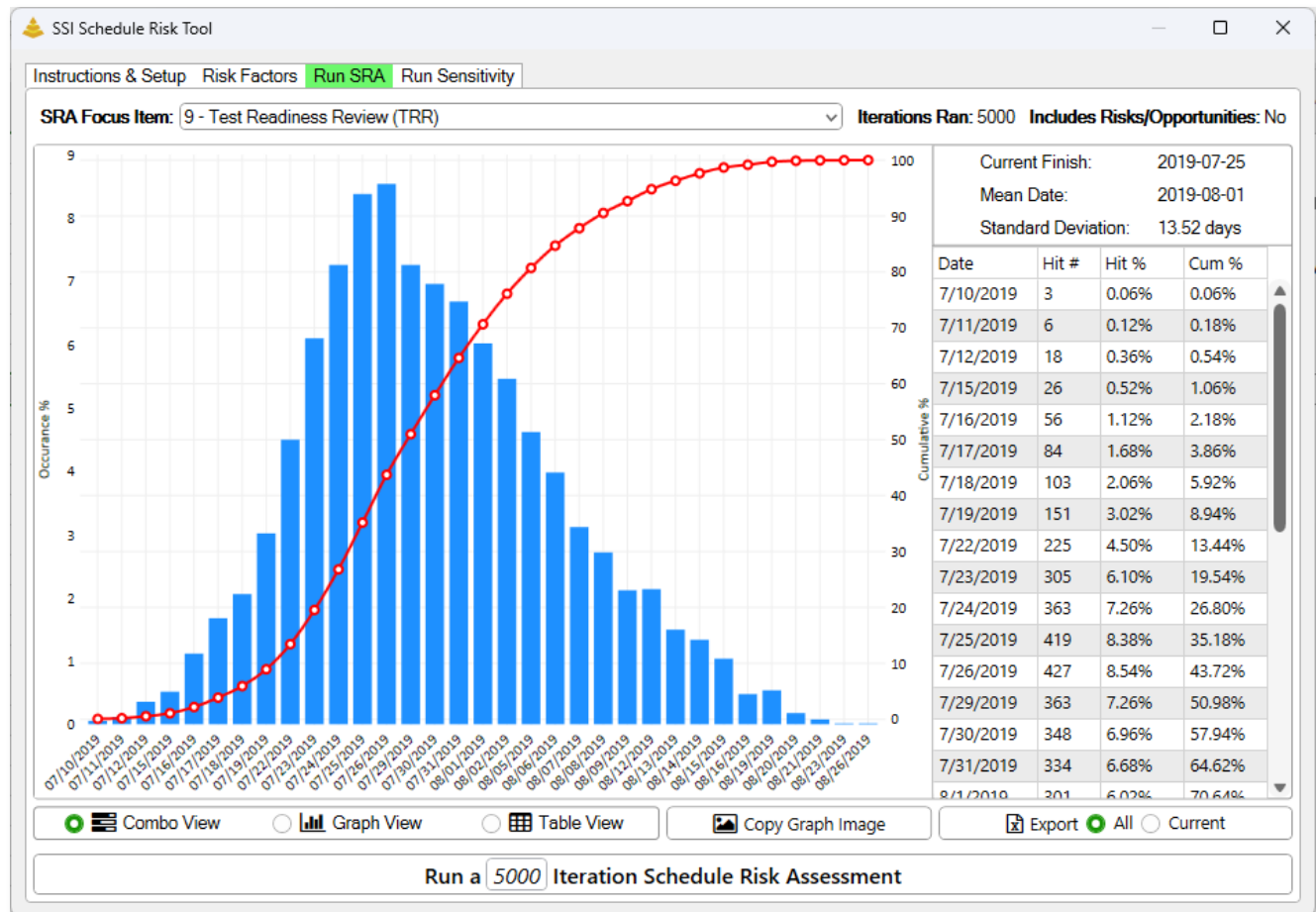
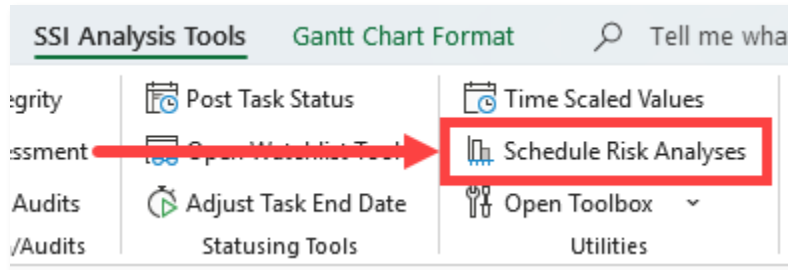


Table of Contents

SSI's Schedule Risk Analysis Tool	2
Overview.....	2
Understanding Duration Uncertainty	3
Understanding Risks and Opportunities	4
Setting up a Project for Analyses	5
Flagging Key Events	6
Entering Duration Uncertainty Estimates	7
Class Exercise 1 – Flagging Key Events and Establishing Duration Uncertainty.....	12
Setting up Risks and Opportunities	17
Class Exercise 2 – Setting up Risks/Opportunities for Analysis	19
Prerequisite Audits	21
Schedule Risk Assessments	22
Understanding how Duration Uncertainty is Simulated.....	22
Distribution Algorithms.....	23
Understanding how Risks and Opportunities are Simulated	24
Understanding how SRA Results are Calculated	25
SRA Specific Options	26
Running a Schedule Risk Assessment	28
Understanding the Results.....	30
Observing and Distributing Results	32
Class Exercise 3 – Performing a Schedule Risk Analysis	33
Sensitivity Analyses	37
Running a Sensitivity Analysis.....	39
Understanding the Results.....	41
Observing and Distributing Results	43
Class Exercise 4 – Performing a Sensitivity Analysis.....	44

SSI's Schedule Risk Analysis Tool

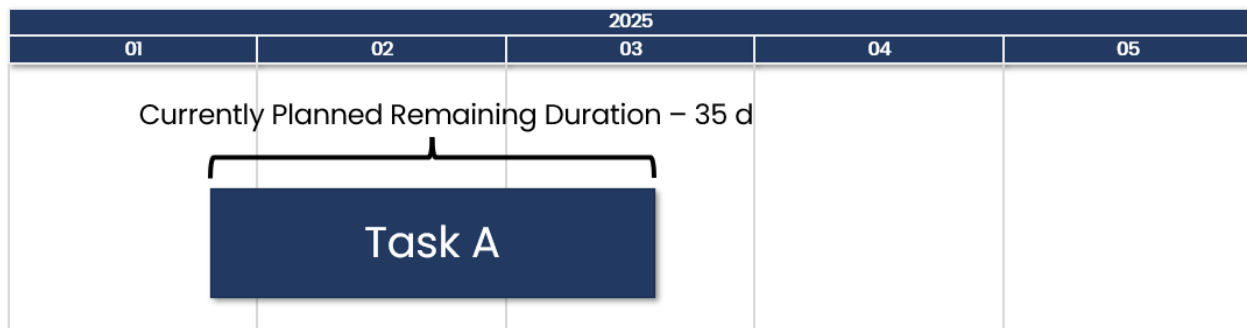


Overview

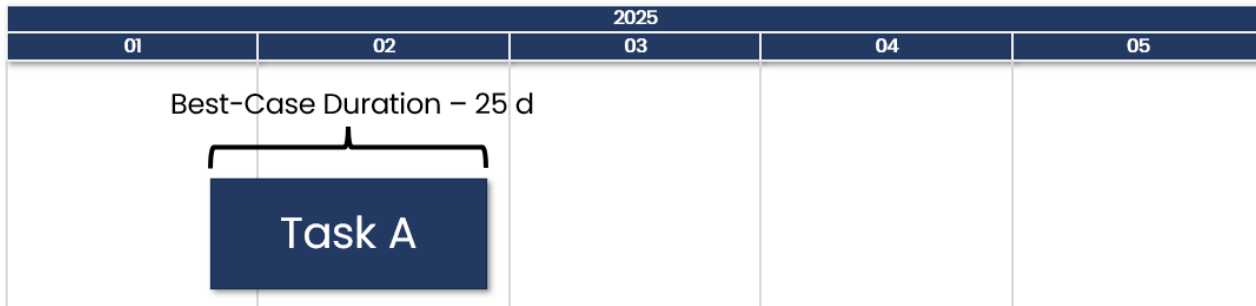
SSI's **Schedule Risk Analysis Tool** is designed to help Microsoft Project users better understand and quantify schedule uncertainty, risks, and opportunities within their project schedules. The tool leverages existing schedule logic (predecessor/successor relationships), along with coded duration estimates and specific schedule risks and opportunities to perform Schedule Risk Assessments (SRAs) and Sensitivity Analyses.

Understanding Duration Uncertainty

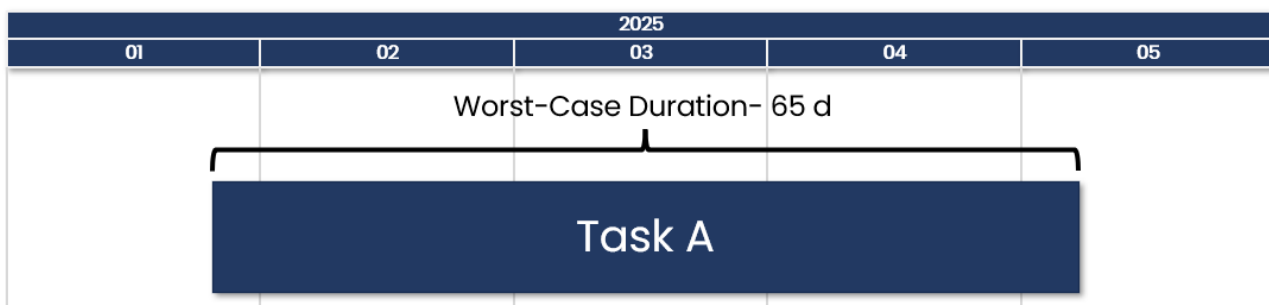
Duration Uncertainty refers to the idea that the actual duration of tasks may differ from their planned duration. When developing a schedule, tasks are typically assigned a **Most-Likely** duration estimate, representing the expected amount of time required to complete the work under normal conditions:



However, actual performance may vary. In some cases, work may be completed more efficiently than anticipated, resulting in a shorter duration. This shortest reasonable duration is referred to as the task's **Best-Case** or **Optimistic** duration estimate:



Conversely, unforeseen challenges may cause the activity to take longer than expected. This longest reasonable duration is referred to as the task's **Worst-Case** or **Pessimistic** duration estimate:



Understanding Risks and Opportunities

Schedule **Risks** and **Opportunities** are typically identified, documented, and tracked by the project team as part of the project's risk and opportunity management process. In addition to recording the existence of a Risk or Opportunity, project teams often maintain supporting information such as a unique identifier, the potential schedule impact if the event is realized, and the estimated likelihood of occurrence. Unlike duration uncertainty, which is always present, Risks and Opportunities are conditional events that either occur or do not occur.

A **Risk** is a potential future event or condition that, if realized, would negatively impact the schedule. In schedule risk analysis, risks typically represent events that may cause work to take longer than planned or delay a Key Event. For example, a project team may identify a risk that a specific test may fail. If the test is unsuccessful, additional time will be required to investigate the failures, implement corrective actions, and repeat testing. As a result, the testing activity will take longer than planned, potentially downstream activities and the Key Event(s) it supports.

Task Name	Remaining Duration	R/O ID	R/O Impact	R/O Probability
Perform Test	10 days	RISK-001	40 days	0.2

An **Opportunity** is a potential future event or condition that, if realized, could positively impact the schedule. In schedule risk analysis, opportunities typically represent events that may allow work to be completed faster than planned or accelerate a Key Event. For example, a project team may identify an opportunity to reuse an existing test procedure instead of developing a new one. If that opportunity occurs, the affected task will require less time to complete, potentially accelerating downstream activities and the Key Event(s) it supports.

Task Name	Remaining Duration	R/O ID	R/O Impact	R/O Probability
Write Test Procedure	30 days	OPP-001	10 days	0.5

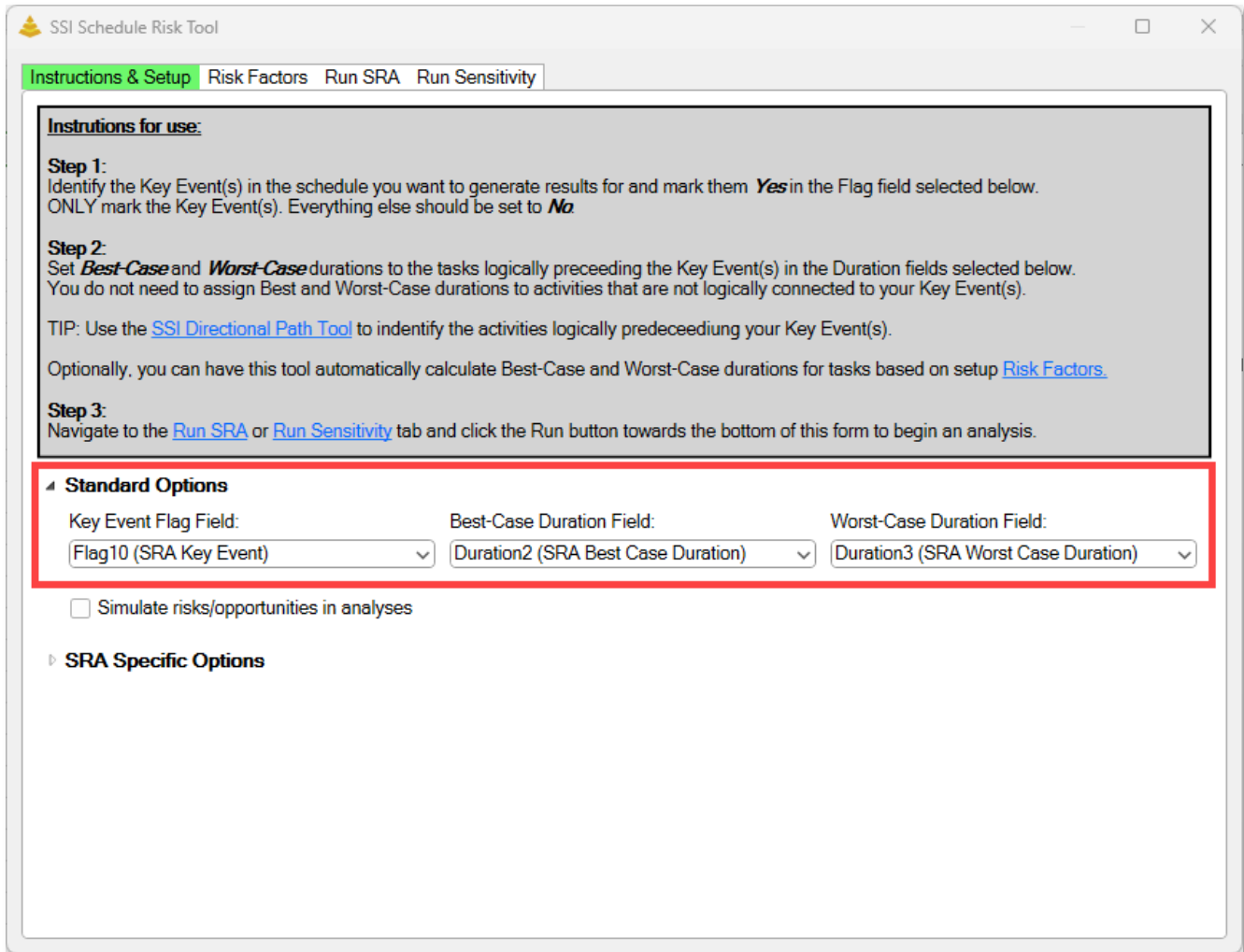
Note: Risks and Opportunities can exist in many forms, including those that affect cost, technical performance, resources, or other aspects of a project. However, throughout this document, the terms **Risk** and **Opportunity** refer specifically to **Schedule Risks** and **Schedule Opportunities** that may impact activity durations, milestone dates, or overall schedule performance.

Setting up a Project for Analyses

Both the Schedule Risk Assessment and Sensitivity Analysis require, at a minimum, the following to be done before analyses are performed:

1. Key Events/Milestone which results will be calculated towards must be flagged “Yes” in a designated flag field
2. Best-Case and Worst-Case duration estimates must be entered in designated duration fields on tasks logically preceding flagged key events

The fields used in your project for this data can be selected from the **Instructions & Setup** tab of the Schedule Risk Analysis tool:



The screenshot shows the 'SSI Schedule Risk Tool' window with the 'Instructions & Setup' tab selected. The tab contains instructions for use, divided into three steps. Step 1 instructs the user to identify key events and mark them 'Yes' in a flag field. Step 2 instructs the user to set best-case and worst-case durations for tasks preceding the key events. Step 3 instructs the user to navigate to the 'Run SRA' or 'Run Sensitivity' tab and click the 'Run' button. Below the instructions, there is a section titled 'Standard Options' which contains three dropdown menus: 'Key Event Flag Field' (set to 'Flag10 (SRA Key Event)'), 'Best-Case Duration Field' (set to 'Duration2 (SRA Best Case Duration)'), and 'Worst-Case Duration Field' (set to 'Duration3 (SRA Worst Case Duration)'). There is also a checkbox for 'Simulate risks/opportunities in analyses' which is currently unchecked. Below this is a section titled 'SRA Specific Options'.

