



# Operational Excellence Services

Health · Safety · Environment  
(HSE)

**CoreSafety®**

Application for Risk-Based Process Safety

Powered by Brownreverse



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 <https://www.jgc.com/en/business/epc/operation-maintenance/service/>

## Do you have any of these issues?

- Only limited persons know where PHA(\*) data such as HAZID, HAZOP, LOPA(\*\*) is stored
- PHA data is not actively used for optimization of asset management program
- Risk profile of facilities is not shared in organization

(\*)PHA : Process Hazard Analysis

(\*\*) HAZID : Hazard Identification Study  
HAZOP : Hazard and Operability Studies  
LOPA : Layer of Protection Analysis

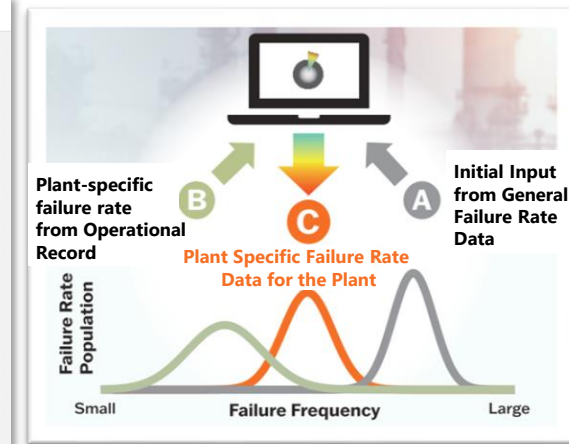
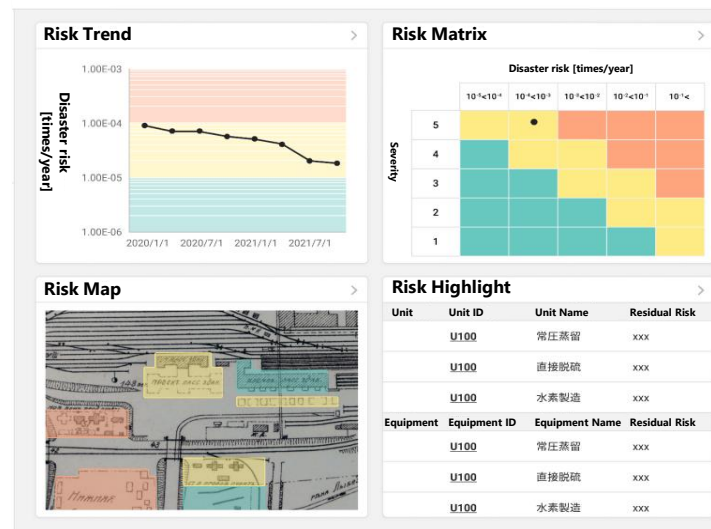
## Functional Features

CoreSafety®, one of JGC in-house application, can summarize and register PHA results to visualize Risk Profile, and easily accessed through a web browser

- Risk Dashboard
- Up-to-date risk by Bayesian Update(\*\*\*)
- Fault Schedule (i.e., hazard register)
- Functional Requirements' management tied with risk scenario
- Safety Performance KPI monitoring

(\*\*\*) A statistical method that updates the probability for a hypothesis as more evidence or information becomes available.

### Risk Dashboard



### Bayesian Update

### Fault Schedule

| Unit             | P&ID           | Equipment Tag | Equipment Name      | Initiating Event Group | Loss of Containment         | Cumulative Initiating Event Frequency [times/year] |
|------------------|----------------|---------------|---------------------|------------------------|-----------------------------|----------------------------------------------------|
| ▶ 041            | 41-PID-PS-1160 | 041-T-1003    | Depropanizer Column | 気相出口閉塞                 | 圧力超過なし (内部破壊/Process upset) | 5.04 × 10 <sup>-4</sup>                            |
| ▶ 041            | 41-PID-PS-1160 |               |                     |                        |                             | 3.29 × 10 <sup>-4</sup>                            |
| ▼ 041            | 41-PID-PS-1160 |               |                     |                        |                             | 1.65 × 10 <sup>-4</sup>                            |
| Initiator Tag    |                |               |                     |                        |                             | Initiator Frequency [times/year]                   |
| ▼ 041-FV-2710    |                | 041-T-1002塔底  | コンデンサ流量調整弁          |                        |                             | 1.65 × 10 <sup>-4</sup>                            |
| Consequence Type |                |               |                     |                        |                             | Residual Risk [times/year]                         |
| Safety           | Severity 4     |               |                     |                        |                             |                                                    |
| Economic loss    | Severity 3     |               |                     |                        |                             |                                                    |
| Environment      | Severity 2     |               |                     |                        |                             |                                                    |
| ▼ 041            | 41-PID-PS-1160 | 041-T-1003    |                     |                        |                             |                                                    |

Outline of a risk scenario

Contributors of a risk scenario (i.e, failure rate of initiators, probability of failure on demand of safeguards)

