

# Synergi Plant Training

## Risk based inspection

## Risk Based Inspection

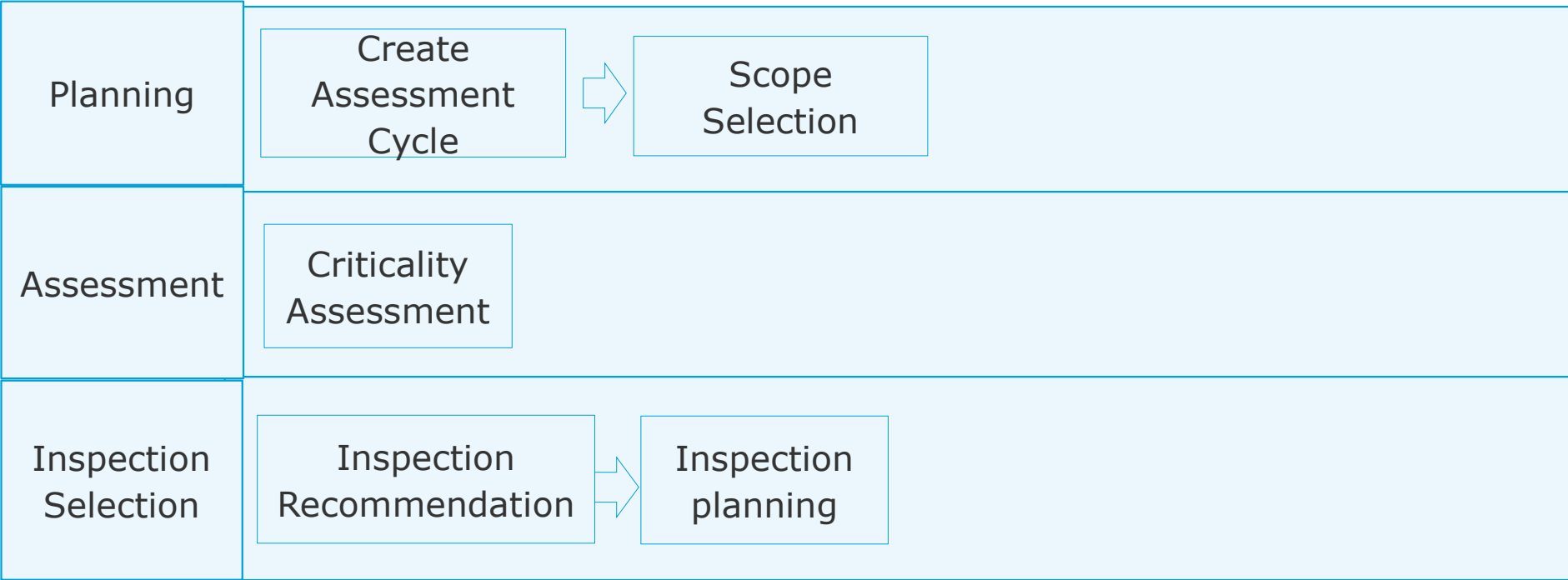
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**Risk based inspection** (RBI) is a method in which assets are identified for inspection based on their associated risks as opposed to a predetermined fixed time interval. In other words, it is a prioritizing and planning tool, predominantly used in the oil and gas industries, which aids in the identification of high priority items (i.e., those with high risk) vs. low priority items (i.e., those with low risk). This approach allows the users/owners of the assets to maximize the effectiveness of their inspection resources by concentrating them on those assets that pose the highest risk and not wasting resources on assets that are, in essence, inconsequential.

In Synergi Plant, when user wants to create, revise, update risk calculation, will open an assessment to access all information about current risk and recalculate with the latest inspection information (inspection, wall thickness, changed parameters, etc.). It will be possible to recalculate a single asset (RBI element) as well as run a batch calculation on a larger scope (i.e. for Plant). Once an assessment has been completed, an inspection plan needs to be approved. Only authorized users will be able to approve inspection plan. Below can be found snapshots of the overview process.

# Risk Based Inspection

- Risk Based Inspection(RBI) is an analytical tool to examine equipment's such as pressure vessel, piping, heat exchangers in industrial plants. RBI is decision making methodology for optimizing inspection plans.
- The following diagram shows the overview of RBI assessment process in Synergi Plant. It can be divided into 3 phases: planning, assessment, and task selection. Each phase consists of different activities.



## Risk Based Inspection

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- RBI Assessment Navigation path:
- Standard->RBI->Assessment
- Steps involved in RBI Assessment
  - Create Assessment
  - Scope Selection
  - Assessment Method Selection
  - Asset Data
  - Damage Mechanism
  - Consequence Calculation
  - Final Consequences
  - Likelihood Calculation
  - Final Probability
  - Inspection Recommendations
  - Approval
  - Executive Summary

# RBI – Creating Assessment

- Navigation: Focus on your Process Unit, and select RBI -> Assessment
- Creating assessment cycle is the first step in RBI process. In general one assessment will be created for all the parts/elements and user will recalculate based on the latest data.

The screenshot displays the Synergi Plant software interface for the 'AIRMS' facility. The 'RBI' tab is active, showing the 'Assessment Unit X01 RBI' screen. The interface includes a navigation menu on the left, a search bar, and three risk matrices. A callout box points to a 'Select' button, indicating that clicking it invokes the Assessment Cycle RBI screen.

**Current Risk Matrix**

Probability	Consequence (Total Cost CoF)				
	A	B	C	D	E
5	Orange	Orange	Orange	Red	Red
4	Yellow	Yellow	Orange	Orange	Red
3	Green	Green	Yellow	5	Red
2	Green	Green	Yellow	6	Orange
1	Green	Green	Yellow	Orange	Orange

**Future without Inspection Risk Matrix**

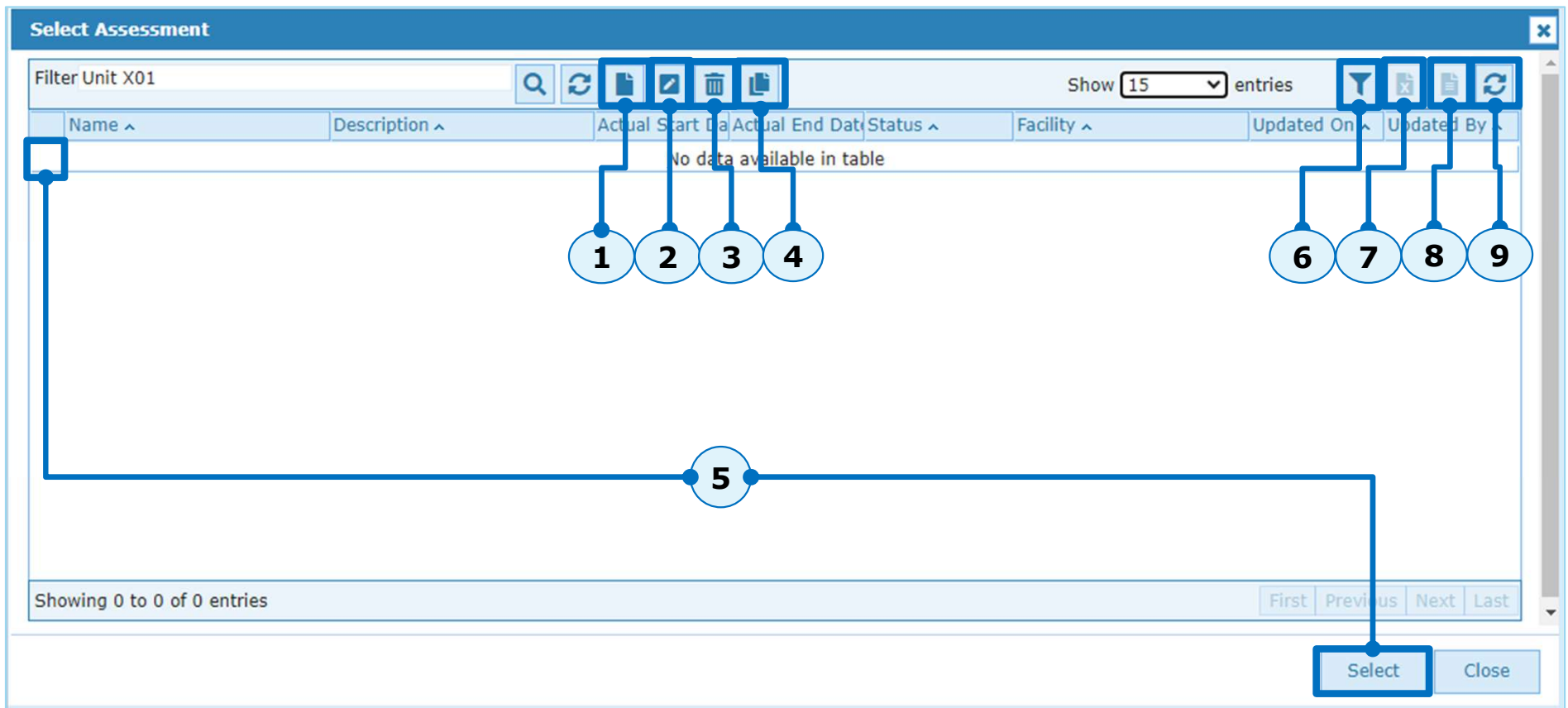
Probability	Consequence (Total Cost CoF)				
	A	B	C	D	E
5	Green	Green	Yellow	Orange	Orange
4	Green	Green	Yellow	Orange	Orange
3	Green	Green	Yellow	Orange	Orange
2	Green	Green	Yellow	Orange	Orange
1	Green	Green	Yellow	Orange	Orange

**Future with Inspection Risk Matrix**

Probability	Consequence (Total Cost CoF)				
	A	B	C	D	E
5	Orange	Orange	Orange	Red	Red
4	Yellow	Yellow	Orange	8	Red
3	Green	Green	Yellow	1	Red
2	Green	Green	Yellow	2	Orange
1	Green	Green	Yellow	Orange	Orange

## RBI – Creating Assessment

- In Assessment RBI screen user will be able to create, modify, delete, and copy assessment.
- See description of each function in the next page.