SSI Schedule Risk Tool

Instructions & Setup Risk Factors Run SRA Run Sensitivity

Instructions for use:

Step 1:
Identify the Key Event(s) in the schedule you want to generate results for and mark them **Yes** in the Flag field selected below. ONLY mark the Key Event(s). Everything else should be set to **No**.

Step 2:
Set **Best-Case** and **Worst-Case** durations to the tasks logically preceding the Key Event(s) in the Duration fields selected below. You do not need to assign Best and Worst-Case durations to activities that are not logically connected to your Key Event(s).
TIP: Use the [SSI Directional Path Tool](#) to identify the activities logically preceding your Key Event(s).
Optionally, you can have this tool automatically calculate Best-Case and Worst-Case durations for tasks based on setup [Risk Factors](#).

Step 3:
Navigate to the [Run SRA](#) or [Run Sensitivity](#) tab and click the Run button towards the bottom of this form to begin an analysis.

Standard Options

Key Event Flag Field: Best-Case Duration Field: Worst-Case Duration Field:

Flag10 (SRA Key Event) Duration2 (SRA Best Case Duration) Duration3 (SRA Worst Case Duration)

☐ Simulate risks/opportunities in analyses

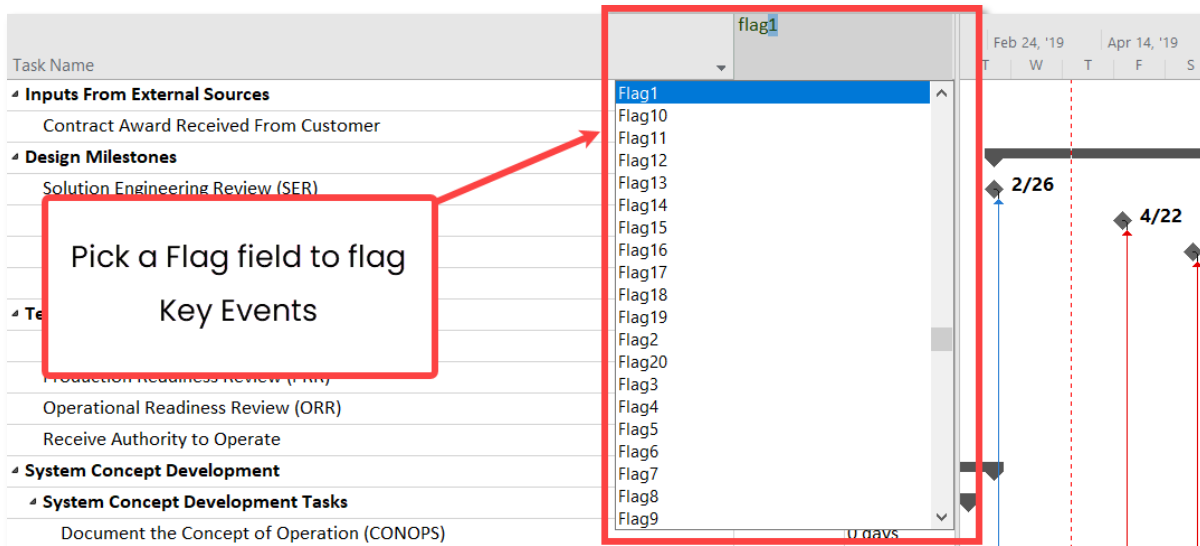
SRA Specific Options

Flagging Key Events

Key Events are the activities or milestones for which you want to evaluate schedule risk analysis results. To be recognized by the Schedule Risk Analysis Tool, Key Events must be flagged "Yes" in a designated Key Event flag field. While any task or milestone in the schedule can be identified as a Key Event, it is generally recommended that only the most significant project milestones, decision points, or deliverables be selected.

To mark activities in your schedule as "Key Events" complete the following steps:

1. Pick one of Microsoft Project's Task Flag fields to use to mark these activities.



Pick a Flag field to flag Key Events

2. Set this flag = "Yes" on each activity you consider to be a key event*.

Task Name	SRA Key Event (Flag10)	Half 2, 2019
Test & Verification Milestones	No	J A S O N D J
Test Readiness Review (TRR)	Yes	7/25
Production Readiness Review (PRR)	Yes	9/18
Operational Readiness Review (ORR)	Yes	11/4
Receive Authority to Operate	Yes	11/18

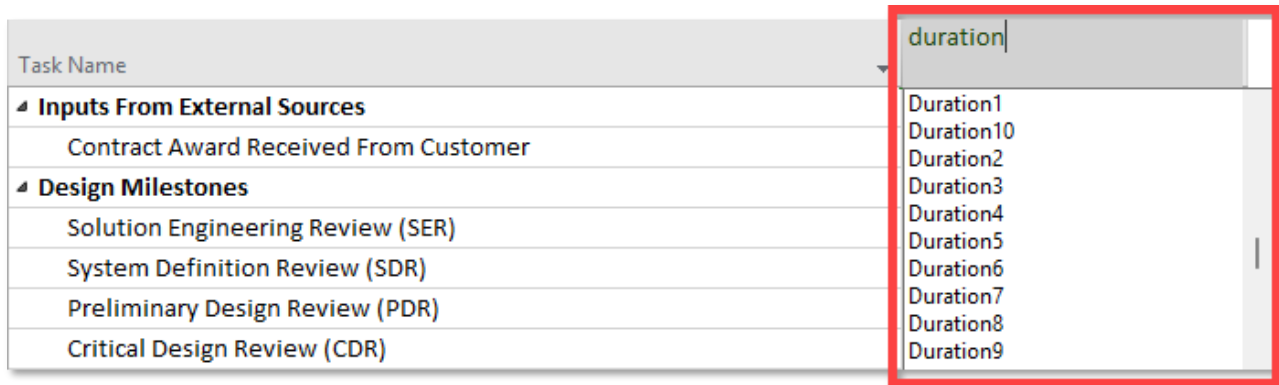
Note: In the flag field chosen, only Key Events should be flagged "Yes". Everything else in the schedule should be flagged "No".

Entering Duration Uncertainty Estimates

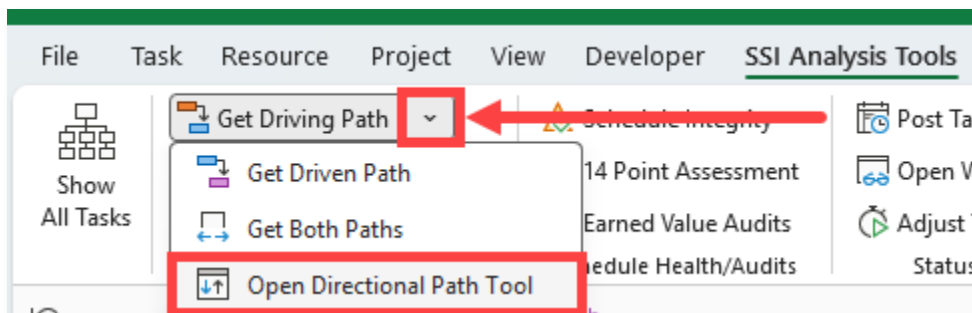
Best-Case and Worst-Case duration estimates should be established on activities that logically precede your identified Key Event(s). While duration uncertainty estimates can be entered for any task in the schedule, activities that are not logically connected to Key Events will have no impact on the analysis results because they cannot affect the Key Event's forecasted completion date no matter how their duration is changed.

To enter duration estimates on tasks in your schedule, complete the following steps:

1. Identify two unused duration fields within the schedule: one to store tasks' Best-Case duration estimates and another to store tasks' Worst-Case duration estimates.



2. Identify the tasks that logically precede your key event(s). SSI's **Directional Path Tool** can be used to easily isolate these tasks.

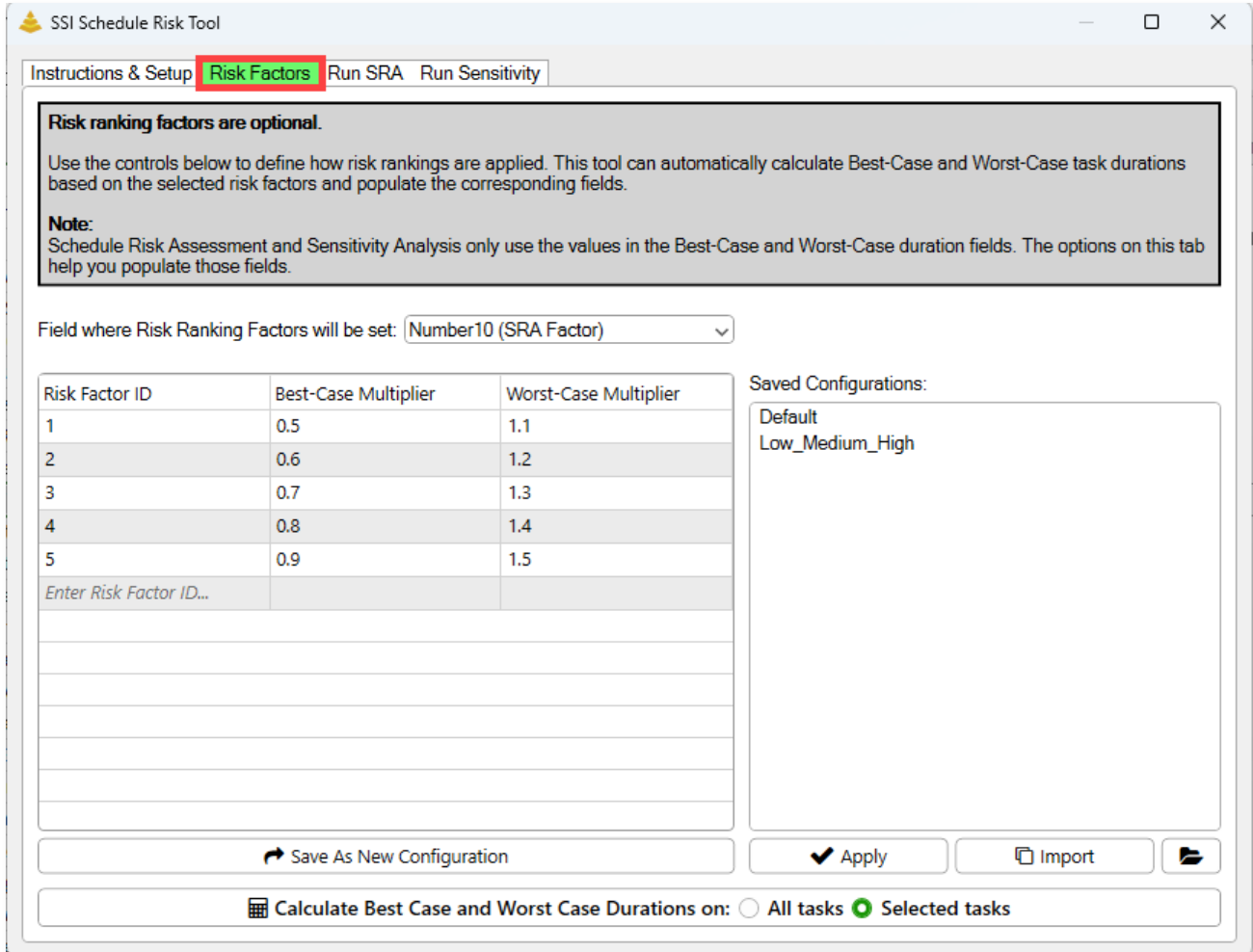


3. Enter tasks' Best-Case duration estimates in the designated Best-Case duration field and their Worst-Case duration estimates in the designated Worst-Case duration field.

Task Name	SRA Best Case Duration	SRA Worst Case Duration	Start	Finish
Generate Developmental Test Plan (DTP)	4 days	8 days	3/27/19	4/9/19
Develop Test Case Specifications	10 days	22 days	4/10/19	5/7/19
Develop System Acceptance Test Procedures	13 days	28 days	5/8/19	6/11/19
Perform Module Testing	18 days	33 days	6/12/19	7/16/19

Using Risk Factors to Automatically Calculate Duration Estimates

The SSI Schedule Risk Analysis Tool can automatically calculate Best- and Worst-Case duration values using a risk factor system. By assigning a risk factor to each task, the tool can apply predefined duration uncertainty multipliers to generate duration uncertainty estimates, providing a quick method to populate duration uncertainty data throughout the schedule.



SSI Schedule Risk Tool

Instructions & Setup **Risk Factors** Run SRA Run Sensitivity

Risk ranking factors are optional.

Use the controls below to define how risk rankings are applied. This tool can automatically calculate Best-Case and Worst-Case task durations based on the selected risk factors and populate the corresponding fields.

Note:
Schedule Risk Assessment and Sensitivity Analysis only use the values in the Best-Case and Worst-Case duration fields. The options on this tab help you populate those fields.

Field where Risk Ranking Factors will be set:

Risk Factor ID	Best-Case Multiplier	Worst-Case Multiplier
1	0.5	1.1
2	0.6	1.2
3	0.7	1.3
4	0.8	1.4
5	0.9	1.5
Enter Risk Factor ID...		

Saved Configurations:

Default
Low_Medium_High

☐ All tasks ☒ Selected tasks

To use this option, you must identify a Text, Number, or Outline Code field that will be used to store the risk rank ID for each task:

Field where Risk Ranking Factors will be set:

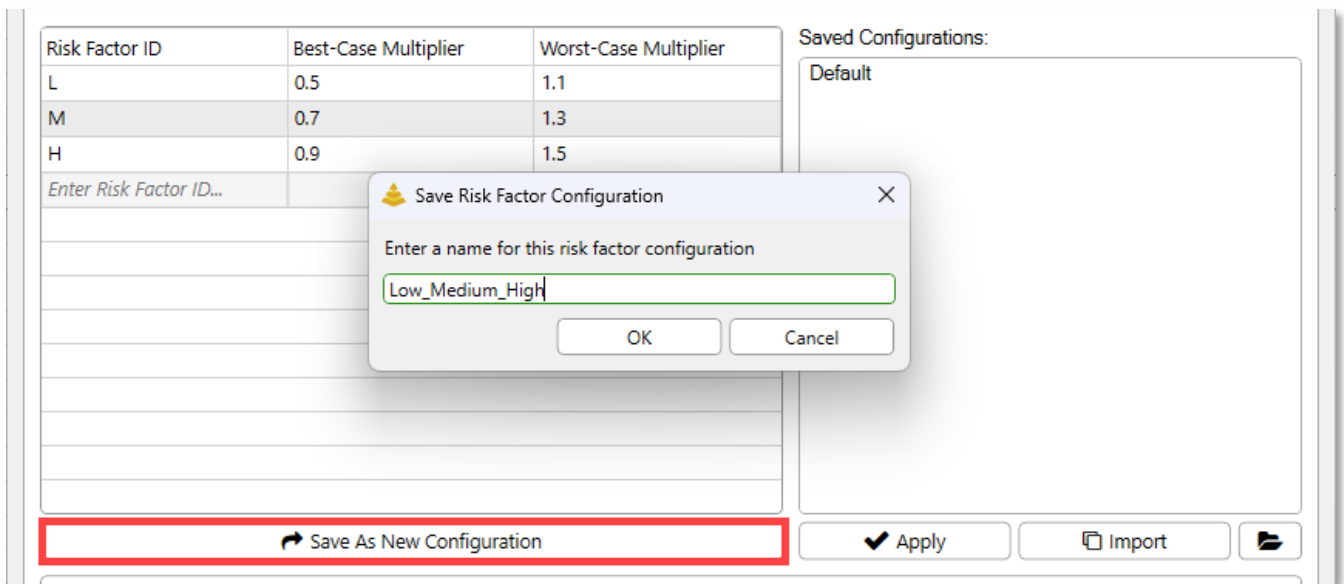
Risk rank IDs and their associated duration uncertainty multipliers are customizable; however, the tool includes the following default values:

Risk Factor ID	Best-Case Multiplier	Worst-Case Multiplier
1	0.5	1.1
2	0.6	1.2
3	0.7	1.3
4	0.8	1.4
5	0.9	1.5

Observe the following table to see how the duration estimates for tasks marked with these risk factors would be calculated:

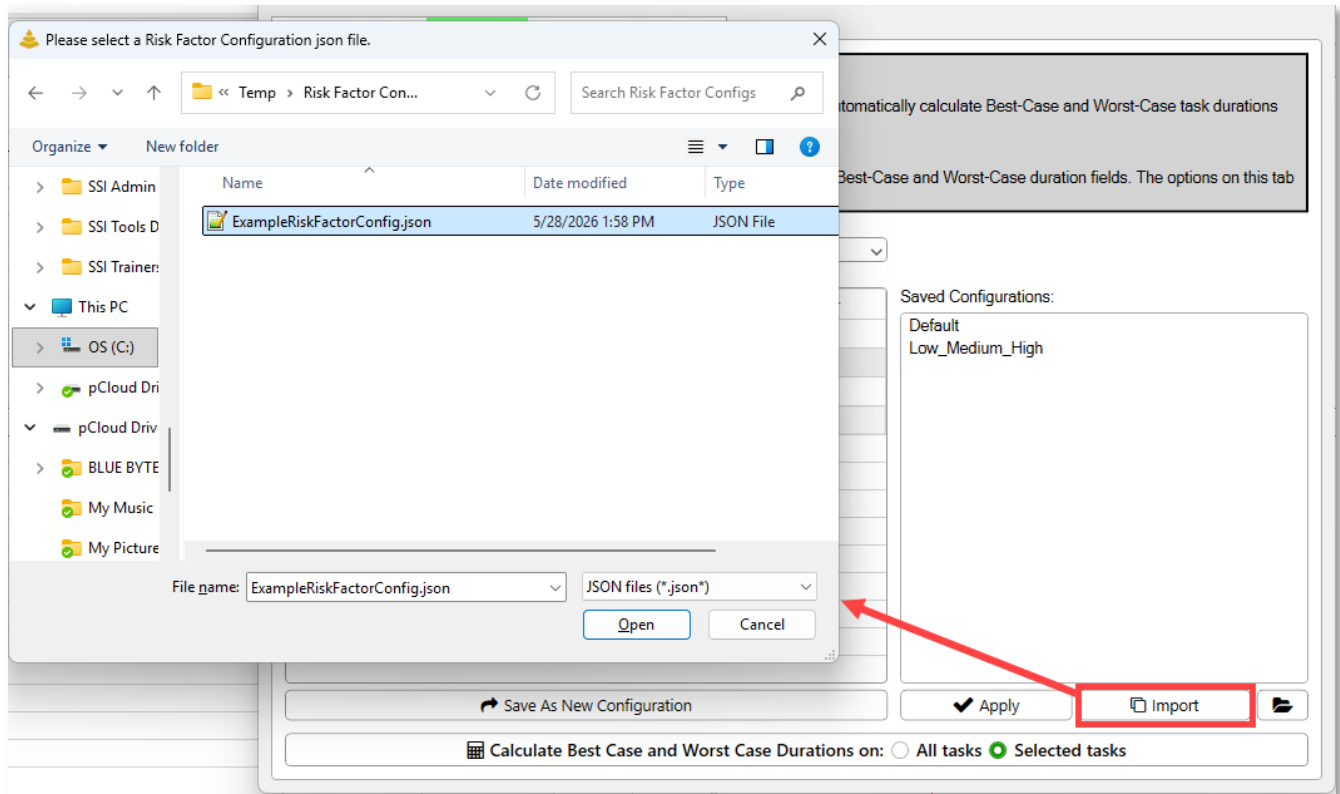
Task Remaining Duration	Risk Factor Assigned	Best Case Multiplier	Best Case Calculation	Worst Case Multiplier	Worst-Case Calculation
10d	1	0.5	$10 * 0.5 = \mathbf{5d}$	1.1	$10 * 1.1 = \mathbf{11d}$
10d	2	0.6	$10 * 0.6 = \mathbf{6d}$	1.2	$10 * 1.2 = \mathbf{12d}$
10d	3	0.7	$10 * 0.7 = \mathbf{7d}$	1.3	$10 * 1.3 = \mathbf{13d}$
10d	4	0.8	$10 * 0.8 = \mathbf{8d}$	1.4	$10 * 1.4 = \mathbf{14d}$
10d	5	0.9	$10 * 0.9 = \mathbf{9d}$	1.5	$10 * 1.5 = \mathbf{15d}$

Risk Factors can be organized and saved into reusable configurations:

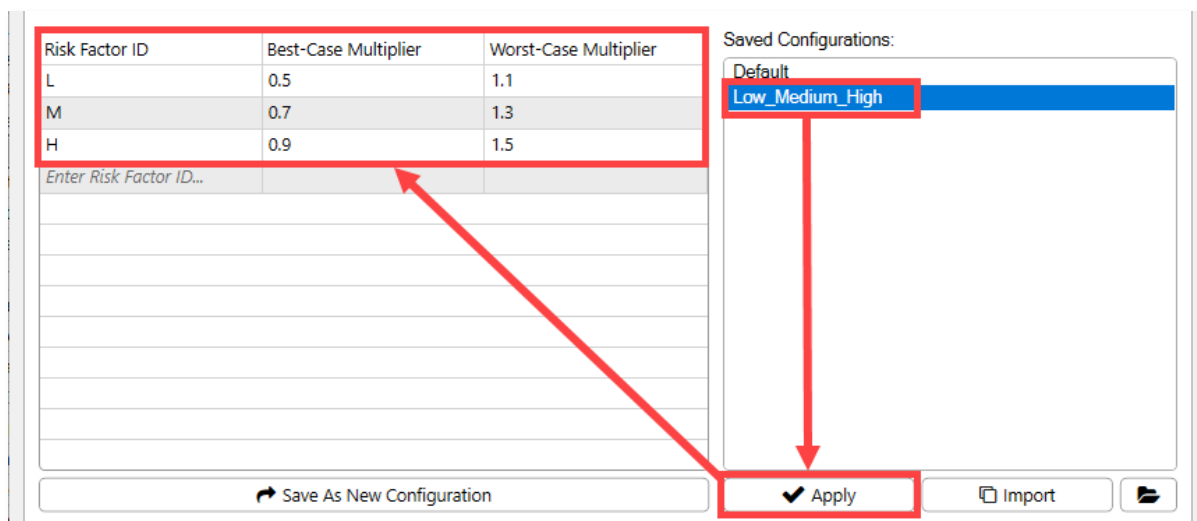


The screenshot shows the SSI Analysis Tools interface. On the left, there is a table with Risk Factor IDs (L, M, H) and their corresponding Best-Case and Worst-Case Multipliers. A dialog box titled "Save Risk Factor Configuration" is open, prompting the user to enter a name for the configuration. The name "Low_Medium_High" is entered in the text field. Below the dialog box, there is a button labeled "Save As New Configuration" which is highlighted with a red box. To the right of the dialog box, there is a section titled "Saved Configurations:" with a list containing "Default". At the bottom right, there are buttons for "Apply", "Import", and a folder icon.

Configurations can be distributed to team members and can be imported for use in their projects:



Applying a Risk Factor Configuration will automatically populate the Risk Factor table with the risk factor IDs and duration uncertainty multipliers defined in the selected configuration.



Once Risk Factors have been assigned to activities, the tool can automatically calculate Best-Case and Worst-Case duration estimates based on the selected Risk Factor configuration. To perform this calculation, click the **Calculate Best-Case and Worst-Case Durations** button located at the bottom of the Risk Factors tab within the Schedule Risk Analysis Tool. The calculation can be applied either to all activities in the schedule that have a Risk Factor ID assigned or only to the activities currently selected in Microsoft Project.

Task Name	Remaining Duration	SRA Factor	SRA Best Case Duration	SRA Worst Case Duration
Generate Developmental Test Plan (DTP)	7 days	2	2.8 days	8.4 days
Develop Test Case Specifications	20 days	2	8 days	24 days
Develop System Acceptance Test Procedures	25 days	2	10 days	30 days
Perform Module Testing	25 days	4	5 days	35 days
Perform Software Code & Unit Testing	25 days	5	2.5 days	37.5 days
Generate Presentation Materials for TRR	5 days	1	2.5 days	5.5 days
Ensure TRR Exit Criteria Has Been Met	1 day	1	0.5 days	1.1 days
Conduct Test Readiness Review (TRR)	1 day	1	0.5 days	1.1 days
Test Readiness Review (TRR)	0 days	0	0 days?	0 days?

SSI Schedule Risk Tool

Instructions & Setup
Risk Factors
Run SRA
Run Sensitivity

Risk ranking factors are optional.

Use the controls below to define how risk rankings are applied. This tool can automatically calculate Best-Case and Worst-Case task durations based on the selected risk factors and populate the corresponding fields.

Schedule Risk Assessment and Sensitivity Analysis only use the values in the Best-Case and Worst-Case duration fields. The options on this tab help you populate those fields.

Field where Risk Ranking Factors will be set: Number10 (SRA Factor)

Risk Factor ID	Best-Case Multiplier	Worst-Case Multiplier
1	0.5	1.1
2	0.4	1.2
3	0.3	1.3
4	0.2	1.4
5	0.1	1.5
Enter Risk Factor ID...		

Saved Configurations:

- Default
- Low_Medium_High

Save As New Configuration
Apply
Import

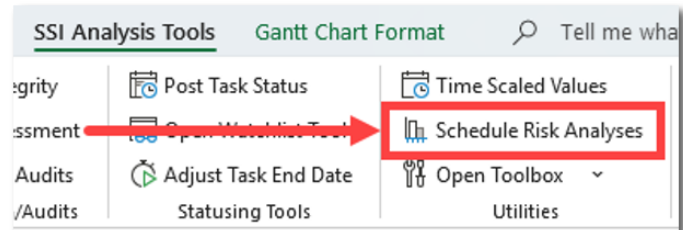
Calculate Best Case and Worst Case Durations on:
☐ All tasks
☒ Selected tasks

Note: When performing either a Schedule Risk Assessment or a Sensitivity Analysis, the SSI Schedule Risk Analysis Tool uses only the values stored in the Best-Case and Worst-Case duration fields. Risk Factor values are not used directly during the analysis. Instead, they serve only as a mechanism for calculating and populating the Best-Case and Worst-Case duration estimates prior to running the analysis.

Class Exercise 1 – Flagging Key Events and Establishing Duration Uncertainty

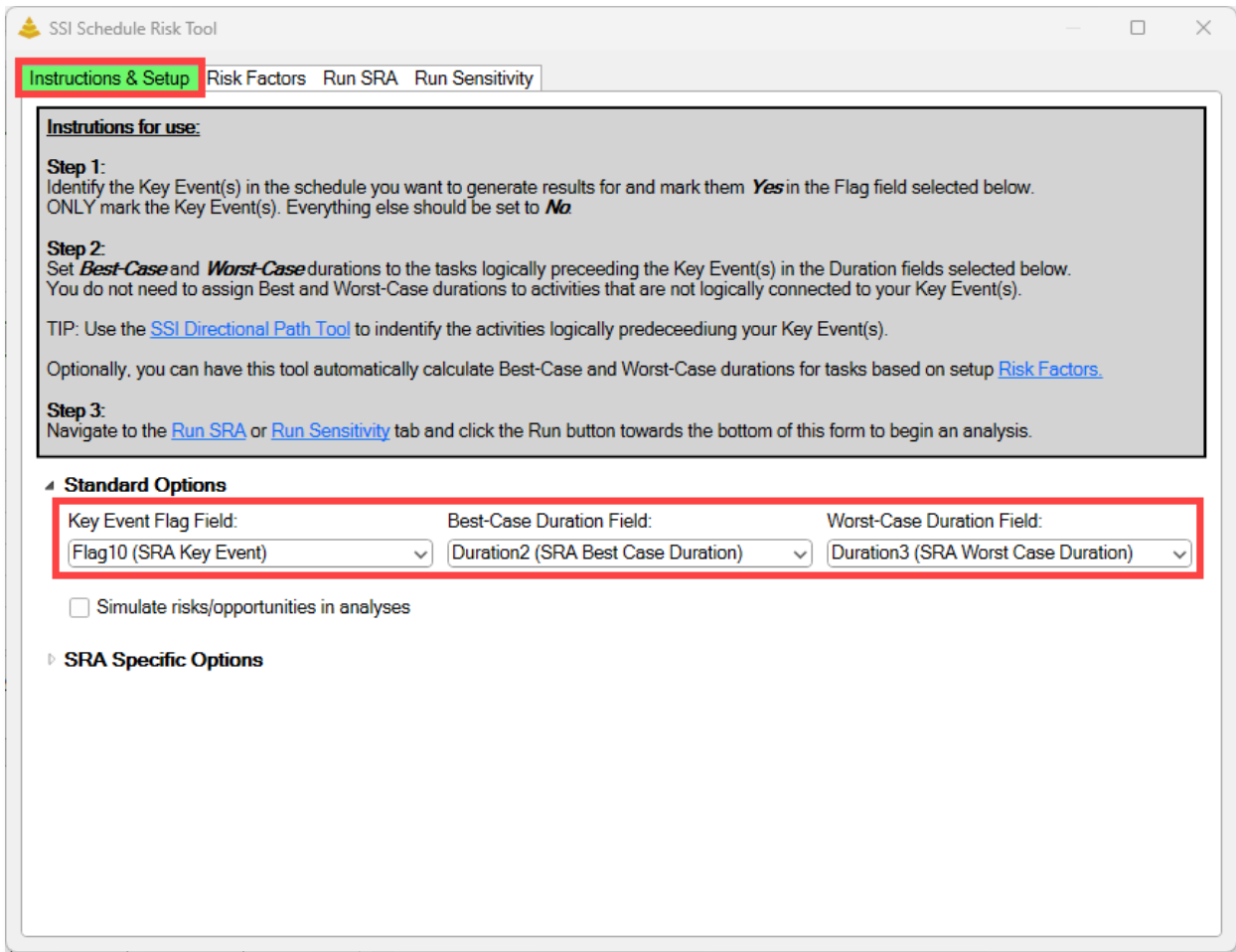
1. Download and open the [ExampleProjectSRA.mpp](#) file.

2. Click **Schedule Risk Analyses** from the **SSi Analysis Tools** ribbon.



3. On the **Instructions & Setup** tab on the **Schedule Risk Analysis** form, make the following selections

- Key Event Flag Field: **Flag10**
- Best-Case Duration Field: **Duration2**
- Worst-Case Duration Field: **Duration3**



SSi Schedule Risk Tool

Instructions & Setup Risk Factors Run SRA Run Sensitivity

Instructions for use:

Step 1:
Identify the Key Event(s) in the schedule you want to generate results for and mark them **Yes** in the Flag field selected below.
ONLY mark the Key Event(s). Everything else should be set to **No**.

Step 2:
Set **Best-Case** and **Worst-Case** durations to the tasks logically preceding the Key Event(s) in the Duration fields selected below.
You do not need to assign Best and Worst-Case durations to activities that are not logically connected to your Key Event(s).

TIP: Use the [SSi Directional Path Tool](#) to identify the activities logically preceding your Key Event(s).

Optionally, you can have this tool automatically calculate Best-Case and Worst-Case durations for tasks based on setup [Risk Factors](#).

Step 3:
Navigate to the [Run SRA](#) or [Run Sensitivity](#) tab and click the Run button towards the bottom of this form to begin an analysis.

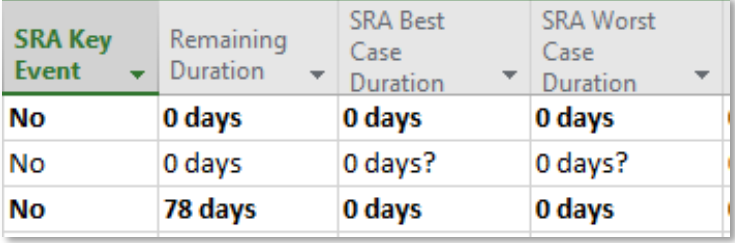
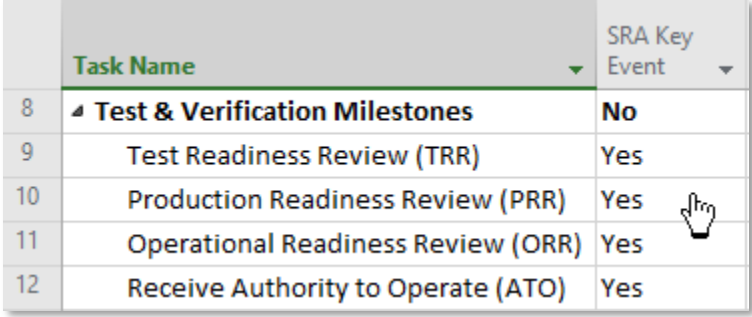
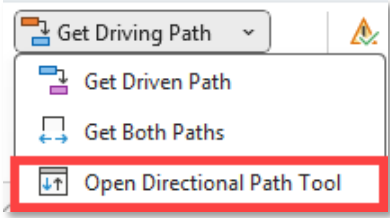
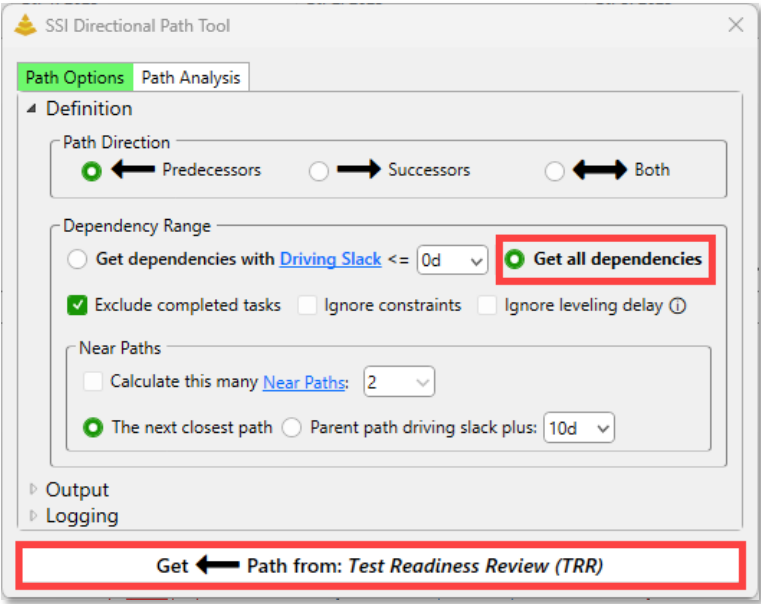
Standard Options

Key Event Flag Field: Best-Case Duration Field: Worst-Case Duration Field:

Flag10 (SRA Key Event) Duration2 (SRA Best Case Duration) Duration3 (SRA Worst Case Duration)

☐ Simulate risks/opportunities in analyses

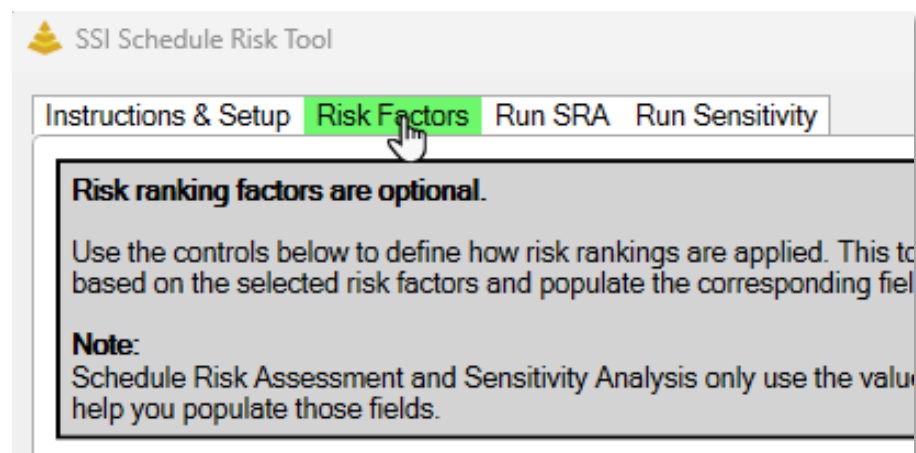
SRA Specific Options

4. Display Flag 10 (SRA Key Event), Remaining Duration, Duration 2 (SRA Best-case Duration) and Duration 3 (SRA Worst-case Duration) in the task table.	
5. Set Flag 10 = Yes on rows 9 - 12	
6. Open the Directional Path Tool by clicking the Open Directional Path Tool button.	
7. On the Directional Path Tool form, set the Dependency Range to Get all dependencies. Select the Test Readiness Review (TRR) focus item and click the Get Path button.	