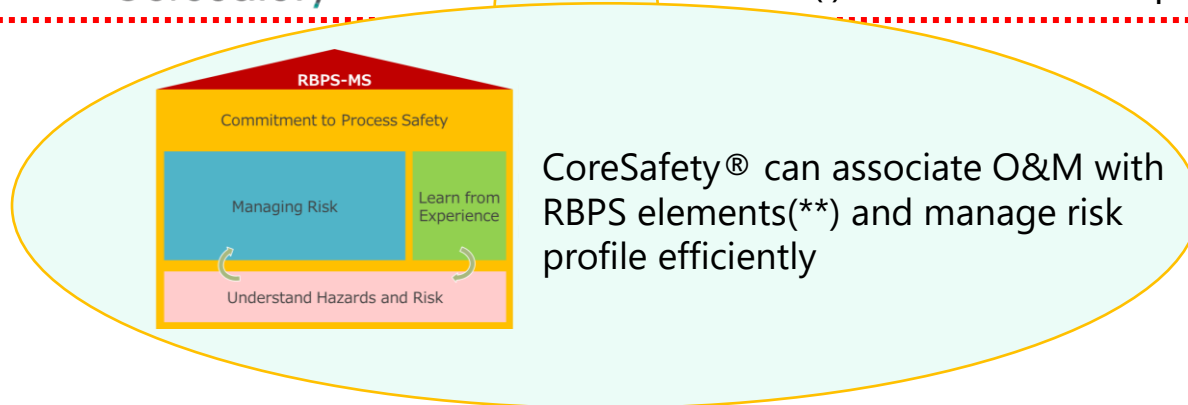
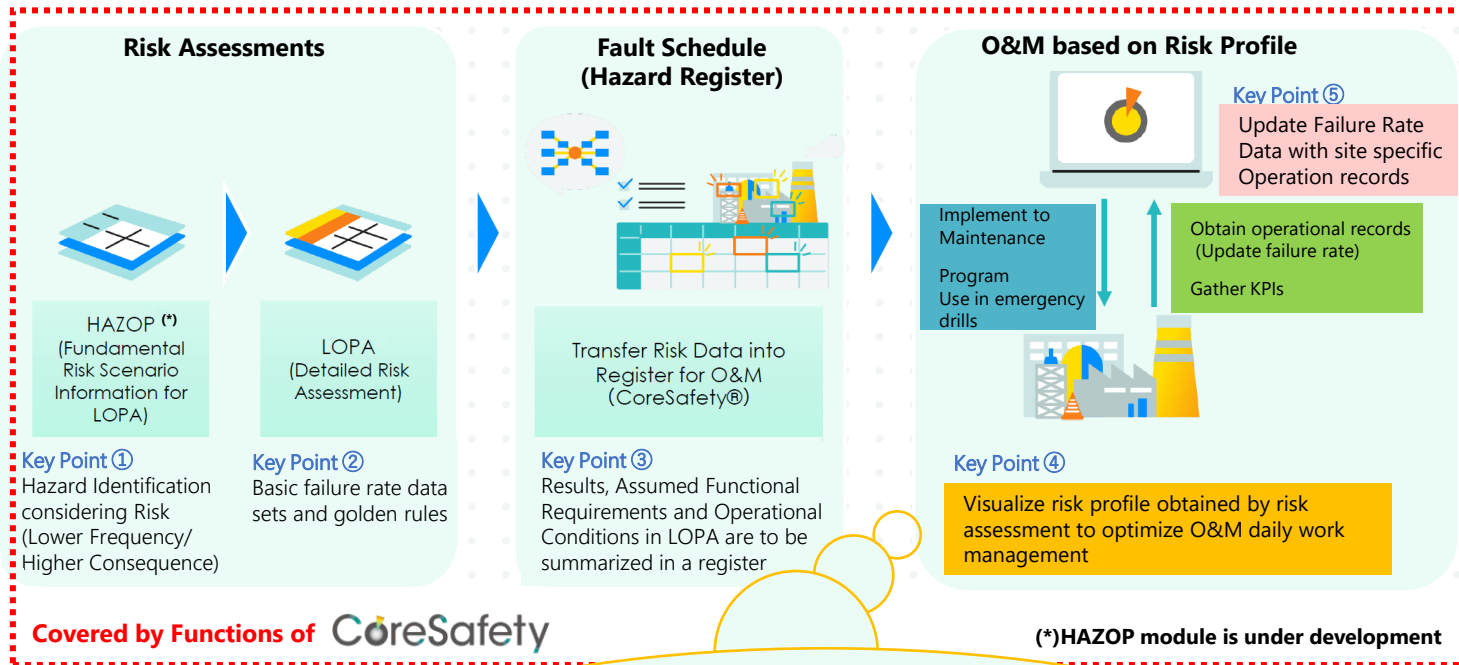
Residual risks for each consequence type (Safety, Economic loss, Environment)

Functional Requirement of the initiator and safeguards for reducing the risk ( i.e., maintenance plan)