## RBI – Creating Assessment

- In Assessment RBI screen user will be able to create, modify, delete, and copy assessment.

Step	Description
1	<ul style="list-style-type: none"><li>• Click on the 'New' button to create a new assessment cycle. The screen shown in next slide will be invoked.</li></ul>
2	<ul style="list-style-type: none"><li>• Click on the 'Edit' button to modify a existing assessment cycle.</li></ul>
3	<ul style="list-style-type: none"><li>• Click on the 'Delete' button to delete existing assessment cycle.</li></ul>
4	<ul style="list-style-type: none"><li>• Click on 'Copy' button to copy to create the copy of the assessment.</li></ul>
5	<ul style="list-style-type: none"><li>• Once assessment cycle is created, it will be shown in the list. Select the assessment cycle by ticking the checkbox and click on the 'Select button'.</li></ul>
6	<ul style="list-style-type: none"><li>• Filter is used to filter the data based on columns in the grid.</li></ul>
7	<ul style="list-style-type: none"><li>• Export button is used to export the data to excel.</li></ul>
8	<ul style="list-style-type: none"><li>• Export All to excel button is used to export the data to excel.</li></ul>
9	<ul style="list-style-type: none"><li>• Refresh is used to refresh the grid data.</li></ul>

## RBI – Creating Assessment

- This screen is invoked from 'New' button
  - Name, Facility are mandatory.
  - Facility column is used to limit the scope of asset for the assessment.
- Facility tree hierarchy appears as shown on select of the facility as shown below. This is to set the range of selectable elements into the assessment.

**Create Assessment**

Name: Unit X01 RBI

Description: Unit X01 RBI Assessment

Facility: Unit X01

Plan Start Date: 29/06/2023

Plan End Date: 07/07/2023

Actual Start Date:

Actual End Date:

Status: New

Is RBI API:

Study file: RBI Study 01::DOC-2023-06-15-017

Buttons: Save & Select, Save, Cancel

**Create Assessment**

Name: Unit X01 RBI

Description: Unit X01 RBI Assessment

Facility: Unit X01

Plan Start Date:

Plan End Date:

Actual Start Date:

Actual End Date:

Status:

Is RBI API:

Study file:

Updated On: 2023/06/20

**Facility Tree**

- DNV
  - Plant A
    - 01. Inventory Groups
      - Prod Unit 01
        - 01. Corrosion Circuits
          - Unit X01
    - Prod Unit 02
    - Prod Unit 03
    - Prod Unit 04
    - Prod Unit 05
  - Plant B
  - Plant C
  - Plant D
  - Plant E
  - Sample Plant

Buttons: Close



## RBI – Creating Assessment

- Is RBI API check box is used when there is onshore study file to be used in Synergiant with API 581 methodology.
- If RBI API is checked, then a study file should be selected. if RBI API is not checked the assessment will be used as bespoke assessment.
- Select the imported study file from the list. import of study file can be done using integration module.

The screenshot shows a 'Create Assessment' form with the following fields and values:

Name	Unit X01 RBI
Description	Unit X01 RBI Assessment
Facility	Unit X01
Plan Start Date	29/06/2023
Plan End Date	07/07/2023
Actual Start Date	
Actual End Date	
Status	New
Is RBI API	<input checked="" type="checkbox"/>
Study file	RBI Study 01::DOC-2023-06-15-01

At the bottom of the form are three buttons: 'Save & Select', 'Save', and 'Cancel'. Blue lines with circular endpoints connect these buttons to the text on the right. A line also connects the 'Is RBI API' checkbox to the first bullet point in the list above.

'Save' Button is used to save the Assessment.

- 'Cancel' button is used to close the screen without saving the changes
- Select Save & select to go to Scope selection. one can also go to scope selection from Assessment General Information Button as shown in Next Slide

## RBI – Scope Selection

- This step is to define the scope of assessment.
- Scope is defined by selecting the assets required for RBI assessment.

Assessment General Information

Scope Selection | Assessment Methods

Add Remove Batch Recalculation Status Set As Completed Set As On Going

Class	Asset Name	Asset Description	Asset Type	Status
No records to display				

- can set as ongoing for each asset selected.
- can set as complete for each asset selected.
- This is used to know the status of batch calculation.
- This is used to recalculate
- Click on the 'Add' button to select the Asset.

Close

## RBI – Scope Selection

- Click the Add button to add elements into the scope
- It displays a list of elements available for assessment. The list is filtered accordingly to the facility entered during the creation of assessment.
- Select all elements into the scope (for example).
- The batch recalculation status screen will show up with Get Input Data.

• Select the assets by ticking the checkbox and click on the 'Save' button to select the scope.

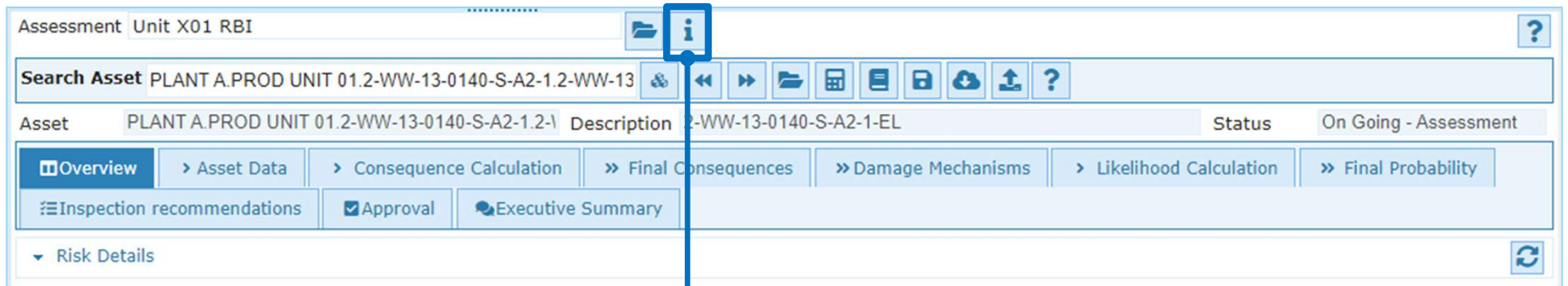
Class	Asset Name	Asset Description	Asset Type
<input type="checkbox"/>	API581	PLANT A.PROD UNIT 01.2-WW-13-0140...	2-WW-13-0140-S-A2-1-EL
<input type="checkbox"/>	API581	PLANT A.PROD UNIT 01.8-HM-13-0143-...	8-HM-13-0143-N-A2-1-EL
<input type="checkbox"/>	API581	PLANT A.PROD UNIT 01.8-HM-13-0179-...	8-HM-13-0179-N-A2-1-EL
<input type="checkbox"/>	API581	PLANT A.PROD UNIT 01.D-211.D-211 H...	D-211 Head
<input type="checkbox"/>	API581	PLANT A.PROD UNIT 01.D-211.D-211-S...	D-211-Shell
<input type="checkbox"/>	API581	PLANT A.PROD UNIT 01.X-171.X-171 TU...	X-171 Tube Bundle
<input type="checkbox"/>	API581	PLANT A.PROD UNIT 01.X-171.X-171-C...	X-171-Channel
<input type="checkbox"/>	API581	PLANT A.PROD UNIT 01.X-171.X-171-S...	X-171-Shell
<input type="checkbox"/>	API581	PLANT A.PROD UNIT 01.X-27.X-27 TUB...	X-27 Tube Bundle
<input type="checkbox"/>	API581	PLANT A.PROD UNIT 01.X-27.X-27-CHA...	X-27-Channel
<input type="checkbox"/>			ELEMENT

## RBI – Scope Selection

Step	Description
1	Click on the 'Save' button to Select the scope for the assessment. The selected scope will be shown in the assessment main grid which was shown in previous slide. Once the save is done the next tab is Assessment Method selection as shown in next slide.
2	Close button is used to close the screen.
3	Filter is used to filter the data based on columns in the grid.
4	Export button is used to export the data to excel.
5	Export All to excel button is used to export the data to excel.
6	Refresh is used to refresh the grid data.

## RBI – Scope Selection

- Also, for the existing assessment to modify the scope navigate through Information button as shown below



- Click on the 'i' button to go to Scope selection screen

## RBI – Assessment Method Selection

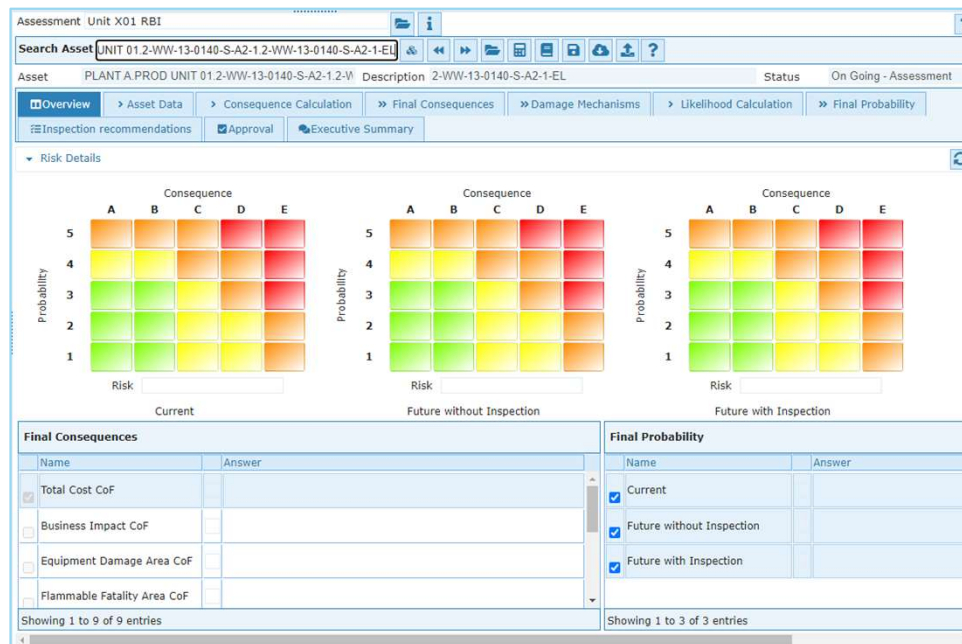
- Once the scope is selected, Next Select the Assessment Method from the tab as shown below:
- It displays all the methods linked to the scope of assets created to do the assessment. If in assessment creation RBI API is checked, by default API 581 critical method will be selected. The main grid shows what is the class and criticality method selected.