8. You now need to set the SRA Best-case Duration (Duration 2) and the SRA Worst-case Duration (Duration 3) on all the tasks that are highlighted and show "0 days?"

	Task Name	SRA Best Case	SRA Worst	Remaining Duration
37	Develop Requirements Traceability Matrix (RTM)	0 days?	0 days?	9 days
40	Generate Developmental Test Plan (DTP)	0 days?	0 days?	7 days
46	Develop Security Test & Evaluation (ST&E) Plan	0 days?	0 days?	2 days
50	Finalize Presentation Materials for SDR	0 days?	0 days?	5 days
51	Ensure SDR Exit Criteria Has Been Met	0 days?	0 days?	1 day
52	Conduct SDR	0 days?	0 days?	1 day
57	Develop Logical (Preliminary) Design	0 days?	0 days?	3 days
58	Develop Data Architecture	0 days?	0 days?	15 days

9. Open the **SSI Schedule Risk Analysis** tool and click on the **Risk Factors** tab.



10. Set the **Field where Risk Ranking Factors will be set** to **Number 10 (SRA Factor)**

Field where Risk Ranking Factors will be set:

11. Review the Default Risk Factor IDs and their Best-Case and Worst-Case Multiplier values.

Risk Factor ID	Best-Case Multiplier	Worst-Case Multiplier
1	0.5	1.1
2	0.4	1.2
3	0.3	1.3
4	0.2	1.4
5	0.1	1.5
Enter Risk Factor ID...		

12. Display Number10 (SRA Factor) in the task table

Task Name	Remaining Duration	SRA Factor	SRA Best Case	SRA Worst
Develop Security Test & Evaluation (ST&E) Plan	2 days	0	0 days?	0 days?
Generate Developmental Test Plan (DTP)	7 days	0	0 days	0 days?
Develop Requirements Traceability Matrix (RTM)	9 days	0	0 days?	0 days?
Finalize Presentation Materials for SDR	5 days	0	0 days?	0 days?
Ensure SDR Exit Criteria Has Been Met	1 day	0	0 days?	0 days?
Conduct SDR	1 day	0	0 days?	0 days?
Develop Logical (Preliminary) Design	3 days	0	0 days?	0 days?
Develop Data Architecture	15 days	0	0 days?	0 days?

13. Enter the following Risk Factors to the tasks that are highlighted

Task Name	Remaining Duration	SRA Factor	SRA Best Case	SRA Worst
Develop Security Test & Evaluation (ST&E) Plan	2 days	1	0 days?	0 days?
Generate Developmental Test Plan (DTP)	7 days	2	0 days	0 days?
Develop Requirements Traceability Matrix (RTM)	9 days	3	0 days?	0 days?
Finalize Presentation Materials for SDR	5 days	4	0 days?	0 days?
Ensure SDR Exit Criteria Has Been Met	1 day	5	0 days?	0 days?
Conduct SDR	1 day	1	0 days?	0 days?
Develop Logical (Preliminary) Design	3 days	2	0 days?	0 days?
Develop Data Architecture	15 days	3	0 days?	0 days?



14. Selected those tasks and click the button at the bottom of the Risk Factors tab to **Calculate Best and Worst Case Durations on Selected Tasks.**

Calculate Best Case and Worst Case Durations on: ☐ All tasks ☒ Selected tasks

15. Observe the Best-Case and Worst-Case durations of the selected tasks have all been calculated based on the multipliers set.

Task Name	Remaining Duration	SRA Factor	SRA Best Case	SRA Worst
Develop Security Test & Evaluation (ST&E) Plan	2 days	1	1 day	2.2 days
Generate Developmental Test Plan (DTP)	7 days	2	2.8 days	8.4 days
Develop Requirements Traceability Matrix (RTM)	9 days	3	2.7 days	11.7 days
Finalize Presentation Materials for SDR	5 days	4	1 day	7 days
Ensure SDR Exit Criteria Has Been Met	1 day	5	0.1 days	1.5 days
Conduct SDR	1 day	1	0.5 days	1.1 days
Develop Logical (Preliminary) Design	3 days	2	1.2 days	3.6 days
Develop Data Architecture	15 days	3	4.5 days	19.5 days

SSI Schedule Risk Tool

Instructions & Setup Risk Factors Run SRA Run Sensitivity

Risk ranking factors are optional.

Use the controls below to define how risk rankings are applied. This tool can automatically calculate Best-Case based on the selected risk factors and populate the corresponding fields.

Note:

Schedule Risk Assessment and Sensitivity Analysis only use the values in the Best-Case and Worst-Case durations to help you populate those fields.

Field where Risk Ranking Factors will be set: Number10 (SRA Factor)

Risk Factor ID	Best-Case Multiplier	Worst-Case Multiplier
1	0.5	1.1
2	0.4	1.2
3	0.3	1.3
4	0.2	1.4
5	0.1	1.5

Saved Configurations:

Default
H-M-L

Adjust the Best and Worst-Case durations as desired.

End of Practice Exercise

Setting up Risks and Opportunities

In addition to modeling Duration Uncertainty, the SSI Schedule Risk Analysis Tool can model specific schedule Risks and Opportunities that have been identified and documented by the project team. These Risks and Opportunities can be incorporated into both Schedule Risk Assessments and Sensitivity Analyses to evaluate their potential impact on project outcomes.

To be recognized and included in the analysis, the following information must be coded within the schedule:

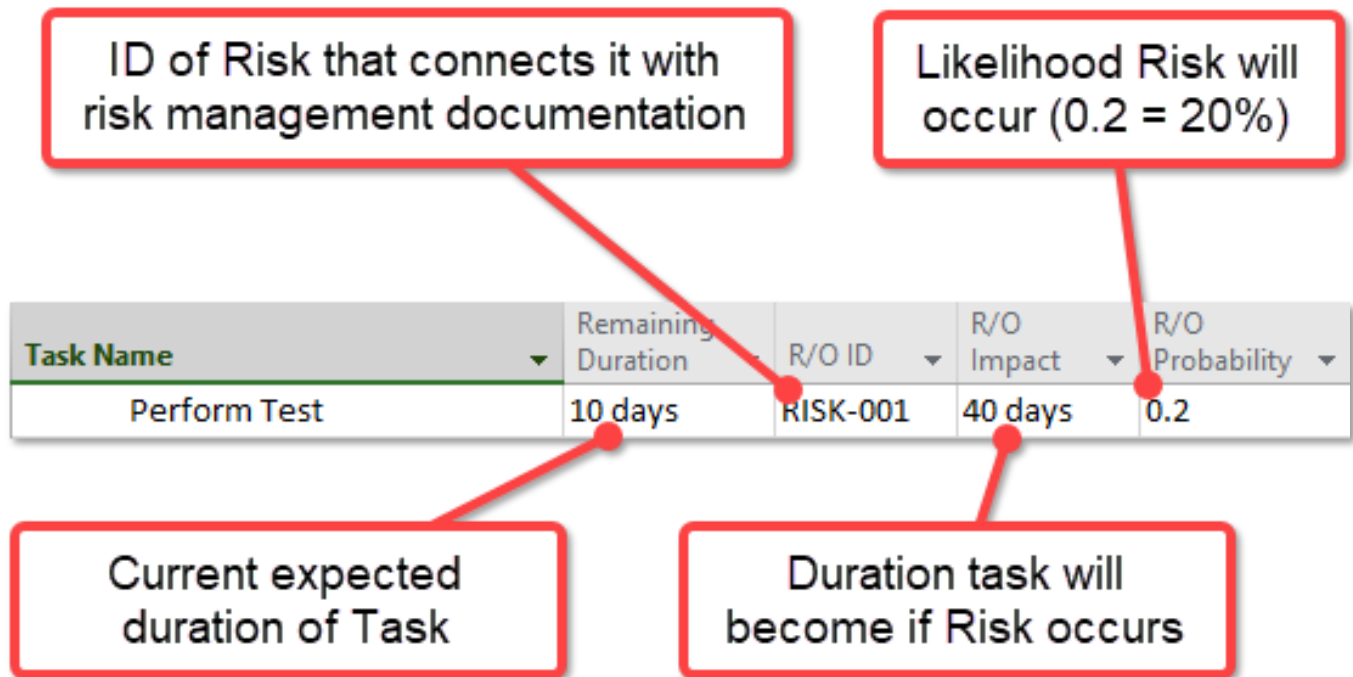
- **Risk/Opportunity ID:** This is a unique identifier assigned to the Risk or Opportunity. This value is stored in a Text or Outline Code field and is used to associate the schedule item with the corresponding risk documentation maintained by the project team.
- **Impact Duration*:** This represents the duration that will be applied to the activity if the Risk or Opportunity is realized. This value must be stored in a Duration field and reflects the schedule impact associated with the event.
- **Probability of Occurrence:** this represents the likelihood that the Risk or Opportunity will be realized. This value is stored in a Number field as a decimal between 0 and 1 (for example, 0.25 = 25% probability). Probability values are only required when performing a Schedule Risk Assessment. Sensitivity Analyses do not require probability values and can model risks and opportunities without this information.

Task Name ▾	R/O ID ▾	R/O Impact ▾	R/O Probabilit ▾
Risk	RISK-001	20 days	0.2
Opportunity	OPP-001	10 days	0.5

Any task in the schedule can be designated as a Risk or an Opportunity. Risks may be coded on either tasks or milestones, while Opportunities can only be coded on tasks. To ensure that a Risk or Opportunity can influence the analysis results, it should logically precede the flagged Key Event(s) within the schedule.

*In addition to defining a single Impact Duration, Risks and Opportunities may also be assigned **Best-Case** and **Worst-Case** duration values. When these additional values are provided, the Impact Duration is treated as the **Most-Likely** duration. This allows the tool to model duration uncertainty around the impact of the risk or opportunity itself, rather than assuming the Risk or Opportunity will always result in a single fixed duration.

Observe the following example of a Risk modeled in Microsoft Project:



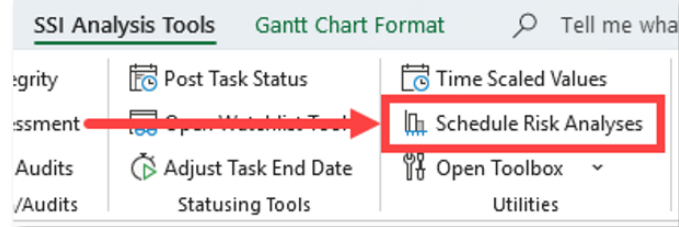
The example above illustrates how a **Schedule Risk** is coded within a Microsoft Project schedule for use by the SSI Schedule Risk Analysis Tool:

- The task's **Remaining Duration** represents the current **Most-Likely** duration estimate. In this example, **10 days**.
- The **R/O ID** field contains the unique identifier (**RISK-001**) that links the task to the project's external risk management documentation or risk register.
- The **R/O Impact** field defines the duration the task will assume if the Risk is realized; in this example, the task's duration would increase from **10 days** to **40 days**.
- Finally, the **R/O Probability** field specifies the likelihood that the Risk will occur during a Schedule Risk Assessment. This value is entered as a decimal between **0** and **1**, where **0.2** represents a **20% probability of occurrence**.

Class Exercise 2 – Setting up Risks/Opportunities for Analysis

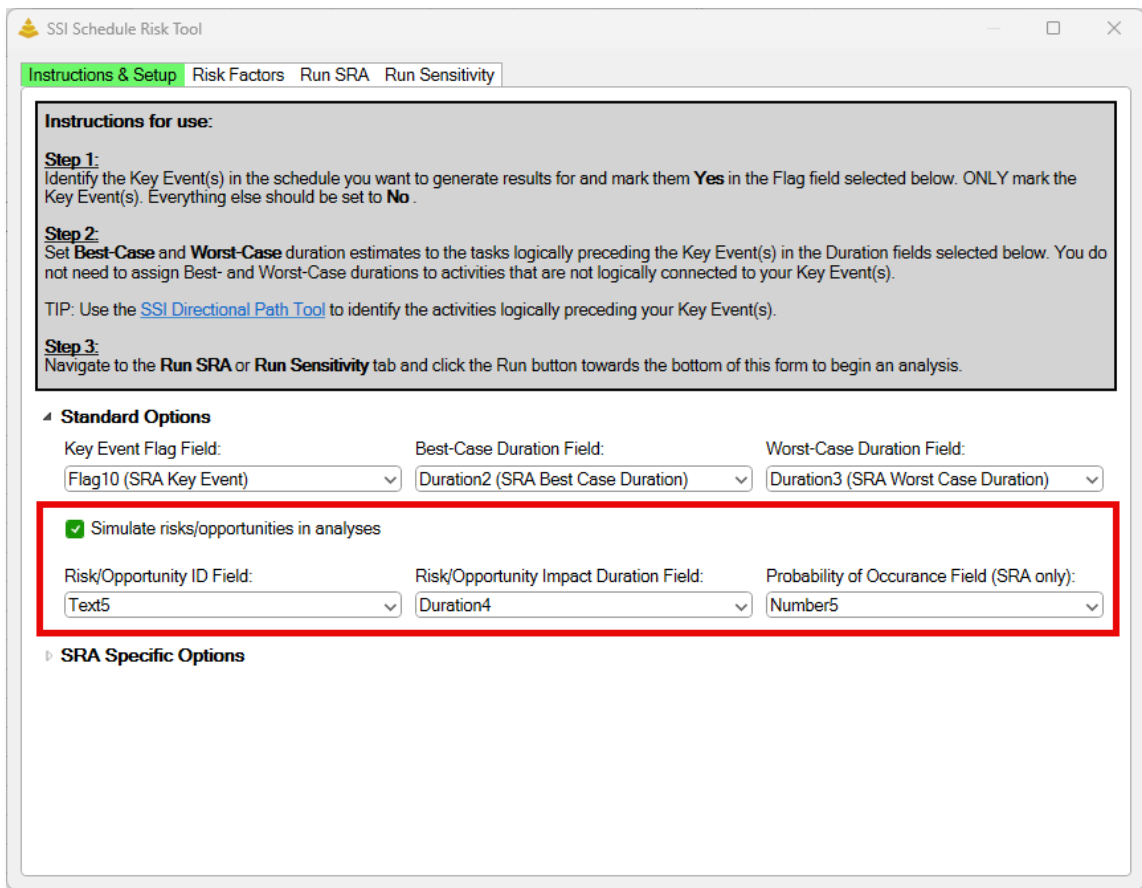
1. Use the ExampleProjectSRA.mpp file from the previous exercise.

2. Click **Schedule Risk Analyses** from the **SSi Analysis Tools** ribbon.



3. On the **Instructions & Setup** tab on the **Schedule Risk Analysis** form, Check the **Simulate risk/opportunities in analysis** check box and make the following selections to the drop-down boxes below:

- Risk/Opportunity ID Field: **Text5**
- Risk/Opportunity Impact Duration Field: **Duration4**
- Probability of Occurrence Field: **Number5**



SSi Schedule Risk Tool

Instructions & Setup | Risk Factors | Run SRA | Run Sensitivity

Instructions for use:

Step 1:
Identify the Key Event(s) in the schedule you want to generate results for and mark them **Yes** in the Flag field selected below. **ONLY** mark the Key Event(s). Everything else should be set to **No**.

Step 2:
Set **Best-Case** and **Worst-Case** duration estimates to the tasks logically preceding the Key Event(s) in the Duration fields selected below. You do not need to assign Best- and Worst-Case durations to activities that are not logically connected to your Key Event(s).

TIP: Use the [SSi Directional Path Tool](#) to identify the activities logically preceding your Key Event(s).

Step 3:
Navigate to the **Run SRA** or **Run Sensitivity** tab and click the Run button towards the bottom of this form to begin an analysis.

