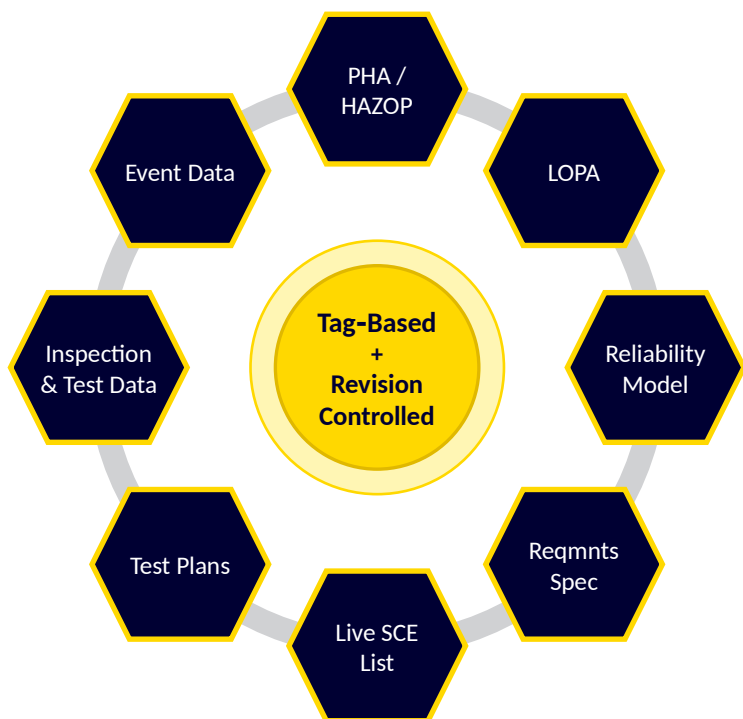
- ▶ Rapidly build out barriers from proven templates
- ▶ Template at the function level or the process equipment level, such as a fired heater or compressor
- ▶ Standardize barriers and best practice across every site

Bulk Data Management

- ▶ Bulk load all data, from day one
- ▶ Bulk edit within the application
- ▶ Bulk export, update externally and re-import
- ▶ Migrate legacy data from spreadsheets and existing tools

Never pay to type data twice again.