Class ^	Criticality Method ^	Updated By ^	Updated Date ^
<input type="checkbox"/> API581	RBI Onshore (API 581)	MGR	18/09/2023

Step	Description
1	Filter is used to filter the data based on columns in the grid.
2	Export button is used to export the data to excel.
3	Export All to excel button is used to export the data to excel.
4	Refresh is used to refresh the grid data.

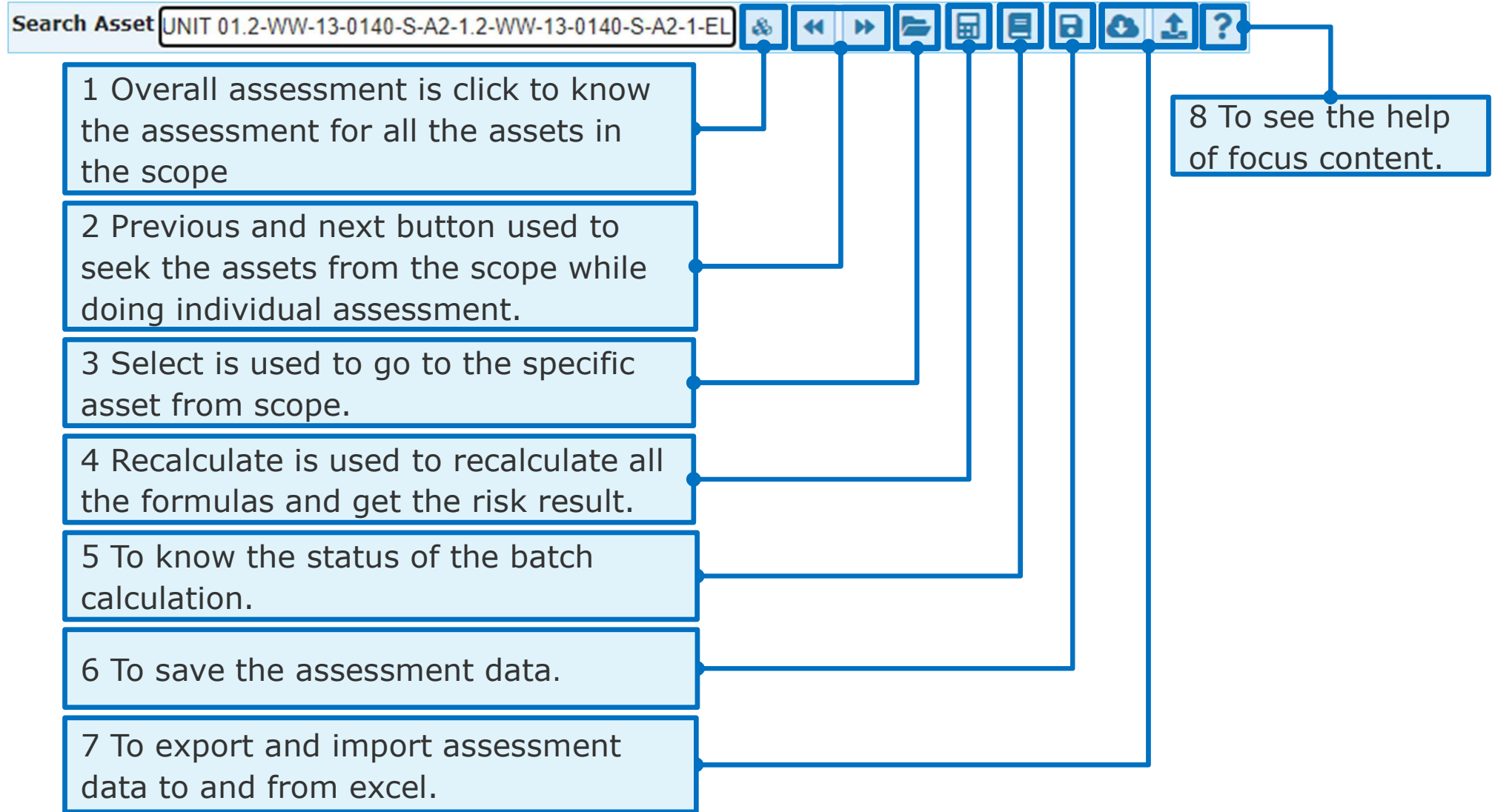
# RBI - Assessment

- Once scope, assessment method is defined, user may proceed to perform assessment for the selected assets.
- Can create the assessment at parent level and actual assessment are performed for each element/part.eg if assessment is created at plant level all the elements below the plant will be considered for assessment.
- All the associated data like design data, general data and all the calculation sheets are been shown in the proceeding tabs like asset data, consequence calculation. once all the input data is given can run the assessment as shown below.




# RBI - Assessment

- This slide explains about the buttons available while doing the assessment.





# RBI - Assessment

- Overall assessment  button is used when the user needs to recalculate and view the assessment result for all the elements in the scope. here assessment is done for all the elements selected in scope.eg if Plant is selected assessment is done for all the elements under that plant as shown below.

Assessment Unit X01 RBI

Search Asset please enter at least 2 character to search asset

Assessment Unit X01 RBI Description Unit X01 RBI Status In Process

Overview >> Damage Mechanisms Inspection recommendations Approval Executive Summary

Risk Details

		Consequence (Total Cost CoF)				
		A	B	C	D	E
Probability	5					
	4					
	3				5	
	2				6	
	1					

		Consequence (Total Cost CoF)				
		A	B	C	D	E
Probability	5				3	
	4				8	
	3					
	2					
	1					

		Consequence (Total Cost CoF)				
		A	B	C	D	E
Probability	5					
	4				8	
	3				1	
	2				2	
	1					

Filter

Show 20 entries

Asset Type ^ Name ^ Updated On ^ Updated By ^

No data available in table

Showing 0 to 0 of 0 entries

First Previous Next Last

# RBI - Assessment

- Previous/Next button is used when the user needs do the assessment for a single element. To navigate through previous or next element and do the assessment.

The screenshot displays the RBI Assessment software interface for element 2-WW-13-0140-S-A2-1-EL. The interface includes a treeview on the left, a search bar at the top, and a main panel with three risk matrices and two summary tables.

**Risk Matrices:**

- Current:** A 5x5 matrix with Probability (1-5) on the y-axis and Consequence (A-E) on the x-axis. The cell at Probability 2, Consequence D is highlighted with a blue box and labeled 'M'.
- Future without Inspection:** A 5x5 matrix with Probability (1-5) on the y-axis and Consequence (A-E) on the x-axis. The cell at Probability 4, Consequence D is highlighted with a blue box and labeled 'H'.
- Future with Inspection:** A 5x5 matrix with Probability (1-5) on the y-axis and Consequence (A-E) on the x-axis. The cell at Probability 4, Consequence D is highlighted with a blue box and labeled 'MH'.

**Final Consequences Table:**

Name	Answer
<input checked="" type="checkbox"/> Total Cost CoF	D
<input type="checkbox"/> Business Impact CoF	C
<input type="checkbox"/> Equipment Damage Area CoF	

**Final Probability Table:**

Name	Answer
<input checked="" type="checkbox"/> Current	2
<input checked="" type="checkbox"/> Future without Inspection	5
<input checked="" type="checkbox"/> Future with Inspection	4

- Once the element is selected then the overview screen shows the result for the specific element as shown below

The screenshot displays the RBI Assessment software interface for element 8-HM-13-0143-N-A2-1-EL. The interface includes a treeview on the left, a search bar at the top, and a main panel with three risk matrices and two summary tables.

**Risk Matrices:**

- Current:** A 5x5 matrix with Probability (1-5) on the y-axis and Consequence (A-E) on the x-axis. The cell at Probability 2, Consequence D is highlighted with a blue box and labeled 'M'.
- Future without Inspection:** A 5x5 matrix with Probability (1-5) on the y-axis and Consequence (A-E) on the x-axis. The cell at Probability 4, Consequence D is highlighted with a blue box and labeled 'MH'.
- Future with Inspection:** A 5x5 matrix with Probability (1-5) on the y-axis and Consequence (A-E) on the x-axis. The cell at Probability 4, Consequence D is highlighted with a blue box and labeled 'MH'.


**Final Consequences Table:**

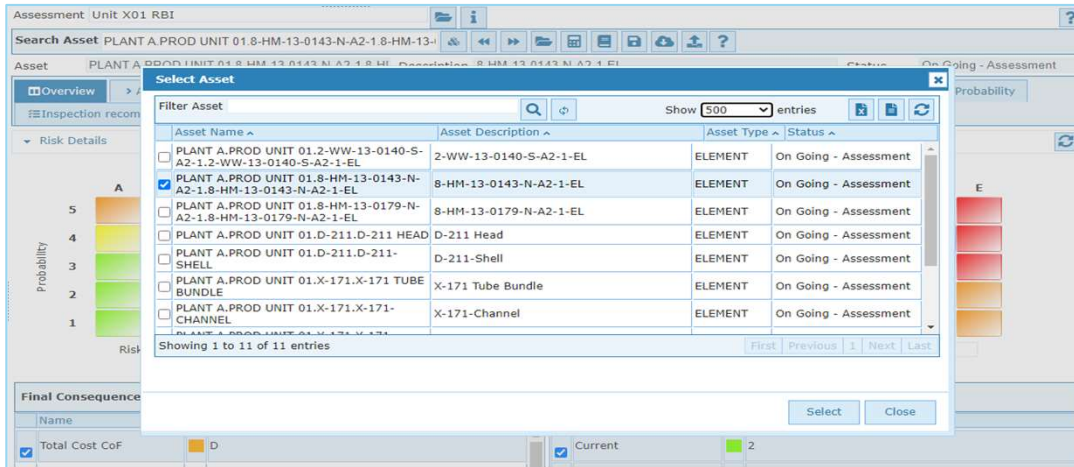
Name	Answer
<input checked="" type="checkbox"/> Total Cost CoF	D
<input type="checkbox"/> Business Impact CoF	C
<input type="checkbox"/> Equipment Damage Area CoF	