Standard Options

Key Event Flag Field: Flag10 (SRA Key Event) | Best-Case Duration Field: Duration2 (SRA Best Case Duration) | Worst-Case Duration Field: Duration3 (SRA Worst Case Duration)

☒ Simulate risks/opportunities in analyses

Risk/Opportunity ID Field: Text5 | Risk/Opportunity Impact Duration Field: Duration4 | Probability of Occurrence Field (SRA only): Number5

SRA Specific Options



4. Display and rename Text5 (R/O ID), Duration 4 (R/O Impact Duration) and Number5 (Probability of Occurrence) in the Gantt Chart

SRA Key Event ▾	R/O ID ▾	R/O Impact Duration ▾	Prob of Occurrence ▾
No		0 days	0
No		0 days	0
No		0 days	0

5. Insert a new task row after **row 81**. This task will represent a Project **Risk**. Name this task, **"Re-Perform Software Testing"**. Assign its predecessors ID 80 and 81 and its successor ID 84. Set its Duration to **0 days**.

	Task Name ▾	Remaining Duration ▾	Jun 2, '19 S	M	Jul 21, T
80	Perform Software Code & Unit Testing	25 days			
81	Perform Module Testing	25 days			
82	Re-Perform Software Testing	0 days			
83	Conduct Test Readiness Review (TRR)	7 days			
84	Generate Presentation Materials for TRR	5 days			

6. Assign the following to its Risk/Opportunity Fields:

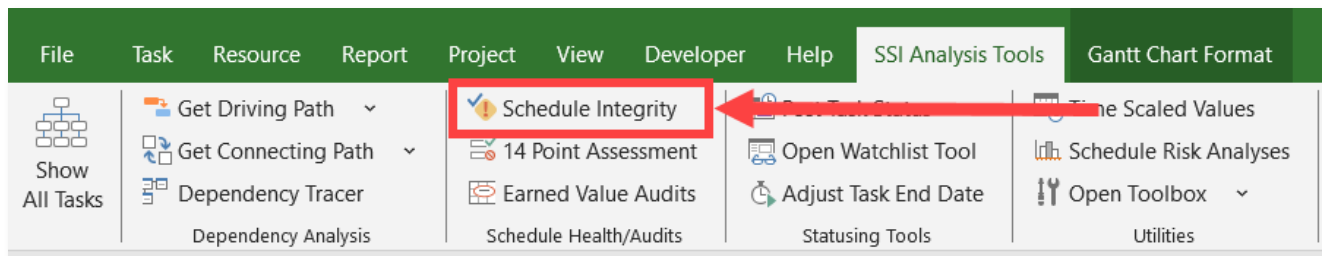
- R/O ID: **R-001**
- R/O Impact Duration: **25 days**
- Prob of Occurrence: **0.3**

	Task Name ▾	R/O ID ▾	R/O Impact Duration ▾	Prob of Occurrence ▾
82	Re-Perform Software Testing	R-001	25 days	0.3

End of Practice Exercise

Prerequisite Audits

To ensure accurate and meaningful analysis results, your project schedule should be in good health and adhere to established scheduling best practices prior to performing either a Schedule Risk Assessment or Sensitivity Analysis. Because the Schedule Risk Analysis Tool relies on schedule logic and activity relationships to perform its calculations, issues such as missing logic, unnecessary constraints, or dependencies on summaries can reduce the accuracy and reliability of the results. Many of these audits to check the condition of your schedule's health can be performed using **SSI's Integrity Audits** tool



SSI recommends schedules be checked, and necessary corrective actions be taken for the following conditions:

- Missing Dependencies
- Dangling Finishes
- Dependencies on Summary Tasks
- Out-of-Sequence Dependency Relationships
- Hard Constraints
- Unnecessary Soft Constraints
- Constraints on Summary Tasks
- Manually Scheduled Tasks
- Invalid Status
- Resources Assigned to Summary Tasks
- Resources with Incorrect Calendars

Note: If any **Schedule Margin** tasks are built into the schedule, their duration should be set to **0** prior to performing either a Schedule Risk Assessment or Sensitivity Analysis.

Schedule Risk Assessments

A **Schedule Risk Assessment (SRA)** is a Monte Carlo simulation that evaluates the potential effects of Duration Uncertainty and, optionally, identified Risks and Opportunities on the project schedule. By repeatedly simulating the schedule many times using different combinations of activity durations and Risk/Opportunity outcomes, from this simulation, a probability distribution for each Key Event can be generated. These results can then be used to determine the likelihood of achieving specific milestones or project events by a given date.

Understanding how Duration Uncertainty is Simulated

When a Schedule Risk Assessment (SRA) runs, the tool simulates duration uncertainty by varying the remaining duration of activities between their defined **Best-Case** and **Worst-Case** duration estimates. Rather than selecting durations completely at random, the analysis uses a probability distribution algorithm to determine how likely each value within that range is to be selected.

One way to visualize this process is to imagine a roulette wheel where each number on the wheel represents a possible duration value between a task's Best-Case and Worst-Case duration estimates.



When the wheel is spun, the selected value becomes the activity's **remaining duration** for that simulation iteration. Depending on the distribution algorithm being used for the task, some duration values may appear on the wheel more frequently than others, making them more likely to be selected.

During each simulation iteration, the tool “spins the wheel” on every activity has a valid Best-Case, Worst-Case, and Most-Likely* duration estimate defined.

Distribution Algorithms

The SSI Schedule Risk Analysis tool supports the following probability distribution algorithms for modeling Duration Uncertainty:

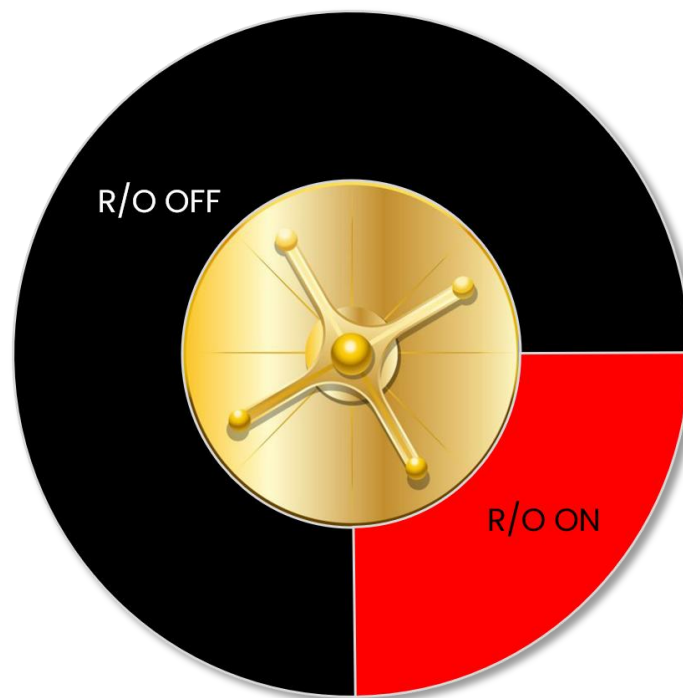
- **Triangular Distribution** – Uses the Best-Case, Most-Likely, and Worst-Case duration estimates to form a triangular-shaped probability distribution. Duration values near the Most-Likely estimate are more likely to be selected than values near the Best-Case or Worst-Case estimates. This is the most commonly used distribution algorithm for Schedule Risk Assessments.
- **Beta PERT Distribution** – Uses the Best-Case, Most-Likely, and Worst-Case duration estimates to create a smooth probability distribution that places greater emphasis on the Most-Likely duration. Compared to the Triangular distribution, Beta PERT generally produces fewer extreme outcomes and is often considered a more realistic representation of task duration uncertainty.
- **Normal Distribution** – Creates a bell-shaped probability distribution centered around the Most-Likely duration. Duration values near the Most-Likely estimate are significantly more likely to be selected than values near the Best-Case or Worst-Case estimates. This distribution is useful when activity durations are expected to cluster around a central value and extreme outcomes are relatively uncommon.
- **Uniform Distribution** – Assumes that every duration value between the Best-Case and Worst-Case estimates is equally likely to occur. Unlike the other distributions, the Uniform distribution does not favor the Most-Likely duration and treats all possible duration values within the range the same.

*Schedule Risk Assessments require a **Most-Likely** duration estimate to be identified for all tasks. Typically, the current **Remaining Duration** of tasks is used as their Most-Likely duration estimate. This value is used in conjunction with the Best-Case and Worst-Case duration estimates when applying probability distributions during each simulation iteration.

Understanding how Risks and Opportunities are Simulated

The SSI Schedule Risk Analysis tool can simulate the realization of identified Risks and Opportunities in a Schedule Risk Assessment. Unlike Duration Uncertainty, which is modeled during every iteration for activities with Best-Case and Worst-Case duration estimates, Risks and Opportunities are treated as discrete events that either occur or do not occur during a given iteration.

This can be visualized as a separate roulette wheel with only two possible outcomes: the event occurs, or the event does not occur. For example, if a Risk has a 25% probability of occurrence, then 25% of the wheel represents “Risk occurs” and 75% represents “Risk does not occur”:

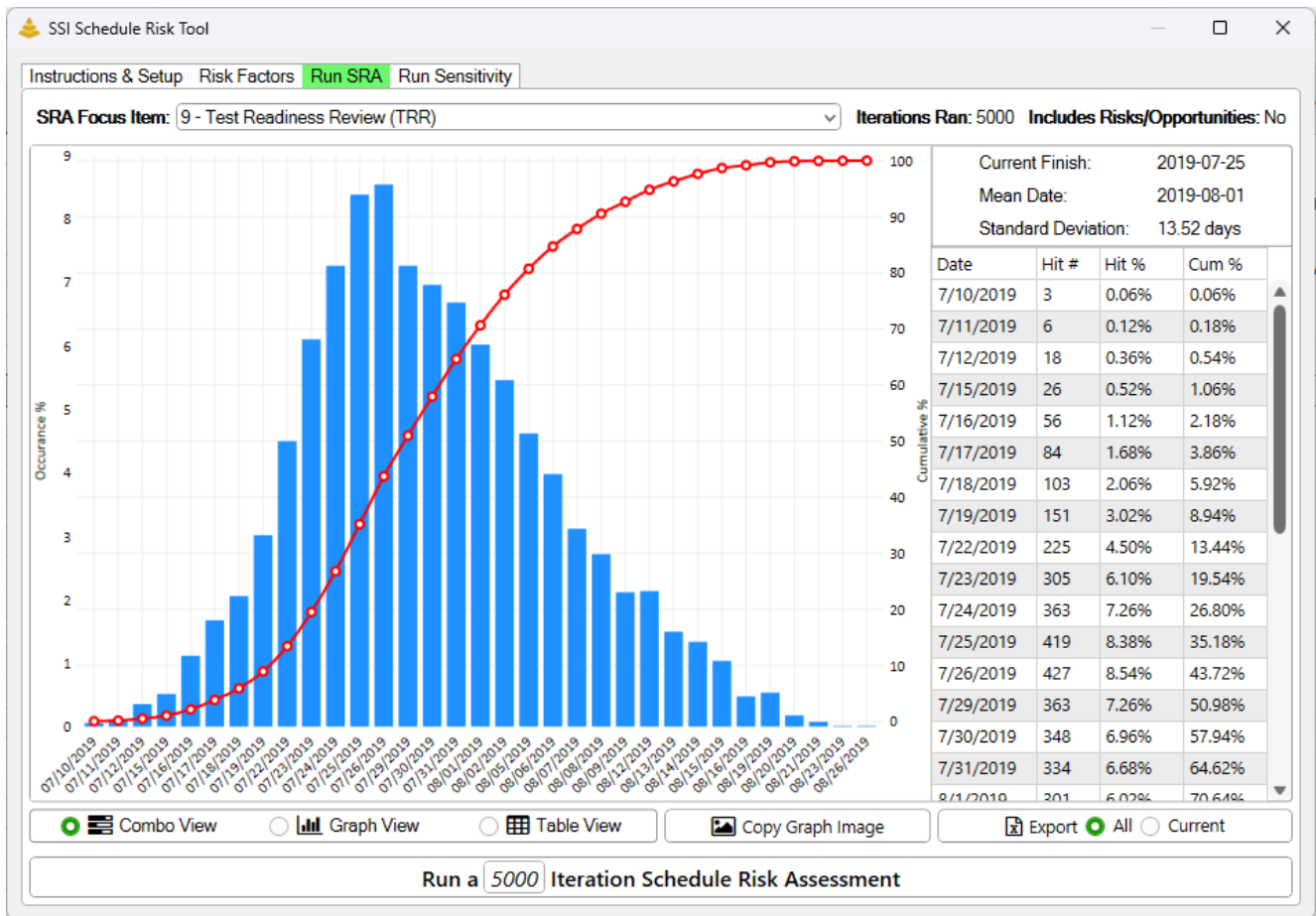


During each simulation iteration, the tool “spins the wheel” on every activity has valid Risk or Opportunity information coded to determine whether the Risk is realized. If the wheel lands on “Risk occurs,” the Risk’s defined schedule impact is applied for that iteration.

Note: Risks and Opportunities can only be modeled during an SRA if a **Probability of Occurrence** has been defined. The SRA uses this value to determine whether a Risk or Opportunity is realized during each simulation iteration. A Sensitivity Analysis does not require a Probability of Occurrence value.

Understanding how SRA Results are Calculated

Once task durations have been determined and any applicable Risks and Opportunities have either been realized or not for the current iteration, the tool simulates the calculation of the schedule and determines the resulting dates for each Key Event. These resulting dates are recorded, and the entire process is repeated for the specified number of iterations. As additional iterations are completed, the tool builds a statistical distribution of possible completion dates for each Key Event. This distribution is then used to calculate the probability of achieving a Key Event on or before a specific date.



Note: Running a Schedule Risk Assessment or Sensitivity Analysis does not alter the Microsoft Project schedule. The SSI Schedule Risk Analysis Tool performs all analysis calculations without writing data back to the project file, ensuring that the schedule remains unchanged throughout the analysis process.

SRA Specific Options

Certain options in the SSI Schedule Risk Analysis tool are specific to Schedule Risk Assessments and affect how they run. These options can be accessed in the SRA Specific Options section of the **Instructions & Setup** tab:

Optionally, you can have this tool automatically calculate Best-Case and Worst-Case durations for tasks based on setup [Risk Factors](#).

Step 3:
Navigate to the [Run SRA](#) or [Run Sensitivity](#) tab and click the Run button towards the bottom of this form to begin an analysis.

▶ **Standard Options**

▲ **SRA Specific Options**

Most-Likely duration field:

Risk/Opp occurrence mode: ☒ Random each iteration ⓘ ☐ Exact percentage overall ⓘ

Duration Uncertainty Distribution Algorithms

Default distribution algorithm: Task specific distribution algorithm field: [Open Task Distribution Mode Map](#)

The following options can be set:

Most Likely Duration field

Most-Likely duration field:

This option can be used to choose the duration field that will contain the **Most-Likely** duration for tasks. The default value is **Remaining Duration**

Risk/Opportunity Occurrence Mode

Risk/Opp occurrence mode: ☒ Random each iteration ⓘ ☐ Exact percentage overall ⓘ

This option determines how the realization of Risks and Opportunities is modeled during a Schedule Risk Assessment. In Random Occurrence mode, each Risk or Opportunity is evaluated independently during every iteration based on its defined Probability of Occurrence. In Fixed Occurrence mode, the tool ensures that each Risk or Opportunity is realized a specific number of times based on its probability and the total number of iterations. For example, if a Risk has a 10% Probability of Occurrence and the SRA is configured to run 100 iterations, Random Occurrence mode gives the Risk a 10% chance of being realized during each iteration, while Fixed Occurrence mode ensures that the Risk is realized in exactly 10 of the 100 iterations.

Default Distribution Algorithm

Default distribution algorithm:

Triangular

This option determines the default distribution algorithm that will be used to model duration uncertainty. The following options can be used:

- Triangular
- BetaPERT
- Normal
- Uniform

The default distribution algorithm will be used for all tasks unless a different distribution algorithm has been explicitly specified for an individual task.

Task Specific Distribution Algorithm Field and Distribution Mode Map

Task specific distribution algorithm field:

None

This option specifies the field that contains the distribution algorithm assigned to each task. During an SRA, the tool will use the distribution algorithm identified in this field when simulating duration uncertainty for the task. The algorithm identified in the field must match the Distribution Algorithm mapping:

Open Task Distribution Mode Map



Distribution Model Map

Map the distribution modes to values that will be found in the text field you selected.