Critical Data Contained Within aeShield



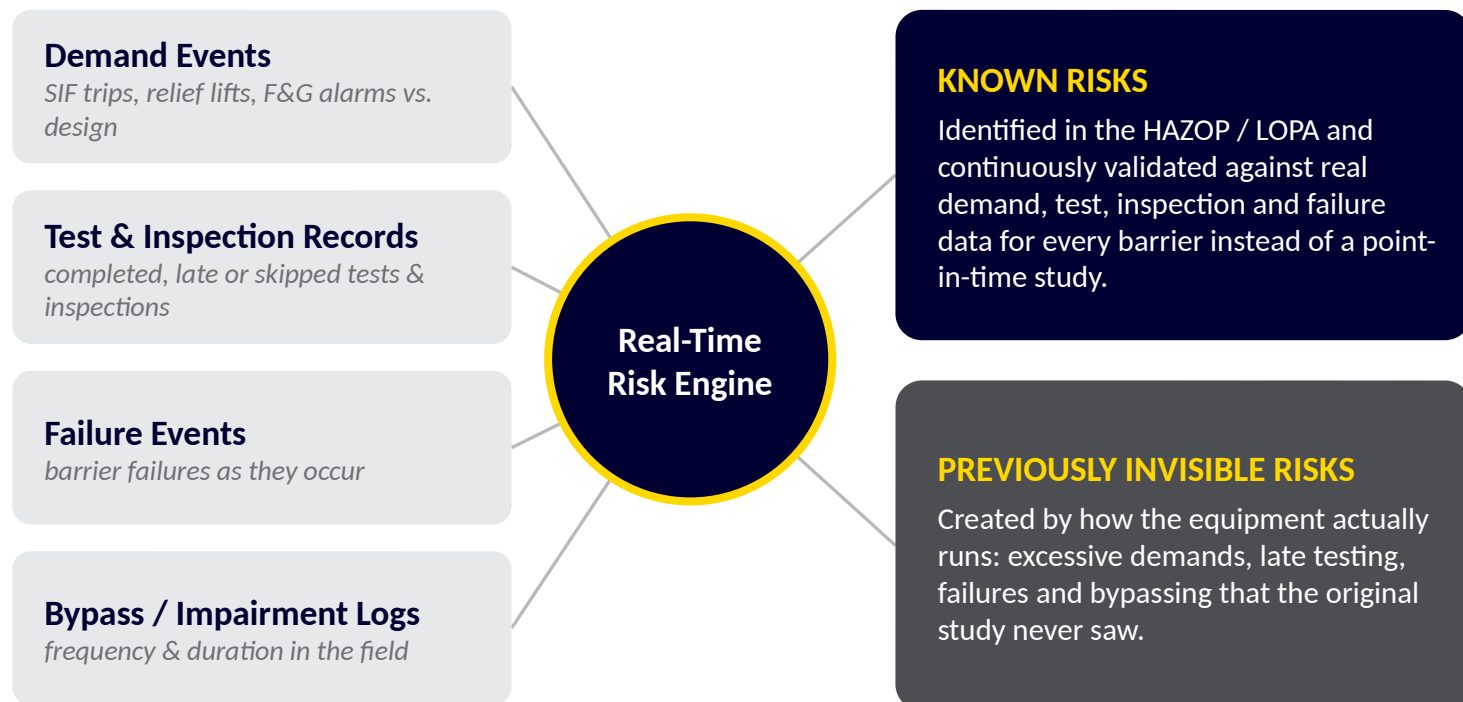
CORE TENETS THAT MAKE IT POSSIBLE

- ▶ **Tag-Based:** every HAZOP scenario, LOPA IPL, test and inspection linked to a unique equipment tag (patented data model)
- ▶ **Revision Controlled:** evergreen single source of truth with workflow, so every risk result is traceable

- ▶ **Every Barrier:** SIFs, relief valves, rupture discs, restriction orifices, check valves, corrosion monitoring, fire & gas
- ▶ **Design Basis:** required performance, demand rates and test / inspection intervals
- ▶ **Field Performance:** demands, failures, impairments, tests and inspections as they occur

Known Risks vs. Previously Invisible Risks

The four live drivers of your FSI™ feed the aeShield Real-Time Risk Engine



Functional Safety Index™ (FSI™)

The **only platform** with a **true reliability model for each and every barrier**. FSI™ aggregates the impact of four live risk drivers to identify when your risk has **increased on your risk matrix**, delivering a truly real-time enterprise risk score and live barrier health.

Display FSI™ in:

Risk Dollars (\$)

or

Risk Units (RU)

1 Bypassing
frequency & duration

2 Late Testing
overdue tests & inspections

3 Demands
actual demand rate vs. design basis

4 Failures
found in test & in service



Configured to your asset / equipment hierarchy and corporate organizational structure

Corporate

Site

Unit

Equipment

True Reliability Models

A degraded barrier is not, by itself, a risk gap. aeShield calculates whether it is.

Current Operating Risk

During this bypass or failure, is the remaining protection adequate?

- ▶ Recalculates the scenario against its approved baseline
- ▶ Accounts for duration, demand likelihood during the window, remaining architecture and other credited IPLs

Demonstrated Performance Over Time

Do accumulated bypass hours, demands and failures change availability or frequency?

- ▶ Updates each barrier's reliability from real field data
- ▶ Separates transient exposure from a persistent loss of reliability

Role-Based Views, Boardroom to Control Room

Every role sees the risk it owns, configured to your corporate organizational structure.

Portfolio

CFO
VP Operations / COO
Exposure, payback and savings

Enterprise

Eng. & Tech Director
Process Safety Manager
Exposure, compliance, governance

Site

Plant Director
Site exposure and capital needs

Unit

Unit Manager
Equipment ranking and KPIs

Equipment

Engineer
Lead Operator
Bad actors, bypasses, demands

From Prescriptive to Performance-Based MI

aeShield digitally transforms your SCE Barrier MI program, using the test and inspection data you already generate to set test intervals and scope by **demonstrated performance**.

Prescriptive MI

- ▶ Fixed calendar intervals for every barrier
- ▶ Same test effort for good and bad actors
- ▶ Test and inspection results filed, not used



Performance-Based MI

- ▶ Intervals set by demonstrated reliability
- ▶ Demands credited as proof tests
- ▶ Effort focused on the bad actors
- ▶ Every change traceable to the approved baseline

How aeShield Delivers the Savings

1 Capture

bulk load existing test, inspection and event data

2 Model

true reliability of every barrier

3 Optimize

test intervals and test scope

4 Realize

hard savings, fully audit-ready

Typical Business Case

20-40%

Test interval extension

5-15%

SCE rationalization

Year 3

Cash-positive payback

14-36%

Lower 12-year testing spend (NPV)

Illustrative ranges from the aeShield Barrier Testing ROI Calculator. A site-specific business case is available on request.

You're already testing these barriers.
The data is free money. aeShield turns it into hard savings.

Software Solutions and Services to Simplify Functional Safety Compliance



We help the Process Industry move from costly flat file project execution to a data centric approach that significantly reduces costs while driving standardization in IEC 61511 compliance.

Why aeShield for Barrier Management

- ▶ **Every MI barrier** guarding against catastrophic loss of containment, not just SIF / IPL instruments
- ▶ **Calculated risk gaps** against your approved, revision-controlled baseline
- ▶ **Live barrier health** and **auto-generated bowties** for every Safety Critical Element (SCE)
- ▶ **Functional Safety Index™**: the only true reliability model for every barrier, rolled into a live enterprise risk score
- ▶ Digital transformation of SCE Barrier MI to a **performance-based** program
- ▶ **Hard savings** and strong ROI from the testing you already perform
- ▶ **One tag-based platform** for PHA, LOPA, reliability models, requirements and bowties

“One must understand their risk before they can control their risk.”

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Contact Us