**Final Probability Table:**

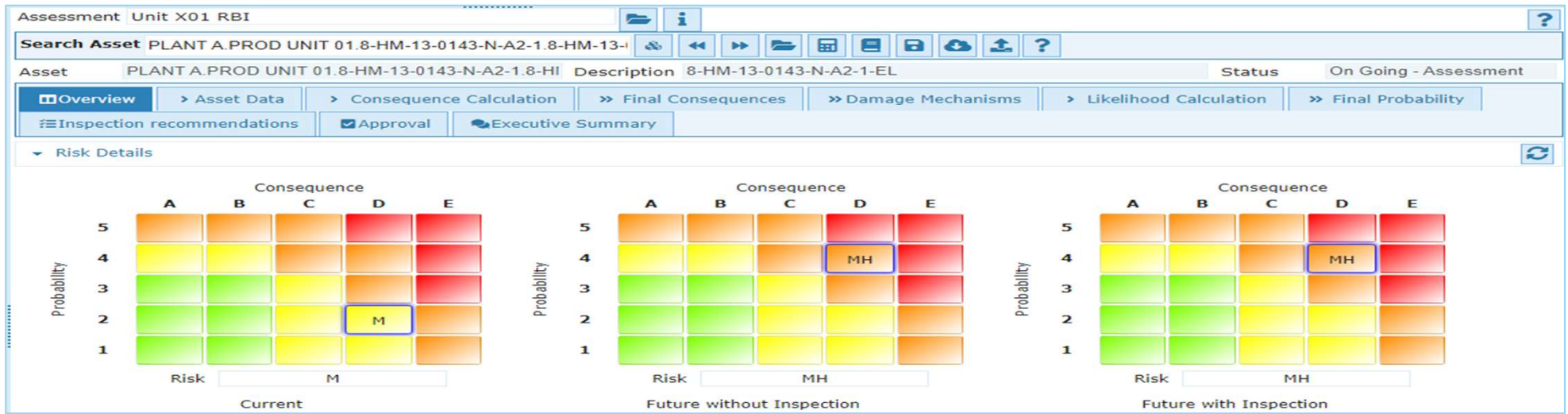
Name	Answer
<input checked="" type="checkbox"/> Current	2
<input checked="" type="checkbox"/> Future without Inspection	5
<input checked="" type="checkbox"/> Future with Inspection	4

# RBI - Assessment




- Select  button is used to select the specific element from the list as shown below

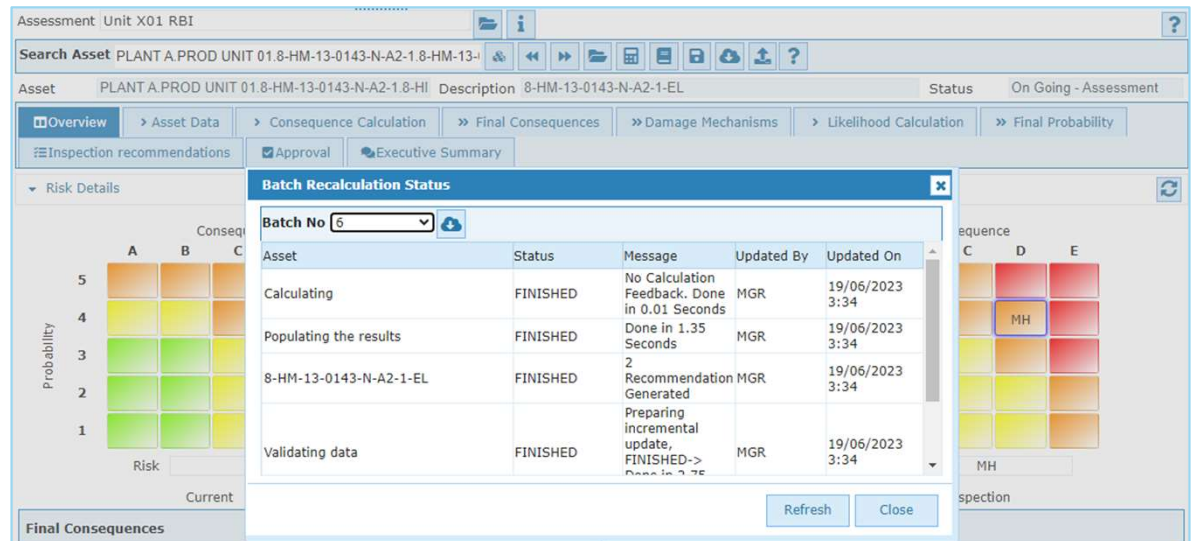
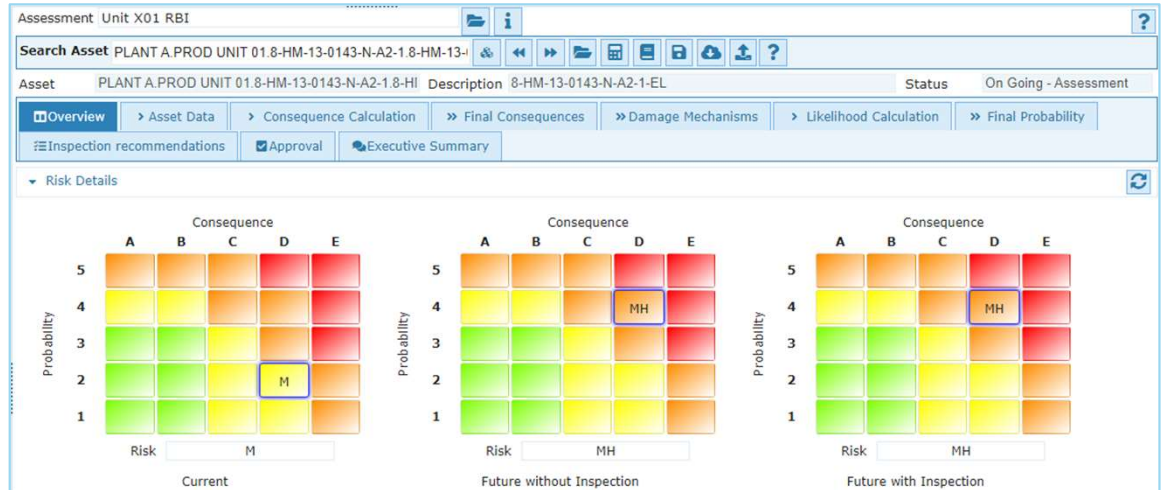


- Once the element is selected then the overview screen shows the result for the specific element as shown below



# RBI - Assessment

- Recalculate  button is used to Recalculate all the calculations and display the risk results. After going thorough validation check the risk results will be displayed.
- Batch  button is used to know the status of the recalculation.
- Save  button is used to know save the assessment.



# RBI - Assessment

- Export/Import button is used to export and import the assessment data.

The screenshot shows the 'RBI - Assessment' software interface. The top navigation bar includes 'Assessment Unit X01 RBI', a search bar, and various icons. The main content area displays 'Asset: PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HI' and 'Description: 8-HM-13-0143-N-A2-1-EL'. Below this are several tabs: 'Overview', 'Asset Data', 'Consequence Calculation', 'Final Consequences', 'Damage Mechanisms', 'Likelihood Calculation', and 'Final Probability'. The 'Risk Details' section is expanded, showing three risk matrices for 'Current', 'Future without Inspection', and 'Future with Inspection'. Each matrix plots 'Probability' (1-5) against 'Consequence' (A-E). An 'Export' dialog box is open, showing 'Export Options' with radio buttons for 'Whole Assessment' (selected), 'Approved Inspection', and 'Filtered Scope Assessment'. 'OK' and 'Cancel' buttons are at the bottom.

The screenshot shows the same 'RBI - Assessment' software interface as above. The 'Import' dialog box is open, showing 'Document Type' set to 'RBI Export/Import Document', 'Allowed extensions' as 'XLS, XLSX', and 'File size limitation' as '4095MB'. The 'File' field is empty with the text '\* Drag & Drop or Select File' and 'No file selected.' below it. 'Import' and 'Cancel' buttons are at the bottom. The background risk matrices are visible but partially obscured by the dialog box.

# RBI – Assessment-Overview

- Shows the final overview of the risk for the selected Element or for all assets from scope in the form of risk matrix and the consequence of failure and probability of failure data that derived the risk ranking. The risk matrix shown here are for current risk, future risk and future with inspection risk.

Assessment Unit X01 RBI

Search Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13-1

Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13- Description 8-HM-13-0143-N-A2-1-EL Status On Going - Assessment

Overview > Asset Data > Consequence Calculation >> Final Consequences >> Damage Mechanisms > Likelihood Calculation >> Final Probability >> Inspection recommendations

Approval Executive Summary

Risk Details

Consequence

	A	B	C	D	E
5	Light Green	Light Green	Light Green	Light Green	Light Green
4	Light Green	Light Green	Light Green	Light Green	Light Green
3	Light Green	Light Green	Light Green	Light Green	Light Green
2	Light Green	Light Green	Light Green	Light Green	Light Green
1	Light Green	Light Green	Light Green	Light Green	Light Green

Risk M

Current

Consequence

	A	B	C	D	E
5	Light Green	Light Green	Light Green	Light Green	Light Green
4	Light Green	Light Green	Light Green	Light Green	Light Green
3	Light Green	Light Green	Light Green	Light Green	Light Green
2	Light Green	Light Green	Light Green	Light Green	Light Green
1	Light Green	Light Green	Light Green	Light Green	Light Green

Risk MH

Future without Inspection

Consequence

	A	B	C	D	E
5	Light Green	Light Green	Light Green	Light Green	Light Green
4	Light Green	Light Green	Light Green	Light Green	Light Green
3	Light Green	Light Green	Light Green	Light Green	Light Green
2	Light Green	Light Green	Light Green	Light Green	Light Green
1	Light Green	Light Green	Light Green	Light Green	Light Green

Risk MH

Future with Inspection

**Final Consequences**

Name	Answer
<input checked="" type="checkbox"/> Total Cost CoF	D
<input type="checkbox"/> Business Impact CoF	D
<input type="checkbox"/> Equipment Damage Area CoF	
<input type="checkbox"/> Flammable Fatality Area CoF	

Showing 1 to 9 of 9 entries

**Final Probability** 4

Name	Answer
<input checked="" type="checkbox"/> Current	2
<input checked="" type="checkbox"/> Future without Inspection	4
<input checked="" type="checkbox"/> Future with Inspection	4

Showing 1 to 3 of 3 entries

# RBI – Assessment-Asset Data

- Shows general and design data of an asset here. can modify the data related to the asset before running the assessment.