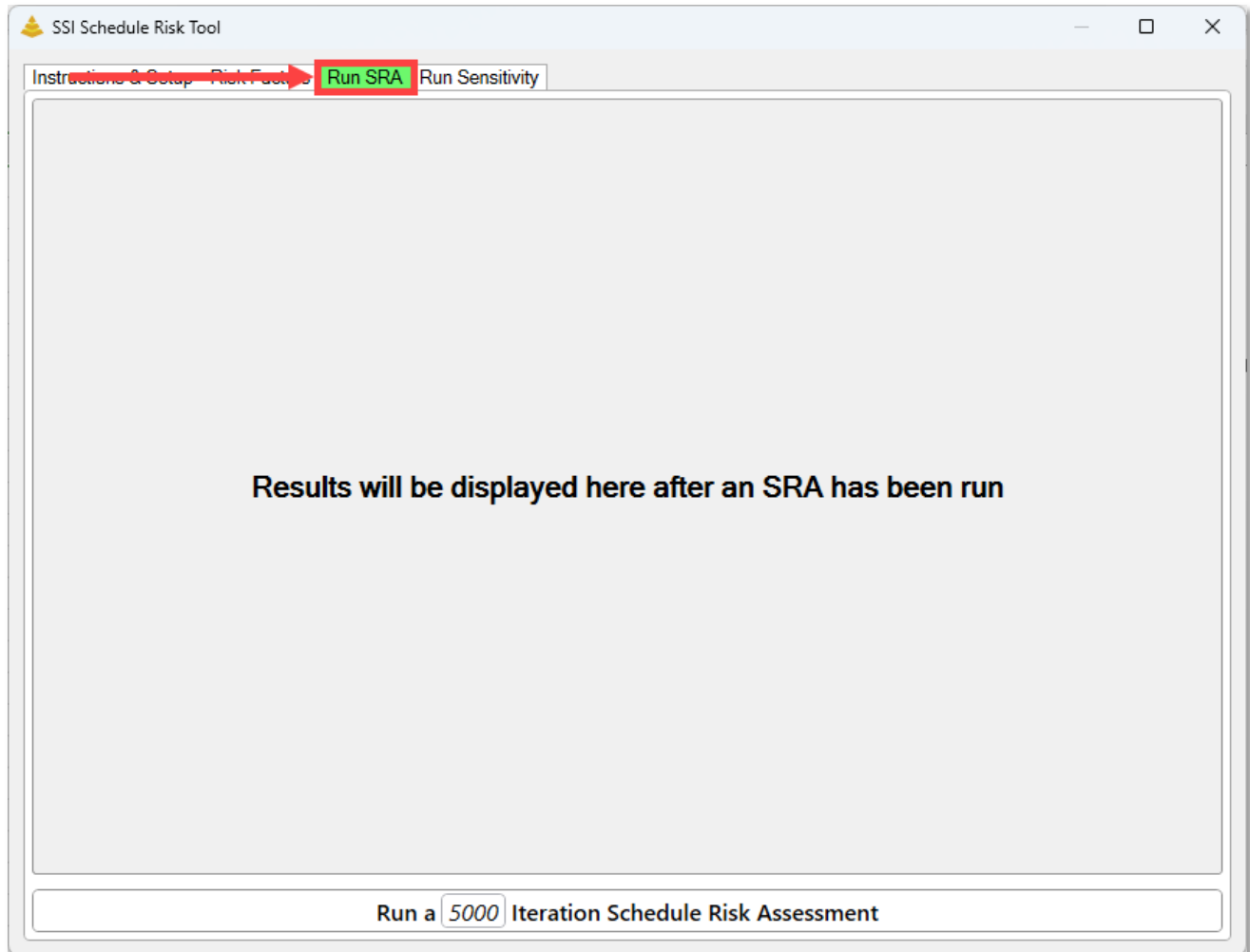
Distribution Mode Mapping	
Triangular	Triangular
BetaPERT	BetaPERT
Normal	Normal
Uniform	Uniform

✓ Accept Changes ✕ Cancel

If no valid algorithm is identified for the task, it will use the default algorithm. If you do not wish to assign distribution algorithms on a task-by-task basis, set this option to **None** and the default distribution algorithm will be used for all tasks.

Running a Schedule Risk Assessment

Once duration uncertainty estimates, Risks and Opportunities, and the desired Schedule Risk Assessment (SRA) options have been configured, an SRA can be performed. Schedule Risk Assessments are initiated from the **Run SRA** tab within the Schedule Risk Analysis Tool.



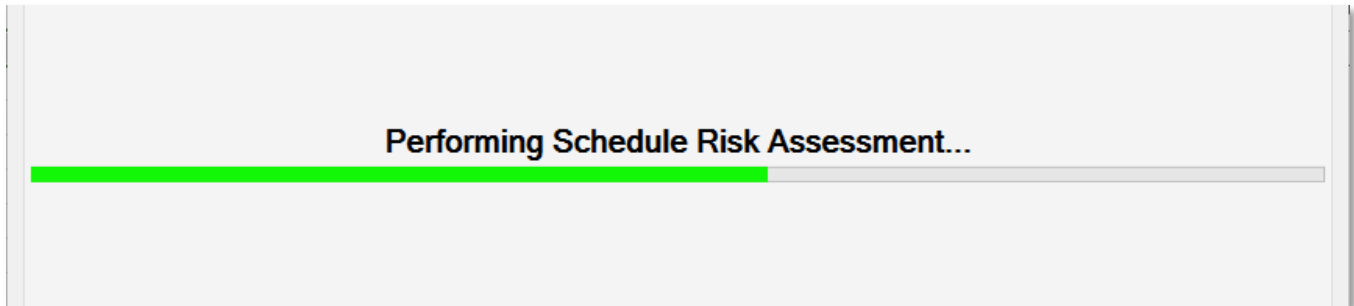
As seen from the image above, results of the SRA will not actually be shown until the **Run** button has been pressed.

You can specify the number of iterations you would like the SRA simulation to run inside the **Run** button:

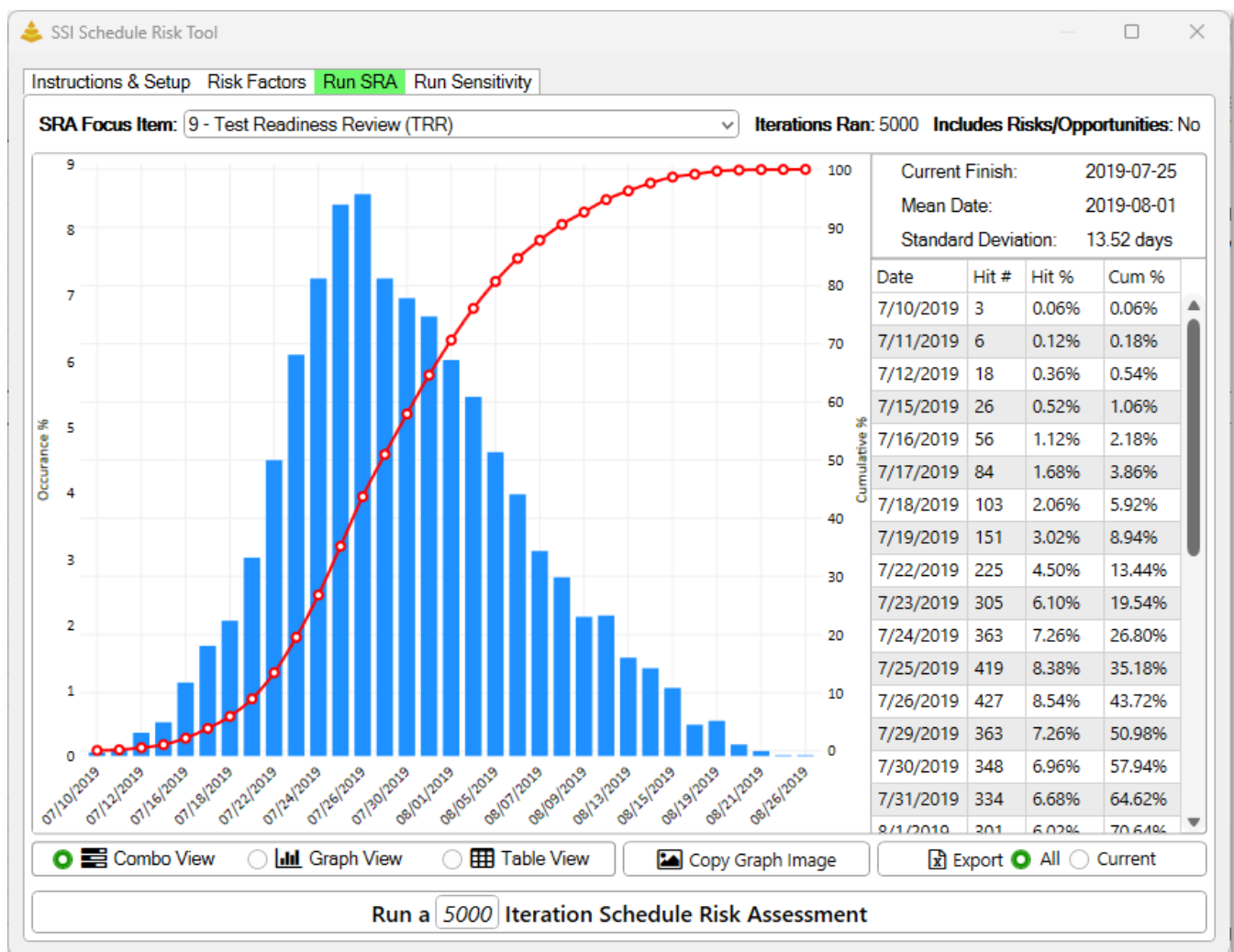


Adjust this number to your preference before clicking the button.

When you are ready to run the SRA, click the **Run** button. A progress bar will appear on the UI indicating how far along the assessment is.



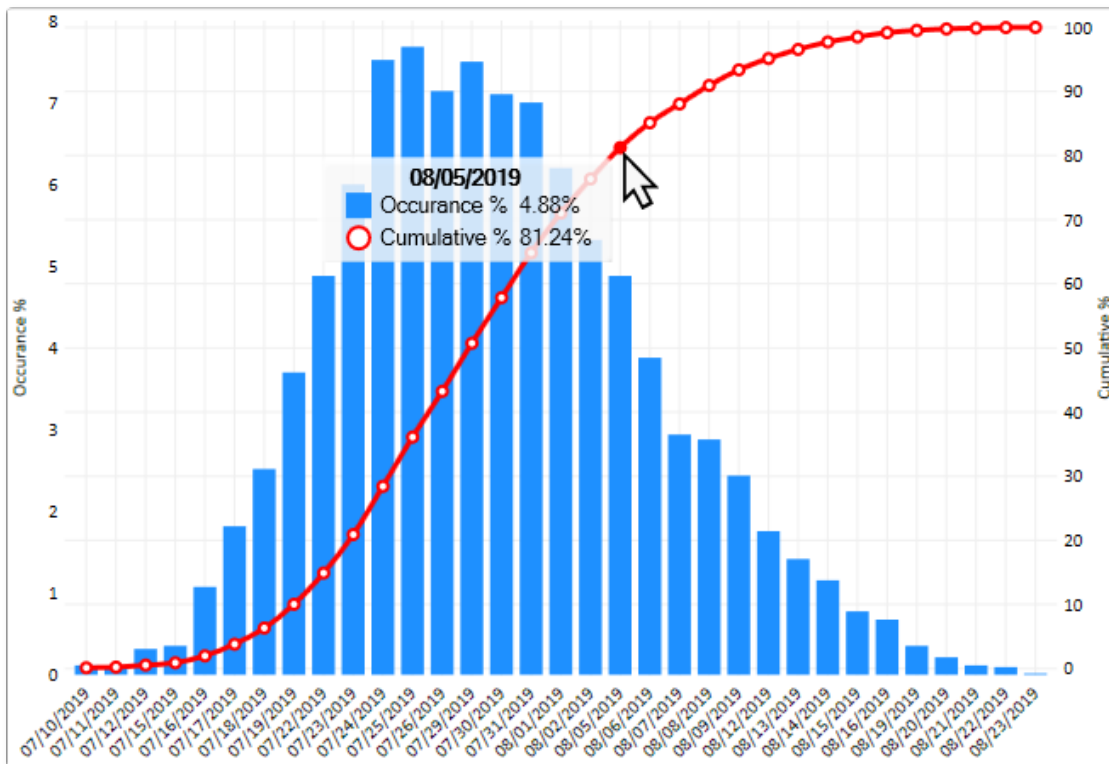
Once the assessment has finished running, results will be shown on the main area of the **Run SRA** tab.



Understanding the Results

The results of a Schedule Risk Assessment are presented in two components: a dual-axis graph and a results table. Together, these components provide both a visual summary of the assessment results and the detailed data used to generate them.

The SRA Graph



The SRA graph is a dual-axis graph that displays the range of possible completion dates for the selected Key Event and the probability associated with those dates. The horizontal axis represents potential completion dates

The graph contains two data series:

- **Histogram (Frequency Distribution):** The vertical bars represent the percentage of simulation iterations that resulted in the Key Event completing on a specific date. The left vertical axis shows the occurrence percentage.
- **Cumulative Probability Curve:** The line represents the cumulative probability of completing the Key Event on or before a given date. The right vertical axis displays this probability as a percentage.

Hovering over any point on the histogram or cumulative probability line will display detailed information about it.

Results Table

Date	Hit #	Hit %	Cum %
7/10/2019	6	0.12%	0.12%
7/11/2019	5	0.10%	0.22%
7/12/2019	16	0.32%	0.54%
7/15/2019	18	0.36%	0.90%
7/16/2019	54	1.08%	1.98%
7/17/2019	91	1.82%	3.80%
7/18/2019	126	2.52%	6.32%
7/19/2019	185	3.70%	10.02%
7/22/2019	244	4.88%	14.90%
7/23/2019	300	6.00%	20.90%
7/24/2019	376	7.52%	28.42%
7/25/2019	384	7.68%	36.10%
7/26/2019	357	7.14%	43.24%
7/29/2019	375	7.50%	50.74%
7/30/2019	355	7.10%	57.84%
7/31/2019	350	7.00%	64.84%
8/1/2019	310	6.20%	71.04%
8/2/2019	266	5.32%	76.36%

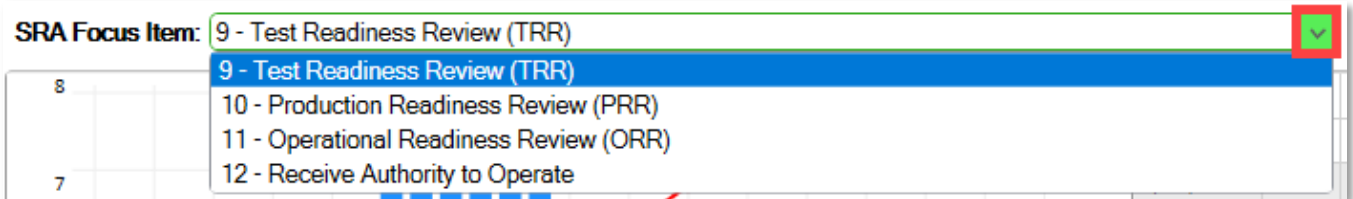
The results table contains the underlying data used to generate the graph. Each row corresponds to a completion date identified during the assessment.

The results table contains the following columns:

- **Date** – The simulated completion date for the selected Key Event.
- **Hit #** – The number of simulation iterations that resulted in the Key Event completing on that date. For example, a value of 300 indicates that the Key Event completed on that date in 300 separate simulation iterations.
- **Hit %** – The percentage of total simulation iterations that resulted in the Key Event completing on that date. This value corresponds to the histogram displayed in the results graph. For example, a Hit % of 6% indicates that 6% of all simulation iterations produced that completion date.
- **Cum %** – The cumulative probability of the Key Event completing on or before the specified date. This value corresponds to the cumulative probability curve displayed in the results graph. For example, a Cum % of 50% indicates there is a 50% probability that the Key Event will complete on or before that date.

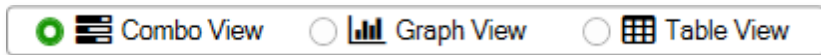
Observing and Distributing Results

Although the Schedule Risk Assessment calculates results for all Key Events during a single simulation, the results are displayed for only one Key Event at a time. To switch to the results for a different Key Event, use the **SRA Focus Item** drop-down menu and select the desired item:



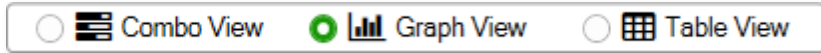
SRA results can be displayed in one of three views:

- **Combo View**



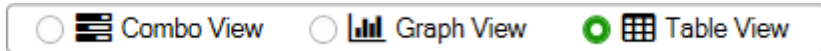
This view displays both the SRA Graph and Results Table

- **Graph View**



This view displays only the graph representation of the results

- **Table View**

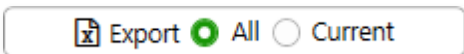


This view displays only the table representation of the results.

The SRA graph can be copied to the clipboard by clicking the **Copy Graph Image** button below the results view:



SRA results can also be exported to an Excel workbook, where results can be more easily distributed to others, by clicking the **Export** button:

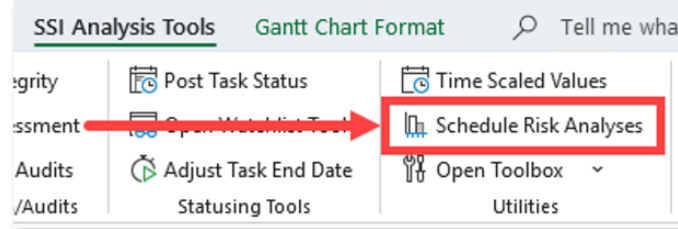


To export results, choose either **All** to export results for every Key Event or **Current** to export results for the currently selected Key Event. After selecting the desired option, click **Export**.

Class Exercise 3 – Performing a Schedule Risk Analysis

1. Use the ExampleProjectSRA.mpp file from the previous exercise.

2. Click **Schedule Risk Analyses** from the **SSi Analysis Tools** ribbon.



3. On the **Instructions & Setup** tab, Expand the **SRA Specific Options** rollup. Set the following options:

- Most Likely Duration Field: **Remaining Duration**
- Risk/Opportunity Occurrence Mode: **Random each iteration**
- Default distribution Algorithm: **BetaPERT**
- Task specific distribution algorithm field: **None**

Instructions & Setup Risk Factors Run SRA Run Sensitivity

Instructions for use:

Step 1:
Identify the Key Event(s) in the schedule you want to generate results for and mark them **Yes** in the Flag field selected below. ONLY mark the Key Event(s). Everything else should be set to **No**.

Step 2:
Set **Best-Case** and **Worst-Case** duration estimates to the tasks logically preceding the Key Event(s) in the Duration fields selected below. You do not need to assign Best- and Worst-Case durations to activities that are not logically connected to your Key Event(s).

TIP: Use the [SSi Directional Path Tool](#) to identify the activities logically preceding your Key Event(s).