Risk Scenario

Measures

## Implementation of Smart RBPS (Risk Based Process Safety)



(\*\*)RBPS Elements are suggested by AIChE CCPS (American Institute of Chemical Engineers Center for Chemical Process Safety)

## Advantages of CoreSafety®

- **Assured by Collaborative Research Projects:**  
Smart RBPS methodology taken in CoreSafety is assured by a collaborative research project involving academia, regulatory bodies, and industry in Japan.
- **Risk Profile Library:**
  - 1. Based on our experience**  
Be built on extensive Process Safety Management (PSM) and Process Hazard Analysis (PHA) experience in global Oil & Gas, Chemical, and Nuclear industry projects.
  - 2. Standardized Profiles**  
Provides standardized risk profiles for various equipment types (e.g., pumps, fractionation columns, drums).
  - 3. Efficient Assessment**  
Enables efficient risk assessments without needing detailed design information.

**e.g. ) Two Phase Separator**  
Standardized **P&ID** and **Risk Scenario** are available for risk assessments

# CoreSafety® -Risk-Based Process Safety Application

Return to  
HSE menu



## User Benefits

BEFORE

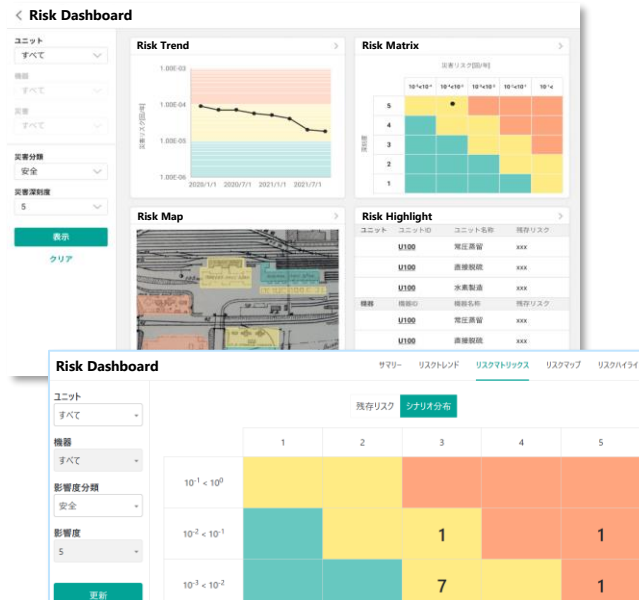
PHA by Excel/Paper

Implementation CoreSafety

AFTER

RBPS's cycle is improving

|                                                                      |                                                                                |                                                                                |
|----------------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Scenario Number 2a                                                   | Equipment Number                                                               | Scenario Title: Hazare Storage Tank Overflow. Spill not contained by the dike. |
| Date                                                                 | Scenario Number 2a                                                             | Equipment Number                                                               |
| Consequence Description/Category                                     | Scenario Title: Hazare Storage Tank Overflow. Spill not contained by the dike. |                                                                                |
| Risk Tolerance Criteria (Category or Frequency)                      | Date                                                                           | Scenario Number 2a                                                             |
| Initiating Event (typically a frequency)                             | Consequence Description/Category                                               | Equipment Number                                                               |
| Enabling Event or Condition                                          | Risk Tolerance Criteria (Category or Frequency)                                | Scenario Title: Hazare Storage Tank Overflow. Spill not contained by the dike. |
| Conditional Modifiers                                                | Initiating Event (typically a frequency)                                       | Frequency                                                                      |
| Frequency of Unmit Independent Protection                            | Enabling Event or Condition                                                    |                                                                                |
| Safeguards (non-IPL)                                                 | Conditional Modifiers (if applicable)                                          |                                                                                |
| Total PFD for all IPL                                                | Frequency of Unmit Independent Protection                                      |                                                                                |
| Frequency of Mitig Risk Tolerance Criteria                           | Frequency of Unmit Independent Protection                                      |                                                                                |
| Actions Required to Meet Risk Tolerance Criteria                     | Frequency of Mitig Risk Tolerance Criteria                                     |                                                                                |
| Notes                                                                | Frequency of Mitig Risk Tolerance Criteria                                     |                                                                                |
| References (links to LOPA analyst (and team members, if applicable)) | Frequency of Mitig Risk Tolerance Criteria                                     |                                                                                |



- Visualizes Risk and Optimizes O&M Tasks
- Brings "Risk Data" to the center of RBPS Management System.

## Actual Benefits of adopting CoreSafety®

Achievement of ALARP(\*) Decision for Higher Risk Items

(\*)ALARP : As Low As Reasonably Practicable

Improved Response and Procedure for Safety Critical Alarms by efficient training utilizing CoreSafety®

High Integrity and Reliability of Equipment and Safety Systems

Enhanced Risk Management at MOC and PTW (\*\*)

(\*\*)MOC : Management Of Change, PTW : Permit To Work

Sophisticated Emergency Planning for Designated Process Incidents