Assessment Unit X01 RBI

Search Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13-

Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13- Description 8-HM-13-0143-N-A2-1-EL Status On Going - Assessment

Overview > **Asset Data** > Consequence Calculation >> Final Consequences >> Damage Mechanisms > Likelihood Calculation >> Final Probability >>> Inspection recommendations

Approval > Executive Summary

**General Data** Design Data

**Basic Information**

Description:  Service start date: 08/11/2003

Torrisspherical head?  Vessel shape: Horizontal

External corrosion driver: Mild Ambient temperature: 23.89 °C

Likelihood pressure option: Operating Pressure Consequence pressure option: Operating Pressure Pressure - expert:  barg

**Operating Conditions**

Chemical for CoF: Gasoline Phase for damage calculations: Liquid

Chemical for damage calculations: Gasoline Chemical phase for CoF: Liquid

NFPA flammability: 3 NFPA toxicity: 1 NFPA reactivity: 0

Chemical notes:

Filled liquid volume fraction: 1 fraction Operating temperature: 45.41 °C Operating pressure: 2 barg

Water present:  Water weight content:  fraction

**Other Groupings**

Corrosion Circuit: CC6 Section:

Inventory Group: IG5 Contribute to group inventory:

**Operating conditions for DM allocation**

Ca++ concentration:  fraction CO3 present:  CO2 present:  Cryogenic conditions:

HCO3- concentration:  fraction Exposed to salty water environment:  Dew point control:  HCl present:

NAOH present:  NH3 present:  pH range:

Subject to fatigue and corrosion:  Subject to thermal variations:  Subject to vibration:  Flow velocity range:

# RBI – Assessment-Consequence Calculation

- Consequence calculations has some input data to be filled in and based on the input data the results are shown in result tab after recalculation.

Assessment Unit X01 RBI

Search Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13-

Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13- Description 8-HM-13-0143-N-A2-1-EL Status On Going - Assessment

Overview > Asset Data > **Consequence Calculation** >> Final Consequences >> Damage Mechanisms > Likelihood Calculation >> Final Probability >> Inspection recommendations

Approval Executive Summary

**Input Data** Results

**Cost**

injury cost	<input type="text" value="10000000"/>	USD	Outage cost	<input type="text" value="36524219.93"/>	USD/year	Equipment cost	<input type="text" value="10763.91"/>	USD/M2	Environment cost	<input type="text" value="1000"/>	USD/m <sup>3</sup>
Population density	<input type="text" value="1076.391"/>	/km <sup>2</sup>	Worst case eqp. damage cost	<input type="text" value="25000000"/>	USD	Worst case fat. count	<input type="text" value="10"/>				

**CoF Method**

CoF method

**Quantitative Method - General**

Detailed CoF calculation method	<input type="text" value="Lookup"/>	Toxic chemical	<input type="text"/>	Toxic fluid mass fraction	<input type="text" value="1"/>	fraction
Leak is contained	<input type="checkbox"/>	Dike area	<input type="text"/>	Surface type	<input type="text" value="Wet Soil"/>	

**Lookup Method Input**

Item inventory option	<input type="text" value="Calculated"/>	Expert item inventory	<input type="text"/>	kg	Add gas mass (for liquid case)	<input type="checkbox"/>
Liquid head option	<input type="text" value="Calculated"/>	Liquid head expert	<input type="text"/>	m	Rupture hole size	<input type="text" value="0.2"/>
Rupture release mass option	<input type="text" value="Calculated"/>	Rupture release mass expert	<input type="text"/>	kg	Rupture duration	<input type="text" value="0.05"/>
Detection system type	<input type="text" value="None"/>	Isolation system type	<input type="text" value="None"/>		Mitigation system type	<input type="text" value="None"/>
Domino effect factor	<input type="text"/>	fraction				

**Pollutant**

Pollutant category	<input type="text"/>	Pollutant location	<input type="text"/>	Pollutant rehabilitation	<input type="text"/>
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## RBI – Assessment-Final Consequence

- A final consequence of failure is calculated from the input datasheets attached to the criticality method. This tab also runs any formula associated with the final COF categories. Or otherwise the category values can be manually selected from the drop-down list also. Each category here can have its own remarks by clicking on the remark button next to each categories.

Assessment Unit X01 RBI

Search Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13-

Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13- Description 8-HM-13-0143-N-A2-1-EL Status On Going - Assessment

Overview > Asset Data > Consequence Calculation >> **Final Consequences** >> Damage Mechanisms > Likelihood Calculation >> Final Probability ≡ Inspection recommendations

Approval Executive Summary

### Final Consequences

Name	Answer	
<input checked="" type="checkbox"/> Total Cost CoF	<span style="color: orange;">■</span> D	
<input type="checkbox"/> Business Impact CoF	<span style="color: orange;">■</span> D	
<input type="checkbox"/> Equipment Damage Area CoF	<span style="color: lightblue;">■</span>	
<input type="checkbox"/> Flammable Fatality Area CoF	<span style="color: lightblue;">■</span>	
<input type="checkbox"/> Toxicity Area CoF	<span style="color: lightblue;">■</span>	
<input type="checkbox"/> CoF Categories - Safety Area	<span style="color: yellow;">■</span> C	
<input type="checkbox"/> PLL CoF	<span style="color: lightblue;">■</span>	
<input type="checkbox"/> Environmental CoF	<span style="color: green;">■</span> A	
<input type="checkbox"/> Total Consequence Area CoF	<span style="color: yellow;">■</span> C	

# RBI – Assessment-Damage mechanism

- This screen is used to link failure mechanism to an asset and based on that damage mechanism. The probability and task recommended is also shown here.

Assessment Unit X01 RBI

Search Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13-

Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13- Description 8-HM-13-0143-N-A2-1-EL Status On Going - Assessment

Overview > Asset Data > Consequence Calculation >> Final Consequences >> **Damage Mechanisms** > Likelihood Calculation >> Final Probability >> Inspection recommendations

Approval > Executive Summary

Filter [Search] [Add] [Refresh] [Print] [Export] [Import] [Refresh] Show 200 entries [Filter] [Print] [Export] [Refresh]

Damage Mechanism ^	Category ^	Mechanism Subtype ^	Override Corrosion Rate ^	Override Remaining Life ^	Comments ^
<input checked="" type="checkbox"/> InternalThinning	RBI (API 581)	General			
<input type="checkbox"/> ExternalThinning	RBI (API 581)	General			

Showing 1 to 2 of 2 entries [First] [Previous] 1 [Next] [Last]

Asset Selection Final Probability Task Recommendations

Filter [Search] [Add Association] [Remove Association] Show 200 entries [Filter] [Print] [Export] [Refresh]

Asset Type ^	Name ^	Updated By ^	Updated On ^	Created By ^	Created On ^
<input type="checkbox"/> Element	8-HM-13-0143-...	MGR	15/06/2023	MGR	15/06/2023

Showing 1 to 1 of 1 entries [First] [Previous] 1 [Next] [Last]

## RBI – Assessment-Likelihood Calculation

- Likelihood calculations has some input data to be filled in and based on the input data the results are shown in result tab after recalculation. Also inspection results can be seen here.

Assessment Unit X01 RBI

Search Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13-

Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13- Description 8-HM-13-0143-N-A2-1-EL Status On Going - Assessment

Overview > Asset Data > Consequence Calculation >> Final Consequences >> Damage Mechanisms > Likelihood Calculation >> Final Probability >> Inspection recommendations

Approval Executive Summary

General Input Internal Thinning External Thinning Remaining Life Results Inspection Results Calculation Feedba...

**Calculation Scope**

Detailed scope  Current eval date *dd/mm/yyyy* \*19/06/2023 Future eval date *dd/mm/yyyy* \*06/05/2043

**Potential Damage Mechanisms**

Internal thinning active  External thinning active

**General**

LoF method \*Quantitative  
 Inspection or Measurement to use for Datum Thickness Inspection 2017 Measured Thickness 6.97 mm Measured Thickness Date 02/03/2017  
 Likelihood Pressure Option Operating Pressure Operating Pressure 2 barg Max. Design Pressure 10.34 barg Pressure - Expert 0 barg

**Operating Conditions**

pH Amine type None Amine composition type None Acid gas loading fraction  
 H2S present H2S mole content fraction Chloride present Chloride weight concentration fraction  
 Dissolved oxygen content  
 Water type Non corrosive water service

**Adjustment Factor**

GFF Adjustment Factor 1 Process factor Mechanical factor Universal factor

## Slide 27

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**SS13**

Shinde, Suhasini, 2020/8/28

**SS14**

need to add slides for general input, internal thinning etc..

Shinde, Suhasini, 2020/8/28

# RBI – Assessment-Likelihood Calculation-General Input data

- There are some General input data to be filled as shown below:

Assessment Unit X01 RBI

Search Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13-

Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13- Description 8-HM-13-0143-N-A2-1-EL Status On Going - Assessment

Overview > Asset Data > Consequence Calculation >> Final Consequences >> Damage Mechanisms > Likelihood Calculation >> Final Probability >> Inspection recommendations

Approval Executive Summary

General Input Internal Thinning External Thinning Remaining Life Results Inspection Results Calculation Feedba...