Step 3:
Navigate to the **Run SRA** or **Run Sensitivity** tab and click the Run button towards the bottom of this form to begin an analysis.

▸ **Standard Options**

▾ **SRA Specific Options**

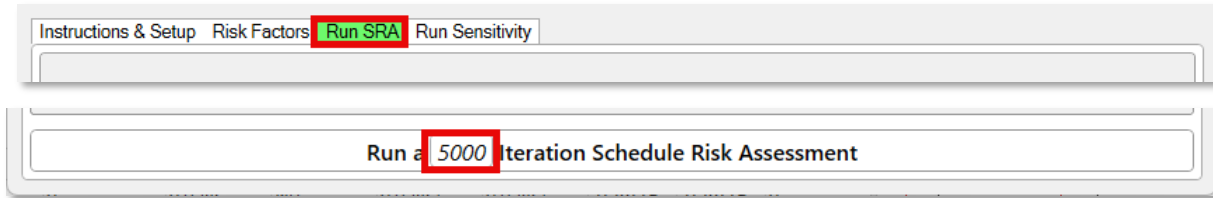
Most-Likely duration field:

Risk/Opp occurrence mode: ☒ Random each iteration ⓘ ☐ Exact percentage overall ⓘ

Duration Uncertainty Distribution Algorithms

Default distribution algorithm: Task specific distribution algorithm field:

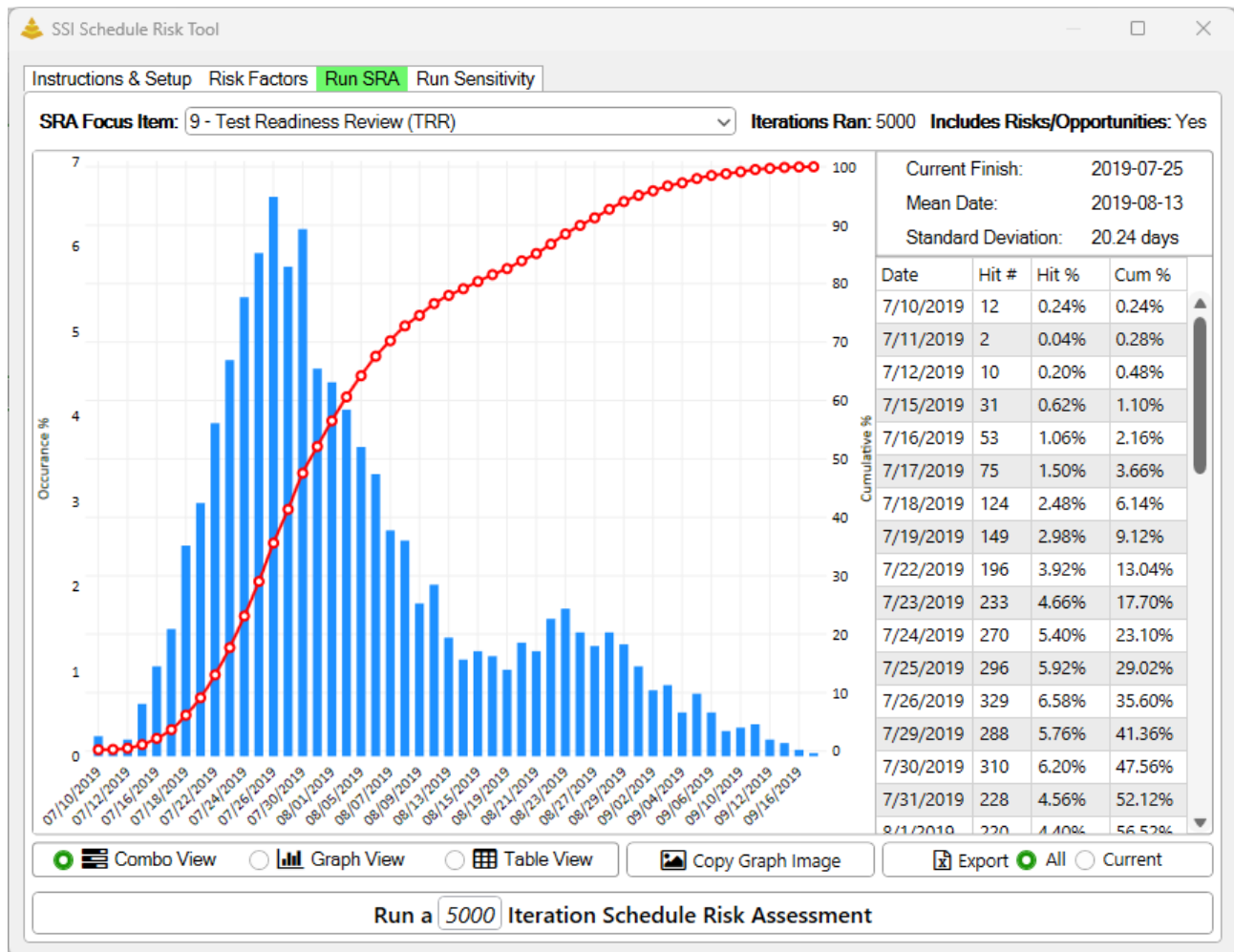
- Navigate to the **Run SRA Tab**. At the bottom of the form enter **5000** as the number of iterations to run.



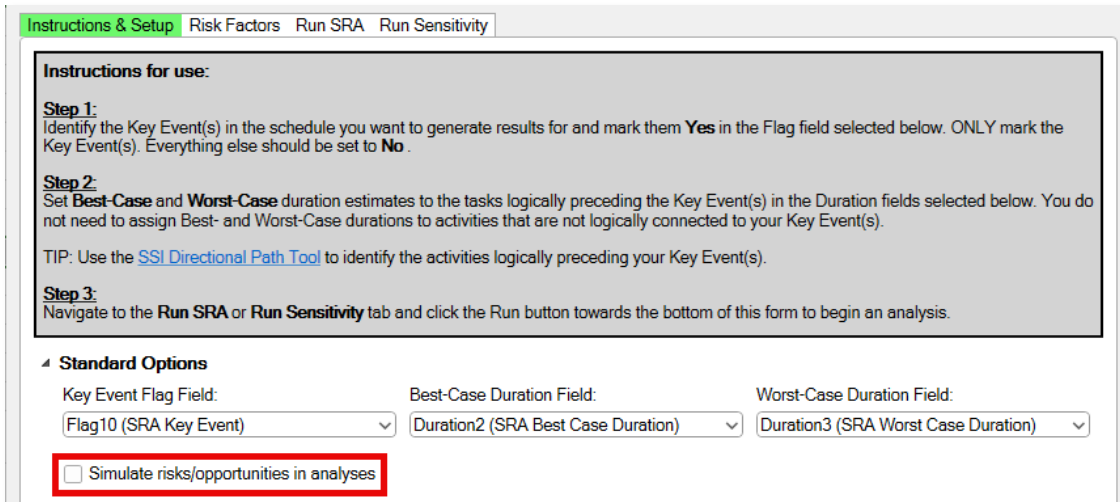
Instructions & Setup Risk Factors **Run SRA** Run Sensitivity

Run a **5000** Iteration Schedule Risk Assessment

- Click the button to Run a 5,000 Iteration Schedule Risk Assessment and observe the results. **Note:** The results will be slightly different each time you perform an SRA.



6. Navigate back to the **Instructions and Set up** Tab. Expand the **Standard Options** roll up and un-check the box to **Simulate risks/opportunities in analyses**.



Instructions for use:

Step 1:
Identify the Key Event(s) in the schedule you want to generate results for and mark them **Yes** in the Flag field selected below. **ONLY** mark the Key Event(s). Everything else should be set to **No**.

Step 2:
Set **Best-Case** and **Worst-Case** duration estimates to the tasks logically preceding the Key Event(s) in the Duration fields selected below. You do not need to assign Best- and Worst-Case durations to activities that are not logically connected to your Key Event(s).

TIP: Use the [SSI Directional Path Tool](#) to identify the activities logically preceding your Key Event(s).

Step 3:
Navigate to the **Run SRA** or **Run Sensitivity** tab and click the Run button towards the bottom of this form to begin an analysis.

Standard Options

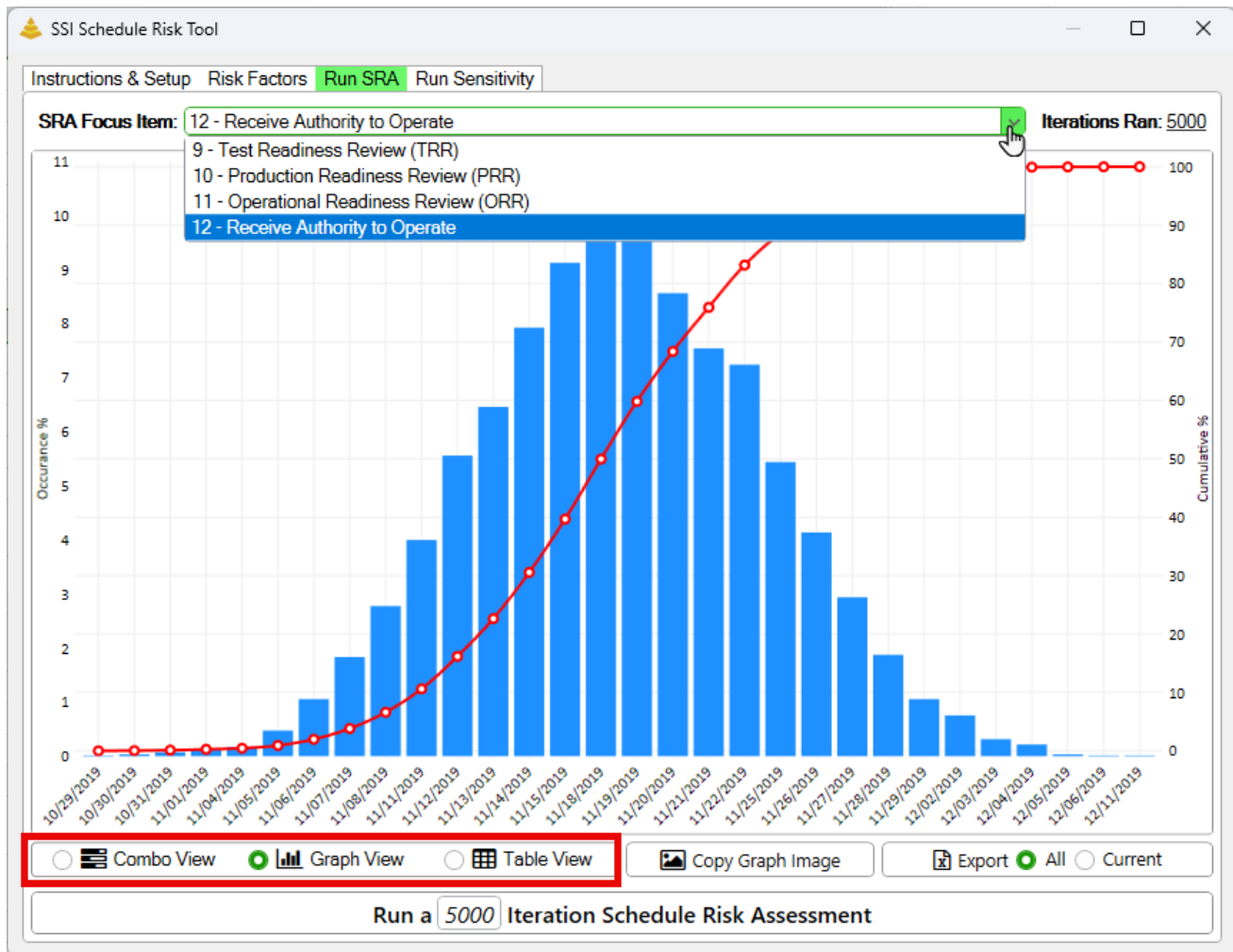
Key Event Flag Field: Flag10 (SRA Key Event) Best-Case Duration Field: Duration2 (SRA Best Case Duration) Worst-Case Duration Field: Duration3 (SRA Worst Case Duration)

☐ Simulate risks/opportunities in analyses

7. Re-run the 5000 iteration SRA, this time **WITHOUT** the Risk/Opportunities simulated in the analysis. Observe the new results and the differences from the initial SRA results.



8. Toggle between the results for the different **SRA Focus Items** that were flagged in the first exercise. Then, practice changing the display between the various options **Combo View**, **Graph Only**, and **Table View**.



9. Click on the **Export to Excel** button to view the results of your Schedule Risk Analyses in an Excel workbook. You have the option to export the results for the current focus item or all the results simultaneously!



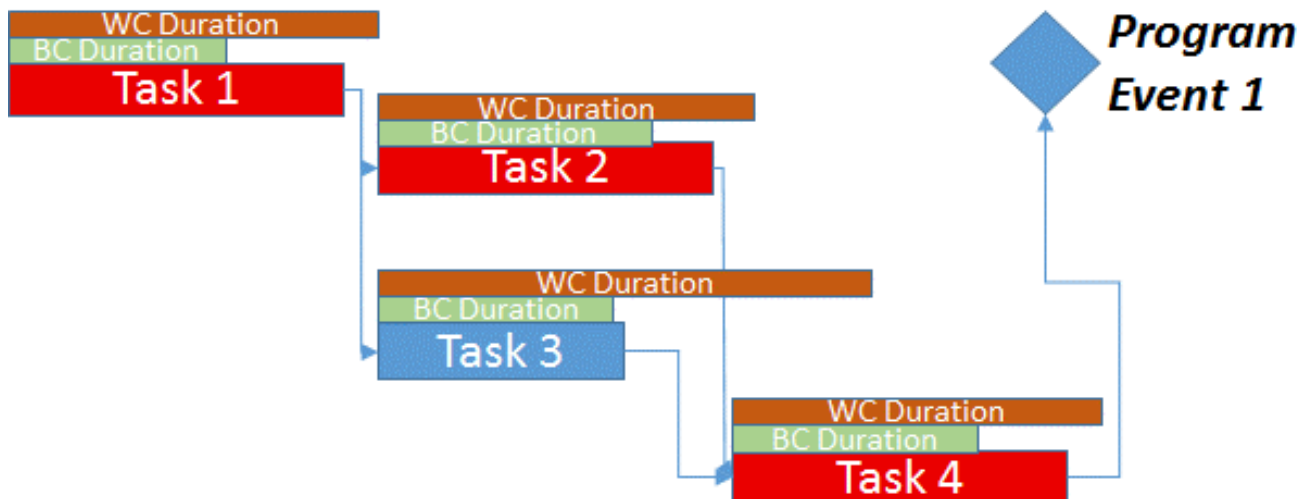
End of Practice Exercise

Sensitivity Analyses

A **Sensitivity Analysis** is used to identify the activities, Risks, and Opportunities that have the greatest potential to influence the completion date of a Key Event. Unlike a Schedule Risk Assessment, which evaluates the probability of achieving an important events or milestones by a given date, a Sensitivity Analysis focuses on determining which tasks have the largest impact on key events. This information helps project teams understand where management attention and corrective action efforts are most likely to be effective.

A Sensitivity Analysis works by performing a series of controlled "what-if" scenarios. Each activity with defined Duration Uncertainty estimates, Risk, or Opportunity is evaluated independently. The tool isolates each item and determines where the Key Event(s) would finish if the task were set to its Best-Case duration, its Worst-Case duration, or if the Risk or Opportunity were realized. The resulting change in the Key Event date is then compared to its original finish date to determine the task's level of sensitivity.