**Calculation Scope**

Detailed scope  Current eval date dd/mm/yyyy \*19/06/2023 Future eval date dd/mm/yyyy \*06/05/2043

**Potential Damage Mechanisms**

Internal thinning active  External thinning active

**General**

LoF method Quantitative  
 Inspection or Measurement to use for Datum Thickness Inspection 2017  
 Measured Thickness 6.97 mm Measured Thickness Date dd/mm/yyyy 02/03/2017  
 Likelihood Pressure Option Operating Pressure Operating Pressure 2 barg Max. Design Pressure 10.34 barg Pressure - Expert 0 barg

**Operating Conditions**

pH Amine type None Amine composition type None Acid gas loading fraction  
 H2S present H2S mole content fraction Chloride present Chloride weight concentration fraction  
 Dissolved oxygen content  
 Water type Non corrosive water service

**Adjustment Factor**

GFF Adjustment Factor 1 Process factor Mechanical factor Universal factor

# RBI – Assessment-Likelihood Calculation-Internal Thinning

- Internal thinning related data to be filled in this section as shown below.

Assessment Unit X01 RBI

Search Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13-

Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13- Description 8-HM-13-0143-N-A2-1-EL Status On Going - Assessment

Overview > Asset Data > Consequence Calculation >> Final Consequences >> Damage Mechanisms > Likelihood Calculation >> Final Probability Inspection recommendations

Approval Executive Summary

General Input Internal Thinning External Thinning Remaining Life Results Inspection Results Calculation Feedba...

**LoF Method**

Internal thinning LoF method Quantitative Internal thinning start date 08/11/2003

**Corrosion Rate**

Internal thinning corrosion rate option Measured Internal thinning expert corrosion rate 0.051 mm/yr Internal thinning measured corrosion rate 0.058 mm/yr

Internal thinning corrosion type Localized Internal thinning corrosion rate confidence Low Confidence

Internal thinning calculated corrosion rate mm/yr Internal thinning calculated corrosion type Localized Internal thinning corrosion rate used 0.058 mm/yr Internal thinning corrosion type used Localized

**Adjustment**

On-line monitoring factor - Expert 1 On-line monitoring type None Injection/mix points present Highly effective inspection for injection/mix points performed

Dead legs present Highly effective inspection for dead legs

**Inspection Plan Input**

Internal thinning intrusive Use internal thinning expert inspection date Internal thinning expert inspection date

Use internal thinning expert inspection task / effectiveness Internal thinning expert inspection task Internal thinning expert inspection effectiveness

Use internal thinning expert inspection interval Internal thinning Expert inspection interval

**Inspection Cost**

Internal thinning highly inspection cost - expert Internal thinning usually inspection cost - expert Internal thinning fairly inspection cost - expert Internal thinning poorly inspection cost - expert

Internal thinning traditional inspection cost Internal thinning usually inspection cost - expert Internal thinning fairly inspection cost - expert Internal thinning poorly inspection cost - expert

**Notes**

Internal thinning notes

# RBI – Assessment-Likelihood Calculation-External Thinning

- External thinning related data to be filled in this section as shown below.

Assessment Unit X01 RBI

Search Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13-

Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13- Description 8-HM-13-0143-N-A2-1-EL Status On Going - Assessment

Overview > Asset Data > Consequence Calculation >> Final Consequences >> Damage Mechanisms > Likelihood Calculation >> Final Probability Inspection recommendations

Approval Executive Summary

General Input Internal Thinning External Thinning Remaining Life Results Inspection Results Calculation Feedba...

**LoF Method**

External thinning LoF method Quantitative External thinning service start date 07/11/2018

**Corrosion Rate**

External thinning corrosion rate option Calculated External thinning expert corrosion rate mm/yr External thinning measured corrosion rate mm/yr

External thinning corrosion type None External thinning corrosion rate confidence Low Confidence Design allows water to pool and increase metal loss rates Interface penalty

External thinning calculated corrosion rate 0.068 mm/yr External thinning corrosion rate used 0.068 mm/yr External thinning calculated corrosion type Generalized

External thinning corrosion type used Generalized SS CRA LEC

**Inspection Plan Input**

Use external thinning expert inspection date External thinning expert inspection date

Use external thinning expert inspection task / effectiveness External thinning expert inspection task External thinning expert inspection effectiveness

Use external thinning expert inspection interval External thinning Expert inspection interval yrs

**Inspection Cost**

External thinning highly inspection cost - expert USD External thinning usually inspection cost - expert USD External thinning fairly inspection cost - expert USD External thinning poorly inspection cost - expert USD

External thinning traditional inspection cost USD/year

**Notes**

External thinning notes

# RBI – Assessment-Likelihood Calculation-Remaining life

- Remaining Life related data to be filled in this section as shown below.

Assessment Unit X01 RBI

Search Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13-1

Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13- Description 8-HM-13-0143-N-A2-1-EL Status On Going - Assessment

Overview > Asset Data > Consequence Calculation >> Final Consequences >> Damage Mechanisms > Likelihood Calculation >> Final Probability >> Inspection recommendations

Approval Executive Summary

General Input Internal Thinning External Thinning **Remaining Life** Results Inspection Results Calculation Feedba...

**Minimum Thickness**

Minimum thickness option Corrosion Allowance Corrosion Allowance 1.6 mm Minimum thickness - expert Minimum thickness calculated 0.94894 mm

**Minimum Thickness - Calculation Input**

Weld joint strength reduction factor option Calculated Weld joint strength reduction factor - expert 1 fraction Weld joint strength reduction factor - Calculated 1 fraction Tube end type Tubes strength welded to tube

Temperature coefficient option Calculated Temperature coefficient - expert 0.4 fraction Minimum allowance for threading and structural stability 0 m

Quality factor - Used 0.8 fraction

**Active Thinning Model**

Internal Thinning  External Thinning

**Remaining Life Result**

Remaining Life Type Measured Nominal remaining life 7.35227 yrs Probabilistic remaining life 5.59507 yrs Low Confidence In Rate

Maximum allowable stress - Used 1378.94 barg



# RBI – Assessment-Likelihood Calculation-Results

- Likelihood calculation results are shown below.

Assessment Unit X01 RBI

Search Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13-

Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13- Description 8-HM-13-0143-N-A2-1-EL Status On Going - Assessment

Overview > Asset Data > Consequence Calculation >> Final Consequences >> Damage Mechanisms > Likelihood Calculation >> Final Probability >> Inspection recommendations

Approval Executive Summary

General Input Internal Thinning External Thinning Remaining Life Results Inspection Results Calculation Feedba...

**Likelihood Result**

Last calculation time	19/06/2023 03:34:08	Current risk ref. Date <i>dd/mm/yyyy</i>	15/06/2023	Future risk ref. Date <i>dd/mm/yyyy</i>	06/05/2043
Current LoF	0.00019 /yr	Current total damage factor	6.19547	Current total damage category	2
Future LoF	0.01968 /yr	Future total damage factor	643.23612	Future total damage category	4
		Current Driving Damage Mechanism		Future Driving Damage mechanism	

**Internal Thinning Result**

Internal thinning current damage factor	3.26329	Internal thinning current damage category	2	Internal thinning future damage factor	298.05009	Internal thinning future damage category	4
Internal thinning confidence in corrosion rate	0.8139534884	<i>fraction</i>					

**External Thinning Result**

External thinning current damage factor	2.93218	External thinning current damage category	2	External thinning future damage factor	345.18602	External thinning future damage category	4
External thinning confidence in corrosion rate	0.8139534884	<i>fraction</i>					

# RBI – Assessment-Likelihood Calculation-Inspection Result

- Inspection results data are shown below.

Assessment Unit X01 RBI

Search Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13- Description 8-HM-13-0143-N-A2-1-EL Status On Going - Assessment

Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13- Description 8-HM-13-0143-N-A2-1-EL Status On Going - Assessment

Overview > Asset Data > Consequence Calculation >> Final Consequences >> Damage Mechanisms > Likelihood Calculation >> Final Probability >> Inspection recommendations

Approval Executive Summary

General Input Internal Thinning External Thinning Remaining Life Results Inspection Results Calculation Feedba...

**Inspection Planning Result**

Future LoF factor w/insp 0.00445 /yr Future total damage factor w/insp 145.39787 Future total damage category w/insp 4 Future With Inspection Driving Dmg. Mechanism

**Internal Thinning - Inspection Result**

Internal thinning target damage factor 100 Internal thinning target driver LoF Category - CoF Category T Internal thinning target reach date 19/07/2035 Internal thinning inspection date 19/07/2035 Internal thinning inspection effectiveness Usually Internal thinning inspection task NonIntr+75UTS/PR

Internal thinning future damage factor w/insp 65.37123 Internal thinning future damage category w/insp 3 Internal thinning criteria met  Criteria Met Possible

Internal thinning intrusive

**Internal Thinning - Inspection Time Result**

**Internal Thinning - CBA / RBA**

**External Thinning - Inspection Result**

External thinning target damage factor 100 External thinning target driver LoF Category - CoF Category T External thinning target reach date 22/08/2034 External thinning inspection date 22/08/2034 External thinning inspection effectiveness Usually External thinning inspection task NonIntr+60VT+UT/RT follow-u

External thinning future damage factor w/insp 80.02664 External thinning future damage category w/insp 3 External thinning criteria met  Criteria Met Possible

External thinning intrusive

**External Thinning - Inspection Time Result**

**External Thinning - CBA / RBA**

# RBI – Assessment-Likelihood Calculation-Calculation Feedback

- Calculation feedback can be provided in this section as shown below.

The screenshot displays a software interface for RBI assessment. At the top, there is a header bar with 'Assessment Unit X01 RBI' and a search bar containing 'PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13-'. Below the search bar, the asset details are shown: 'Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13- Description 8-HM-13-0143-N-A2-1-EL Status On Going - Assessment'. A navigation menu includes 'Overview', 'Asset Data', 'Consequence Calculation', 'Final Consequences', 'Damage Mechanisms', 'Likelihood Calculation' (highlighted), 'Final Probability', and 'Inspection recommendations'. Below the navigation menu, there are tabs for 'General Input', 'Internal Thinning', 'External Thinning', 'Remaining Life', 'Results', 'Inspection Results', and 'Calculation Feedba...'. The main content area is divided into three sections, each with a checkbox and a feedback field:

Section	Checkbox	Feedback Field
LoF Calculation Error	<input type="checkbox"/>	LoF Calculation Feedback
Internal thinning calculation error	<input type="checkbox"/>	Internal thinning calculation feedback
External thinning calculation error	<input type="checkbox"/>	External thinning calculation feedback

# RBI – Assessment-Final Probability

- A final probability of failure is calculated from the input datasheets attached to the criticality method. This tab also runs any formula associated with the final POF categories. Each category here can have its own remarks by clicking on the remark button next to each categories.

Assessment Unit X01 RBI

Search Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13-1

Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13-1 Description 8-HM-13-0143-N-A2-1-EL Status On Going - Assessment

Overview  
 >  Asset Data  
 >  Consequence Calculation  
 >>  Final Consequences  
 >>  Damage Mechanisms  
 >  Likelihood Calculation  
 >>  Final Probability  
 ≡  Inspection recommendations

Approval    Executive Summary

**Final Probability** ■ 4

Name	Answer	
<input checked="" type="checkbox"/> Current	<span style="color: green;">■</span> 2	
<input checked="" type="checkbox"/> Future without Inspection	<span style="color: orange;">■</span> 4	
<input checked="" type="checkbox"/> Future with Inspection	<span style="color: orange;">■</span> 4	

# RBI – Assessment-Inspection Recommendation

- Once final risk value is calculated the inspection selection is normally performed. Based on the criteria like FM, risk value, COF POF value, design data inspection recommendations are listed here. Here can select the inspection recommendation and copy it to our inspection plan. Also can regenerate recommendation by clicking Regenerate recommendation button as shown below.

Assessment Unit X01 RBI

Search Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13-1

Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1.8-HM-13- Description 8-HM-13-0143-N-A2-1-EL Status On Going - Assessment

Overview > Asset Data > Consequence Calculation >> Final Consequences >> Damage Mechanisms > Likelihood Calculation >> Final Probability **Inspection recommendations**

Approval Executive Summary

Filter  Show 50 entries

Inspection Recommendation [Copy To Inspection Plan](#) [Regenerate Recommendations](#)

<input type="checkbox"/>	Name ^	Location ^	Damage Mechanism ^	Target Factor ^	Current Damage Fact	Current Category ^	Future Damage Factor	Future Category ^	Inspection Date ^	Schedul
<input type="checkbox"/>	8-HM-13-0143-N-...		Internal Thinning	100	3.26329	2	298.05009	4	19/07/2035	12
<input type="checkbox"/>	8-HM-13-0143-N-...		External Thinning	100	2.93218	2	345.18602	4	22/08/2034	12

Showing 1 to 2 of 2 entries

Filter  Show 50 entries

Inspection Planned [Add](#) [Edit](#) [Delete](#)

<input type="checkbox"/>	Name ^	Location ^	Damage Mechanism ^	Target Factor ^	Current Damage Fact	Current Category ^	Future Damage Factor	Future Category ^	Inspection Date ^
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# RBI – Assessment-Inspection Recommendation

- Select the recommended inspections and click Copy To Inspection Plan. This will move the selected inspections to the Inspection Planned data.
- When the Inspection Planned data are approved, they will be ready for approval.

Assessment Unit X01 RBI

Search Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1 8-HM-13-

Asset PLANT A.PROD UNIT 01.8-HM-13-0143-N-A2-1 8-HM-13- Description 8-HM-13-0143-N-A2-1-EL Status On Going - Assessment

Overview > Asset Data > Consequence Calculation >> Final Consequences >> Damage Mechanisms > Likelihood Calculation >> Final Probability **Inspection recommendations**

Approval Executive Summary

Filter  Show 50 entries

**Inspection Recommendation** Copy To Inspection Plan Regenerate Recommendations

<input type="checkbox"/>	Name ^	Location ^	Damage Mechanism ^	Target Factor ^	Current Damage Facto	Current Category ^	Future Damage Factor	Future Category ^	Inspection Date ^	Schedule b
Showing 0 to 0 of 0 entries										

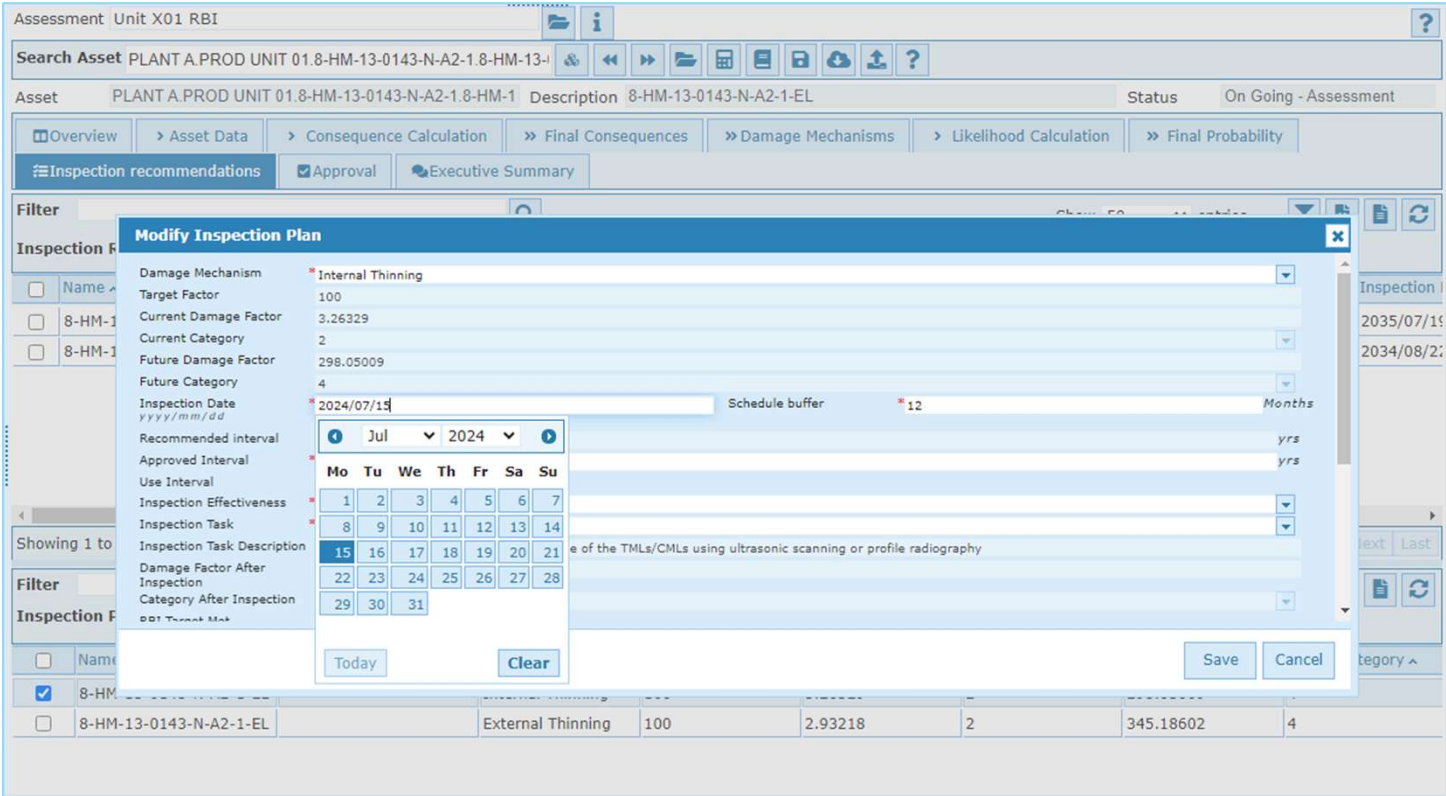
Filter  Show 50 entries

**Inspection Planned**

<input type="checkbox"/>	Name ^	Location ^	Damage Mechanism ^	Target Factor ^	Current Damage Facto	Current Category ^	Future Damage Facto	Future Category ^	Inspection Date ^
<input type="checkbox"/>	8-HM-13-0143-N-A2-1-EL		Internal Thinning	100	3.26329	2	298.05009	4	19/07/2035
<input type="checkbox"/>	8-HM-13-0143-N-A2-1-EL		External Thinning	100	2.93218	2	345.18602	4	22/08/2034

# RBI – Assessment-Inspection Recommendation

- Select one inspection planned data to modify the data if needed.
- For testing purpose to have inspection activity generated, the inspection date minus schedule buffer must be before today so the inspection is due to be created.
- Remember to save the assessment data when modification is done.



- Sample RBI data
  - RBI Recom. Date: 2024/07/15
  - Schedule Buffer: 12 Months
  - Scheduled Date: 2023/07/15
- Sample Plan data
  - Plan User Date: 2023/07/20
  - Plan Lead Time: 1 Month
  - Plan Creation Date: 2023/06/20

## RBI – Assessment-Approval

- Inspection planned data will be shown in the Approval tab for approving the RBI recommended inspections.
- Select the inspections and click Approve button to approve the inspections.
- When approving the inspections, you can specify a comment.
- For approved inspections you can also select and reject them.

The screenshot displays the 'Approval' tab of the RBI Assessment interface. The interface includes a search bar, navigation tabs (Overview, Asset Data, Consequence Calculation, Final Consequences, Damage Mechanisms, Likelihood Calculation, Final Probability), and a table of inspection recommendations. The table has columns for Name, Damage Mechanism, Target Factor, Current Damage Factor, Current Category, Future Damage Factor, Future Category, Inspection Date, Schedule buffer, Recommended interval, and Approved Interval. Two inspections are listed: one for Internal Thinning and one for External Thinning, both with an inspection date of 2024/07/15.

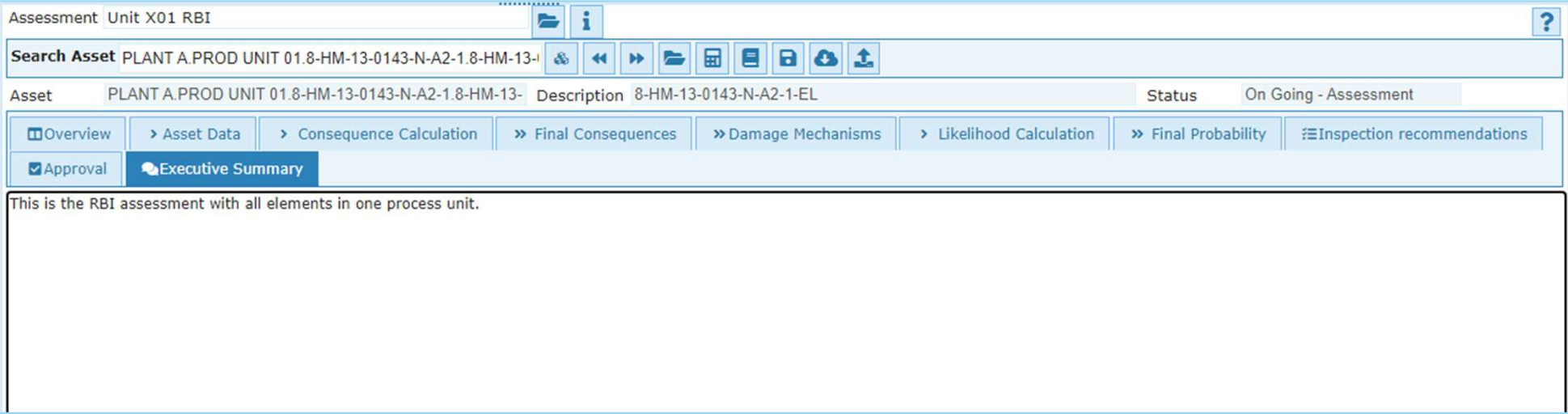
<input type="checkbox"/>	Name	Damage Mechanism	Target Factor	Current Damage Factor	Current Category	Future Damage Factor	Future Category	Inspection Date	Schedule buffer	Recommended interval	Approved Interval
<input type="checkbox"/>	8-HM-13-0143-N-A2-1-EL	Internal Thinning	100	3.26329	2	298.05009	4	2024/07/15	12	12.635	12.635
<input type="checkbox"/>	8-HM-13-0143-N-A2-1-EL	External Thinning	100	2.93218	2	345.18602	4	2024/07/15	12	10.826	10.826

- To synchronize sample RBI inspections to Tag inspection plan, approve the RBI inspections AFTER the Tag inspection plan is created.



# RBI – Assessment-Execute summary

- Once Risk is evaluated an Executive summary can be written for the final risk observations, reasons and evidences. This could be submitted in a reporting format to the client at the end of the RBI project. User should enter the executive summary and click on the Save Icon button to save the updated summary.



## RBI – Assessment-Multiple Elements on a Tag

- When a Tag has multiple Elements, you can focus on the Tag in the asset tree, and go to the Inspection Recommendations to process all recommended inspections for all elements together.
- This includes copy inspections to the inspection planned data and perform approval on them.

Assessment Unit X01 RBI

Search Asset please enter at least 2 character to search asset

Assessment Unit X01 RBI Description Unit X01 RBI Status In Process

Overview Damage Mechanisms **Inspection recommendations** Approval Executive Summary

Filter

Inspection Recommendation Copy To Inspection Plan Regenerate Recommendations Show 50 entries

<input type="checkbox"/>	Name ^	Location ^	Damage Mechanism ^	Target Factor ^	Current Damage Fact	Current Category ^	Future Damage Factor	Future Category ^	Inspection Date ^	Schedule buffe
<input checked="" type="checkbox"/>	D-211 Head		Internal Thinning	100	0.32716	1	526.1753	4	25/10/2030	12
<input checked="" type="checkbox"/>	D-211 Head		External Thinning	100	0.19007	1	310.13428	4	14/05/2034	12
<input type="checkbox"/>	D-211 Head		Internal SCC	100	22.69681	3	108.8493	4	20/05/2041	12
<input type="checkbox"/>	D-211-Shell		Internal Thinning	100	0.12355	1	3.13632	2	01/09/2071	12
<input checked="" type="checkbox"/>	D-211-Shell		External Thinning	100	0.16135	1	143.71191	4	01/09/2038	12
<input type="checkbox"/>	D-211-Shell		Internal SCC	100	7.5656	2	36.2831	3	17/12/2082	12

Showing 1 to 6 of 6 entries

Filter

Inspection Planned Show 50 entries

<input type="checkbox"/>	Name ^	Location ^	Damage Mechanism ^	Target Factor ^	Current Damage Fact	Current Category ^	Future Damage Fact	Future Category ^	Inspection Date ^	Sch
--------------------------	--------	------------	--------------------	-----------------	---------------------	--------------------	--------------------	-------------------	-------------------	-----

- Sample RBI data
  - RBI Recom. Date: 2024/07/15
  - Schedule Buffer: 12 Months
  - Scheduled Date: 2023/07/15
- Sample Plan data
  - Plan User Date: 2023/07/20
  - Plan Lead Time: 1 Month
  - Plan Creation Date: 2023/06/20

# RBI- Reports-Executive Summary Report

- Once the assessment is done, the user can get the Executive summary report as shown below:
- Select Tree-> Asset-> Based on the asset, executive summary for all the assessment which are linked to that asset are shown.
- Navigation path: AIRMS->RBI->Executive Summary

The screenshot displays the Synergi Plant AIRMS software interface. The top menu bar includes options like Facility Data, RBI, Work Pack, Thickness Monitoring, Dashboard, Utilities, and RBI Setup. The left sidebar shows a tree view for 'Process unit : Unit X01' with various sub-items like Inventory Groups, Corrosion Circuits, and Wall Thickness Monitoring. The main report area is titled 'RBI Onshore - Executive Summary Report' and includes the following components:

**Effect On Risk Summary**

RISK	Current	Future
No Inspection	1.60E+004	7.29E+005
With Inspection	1.60E+004	1.14E+005

**Equipment Count**

PART_TYPE	PART_NAME.CountDistinct
Drum Part	2
Pipe Part	3
Shell Tube Heat Exchanger Part	6
<b>Total</b>	<b>11</b>

**Effect On Risk**

Decrease	81.82%
Increase	0.00%
No Change	18.18%

**Risk Reduction**

Current Total Risk /AvgYear	\$24,983.84
Future Total Risk /AvgYear	\$745,321.57
Future With Inspection /AvgYear	\$122,954.58

**Risk Reduced By: 83.50%**

# RBI- Reports-Part Summary Report

- Once the assessment is done, the user can get the Part Summary Report as shown below:
- Select Tree-> Asset-> Based on the asset, executive summary for all the assessment which are linked to that asset are shown.
- Navigation path: AIRMS->RBI->Part Summary Report

The screenshot displays the 'Part Summary Report' for 'Unit X01' in the Synergi Plant software. The report is titled 'RBI Onshore - Element Summary Report' and includes the following sections:

- Basic Data:**
  - Assessment : Unit X01 RBI
  - Part Name : 2-WW-13-0140-S-A2-1-EL
  - Service Start Date : 08/11/2003
  - Part Type : Pipe Part
  - Description : 2-WW-13-0140-S-A2-1-EL
- Group:**
  - Plant : Plant A
  - Production Unit : Prod Unit 01
  - Process Unit : Unit X01
  - Corrosion Circuit : CC6
  - Inventory Group : IG5
  - Section :
  - Tag : 2-WW-13-0140-S-A2-1
- Construction Data:**
  - Material : Carbon Steel \
  - Outside Diameter (mm) : 50.8
  - Nominal Thickness (mm) : 3.73
  - Length (m) : 15.24
  - Insulation : No
  - External Coating : High
  - Liner : No
  - PW/HT : No
- Operating Conditions Data:**
  - Chemical For COF : Gasoline
  - Toxic :
  - Pressure (barg) : Likelihood Pressure: 2 [Operating Pressure] | Consequence Pressure: 2 [Operating Pressure]
  - Operating Temperature (°C) : 45.41
  - Water Present : Yes
- Inspection History:**

Inspection	Inspection Task	Date	Measured Thickness (mm)	Inspection Effectiveness	Description
Inspection 2017		02/03/2017	3.73	Internal thinning (generalized) : Usually, Internal thinning (localized) : Usually, External thinning (atmospheric) : Usually,	

# RBI- Reports-Result Summary

- Once the assessment is done, the user can get the Result Summary as shown below. The result summary is the asset datasheet which store the latest RBI result for the element. It serve the quick data reference for risk summary data.
- Select one Element on the asset tree.
- Navigation path: AIRMS->RBI->Result Summary

The screenshot displays the AIRMS software interface for the 'Result Summary' of a specific element. The top navigation bar includes 'Synergi Plant : AIRMS', 'Facility Data', 'RBI', 'Work Pack', 'Thickness Monitoring', 'Dashboard', 'Utilities', and 'RBI Setup'. The main menu contains 'Import RBI Files', 'Calculation Input', 'Assessment', 'Screening', 'Audit Trail', 'Executive Summary', 'Part Summary Report', and 'Result Summary'. The left sidebar shows a treeview of assets, with '2-WW-13-0140-S-A2-1-EL' selected. The main panel is divided into three sections: 'COF Summary', 'Earliest Next Inspection', and 'Risk Summary'. The 'COF Summary' section includes dropdowns for 'COF Category Selection' (Total cost), 'Total Cost CoF' (D), 'Safety Area CoF' (B), 'Environmental CoF' (A), 'Business Impact CoF' (C), and 'Total Consequence Area CoF' (B). The 'Earliest Next Inspection' section shows 'Next Inspection Date' as 2028/06/27, 'Damage Mechanism' as External Thinning, 'Inspection Effectiveness' as Highly, and 'Inspection Task' as NonIntr+95VT+UT/RT follow-up. The 'Risk Summary' section includes 'CoF Category' (D), 'PoF Category - Current' (2), 'PoF Category - Future' (5), 'PoF Category - Future with Inspection' (4), 'Risk Category - Current' (M), and 'Risk Category - Future' (H).

# Synergi Plant Training

## **Tommy Tang**

Tommy.Tang@dnv.com

+65-8699-5620, +886-983-007388

**www.dnv.com**

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