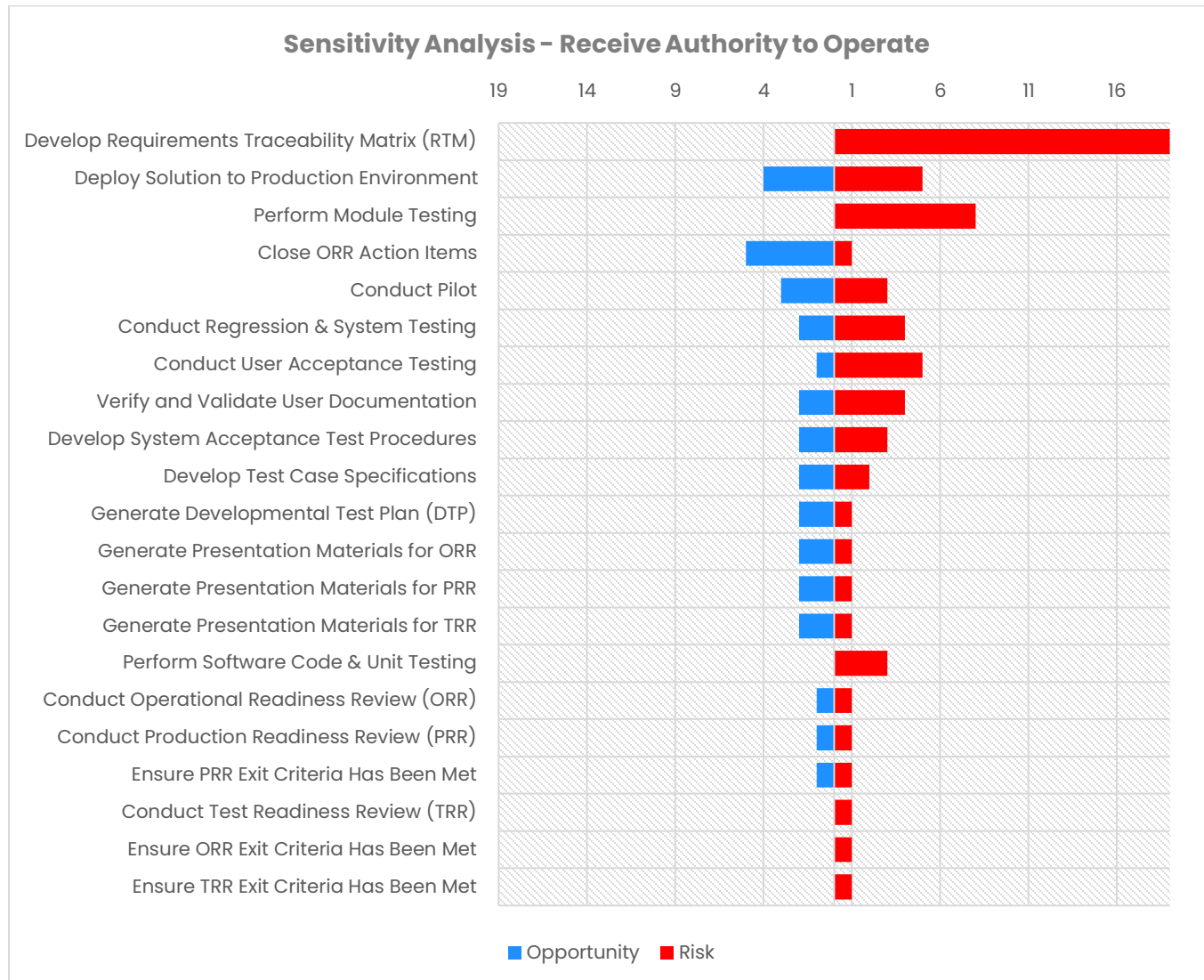
Observe the following diagram:



Using the diagram above as an example, a Sensitivity Analysis would evaluate:

- What is the finish date of "**Program Event 1**" if the duration of **Task 1** is set to its **Best-Case** estimate?
- What is the finish date of "**Program Event 1**" if the duration of **Task 1** is set to its **Worst-Case** estimate?
- And so on for Task 2, 3 and 4

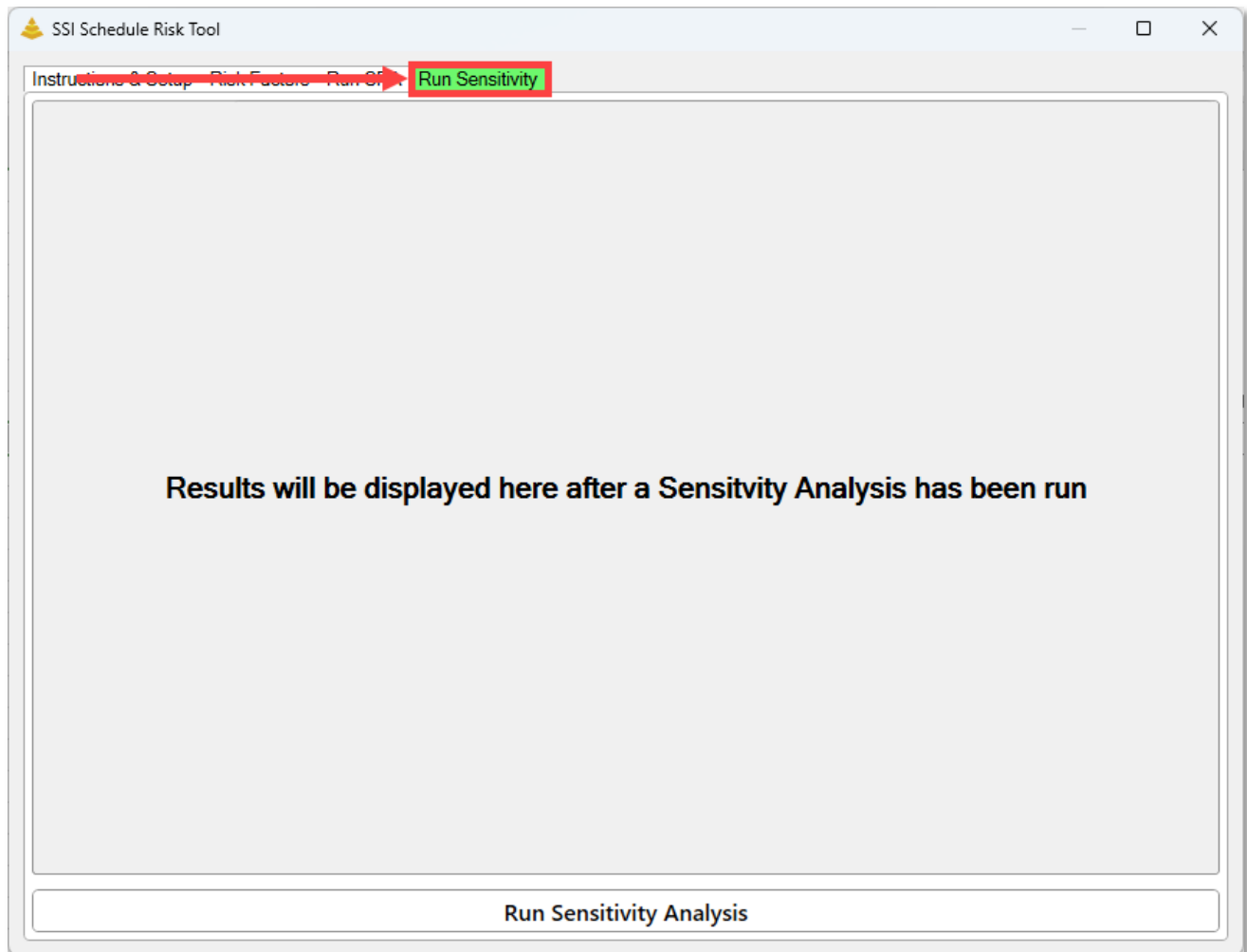
When the change causes a Key Event to occur earlier than planned, the effect is considered an **Opportunity**. When the change causes a Key Event to occur later than planned, the effect is considered a **Risk**. These values are usually plotted out on a graph called a **Tornado Chart**:



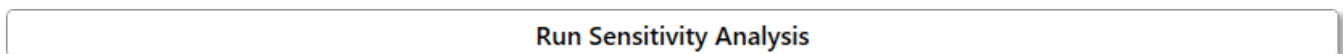
The results of Sensitivity Analyses help project team members prioritize activity monitoring, focus mitigation efforts, and develop corrective action plans. Activities that produce the largest schedule impacts are typically the best candidates for additional management attention, risk mitigation, or schedule recovery actions.

Running a Sensitivity Analysis

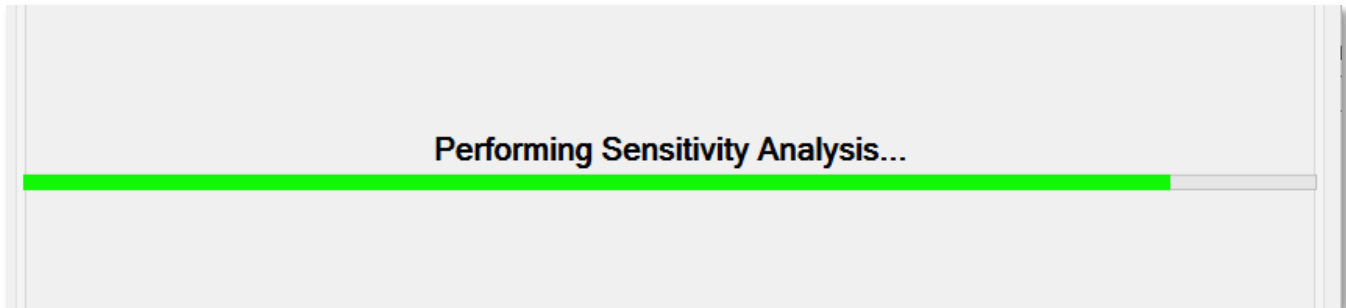
Once Duration Uncertainty estimates, Risks, and Opportunities have been configured, a Sensitivity Analysis can be performed. Sensitivity Analyses are initiated from the **Run Sensitivity** tab within the Schedule Risk Analysis Tool.



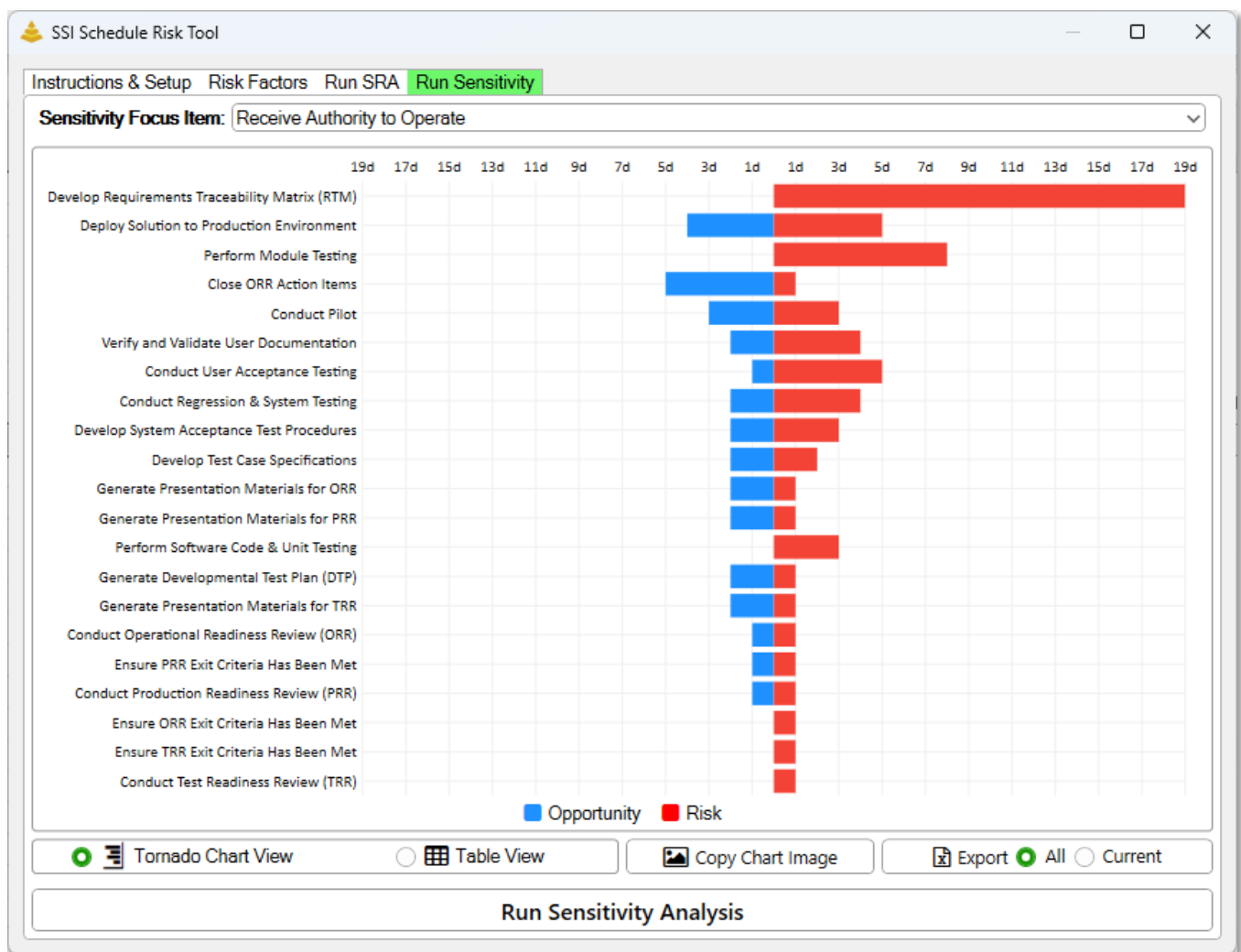
As seen from the image above, results of the Sensitivity Analysis will not actually be shown until the **Run** button has been pressed.



When you are ready to run the Sensitivity Analysis, click the **Run** button. A progress bar will appear on the UI indicating how far along the assessment is.



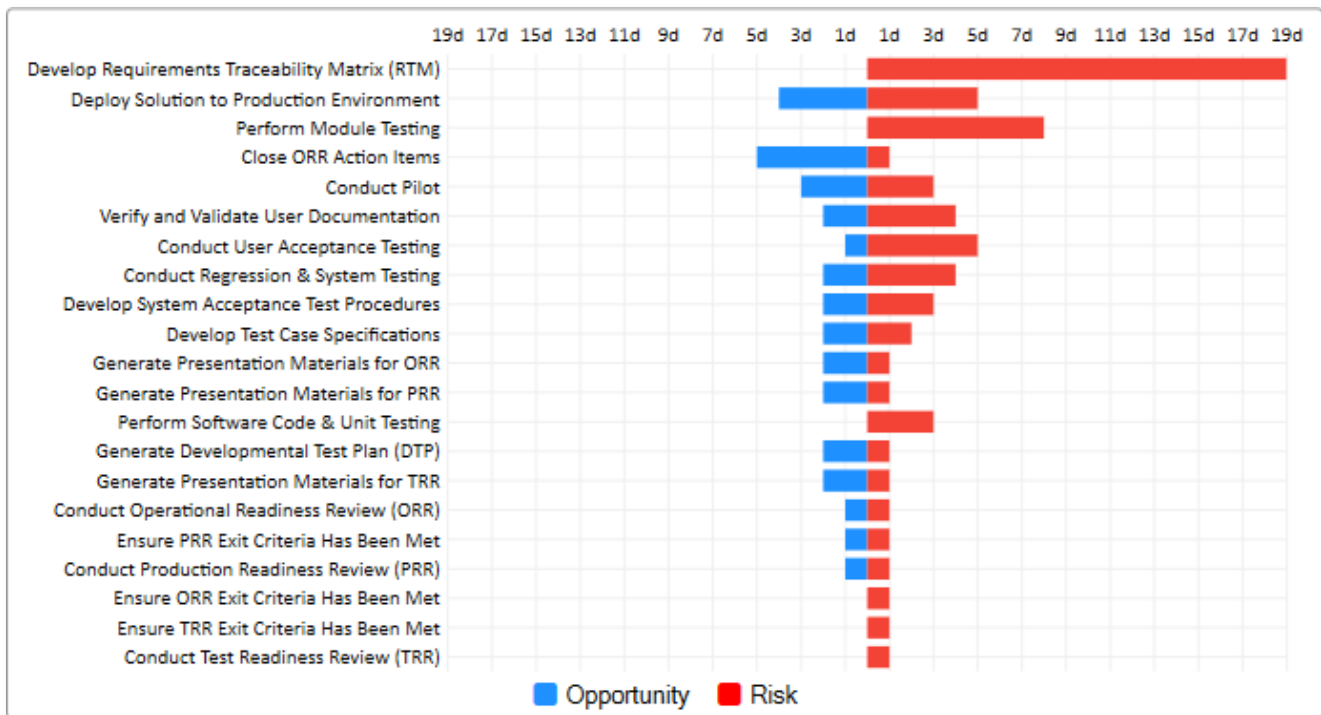
Once the assessment has finished running, results will be shown on the main area of the **Run Sensitivity** tab.



Understanding the Results

The results of a Sensitivity Analysis can be presented in two ways: a **Tornado Chart** and a **Results Table**. These components provide both a visual summary of the assessment results and the detailed data used to generate them.

The Tornado Chart



The primary output of a Sensitivity Analysis is a **Tornado Chart**. A Tornado Chart is a graphical representation of the tasks that have the greatest influence on a Key Event. The chart ranks activities, Risks, and Opportunities according to the magnitude of their impact.

Each bar in the chart represents the effect of a single Task, Risk, or Opportunity when evaluated independently. The red bars extending to the right represent how much risk that item has to delay the Key Event. The blue bars extending to the left represent the amount of opportunity that item has to accelerate the Key Event. The length of each bar corresponds to the amount of schedule movement caused by that item.

Items are sorted by impact, with the most influential items appearing at the top of the chart and the least influential items appearing at the bottom. This arrangement gives the chart its characteristic "tornado" shape.

Hovering over any bar on the chart will display detailed information about it about the risk and opportunity that that particular item has to the selected key event.

Results Table

Task Name	Best-Case Date	Worst-Case Date	Opportunity	Risk	Total Sensitivity
Develop Requirements Traceability Matrix (RTM)	11/18/2019	12/13/2019	0 days	19 days	19 days
Deploy Solution to Production Environment	11/12/2019	11/25/2019	4 days	5 days	9 days
Perform Module Testing	11/18/2019	11/28/2019	0 days	8 days	8 days
Conduct Regression & System Testing	11/14/2019	11/22/2019	2 days	4 days	6 days
Conduct User Acceptance Testing	11/15/2019	11/25/2019	1 day	5 days	6 days
Verify and Validate User Documentation	11/14/2019	11/22/2019	2 days	4 days	6 days
Conduct Pilot	11/13/2019	11/21/2019	3 days	3 days	6 days
Close ORR Action Items	11/11/2019	11/19/2019	5 days	1 day	6 days
Develop System Acceptance Test Procedures	11/14/2019	11/21/2019	2 days	3 days	5 days
Develop Test Case Specifications	11/14/2019	11/20/2019	2 days	2 days	4 days
Generate Presentation Materials for TRR	11/14/2019	11/19/2019	2 days	1 day	3 days
Generate Developmental Test Plan (DTP)	11/14/2019	11/19/2019	2 days	1 day	3 days
Perform Software Code & Unit Testing	11/18/2019	11/21/2019	0 days	3 days	3 days

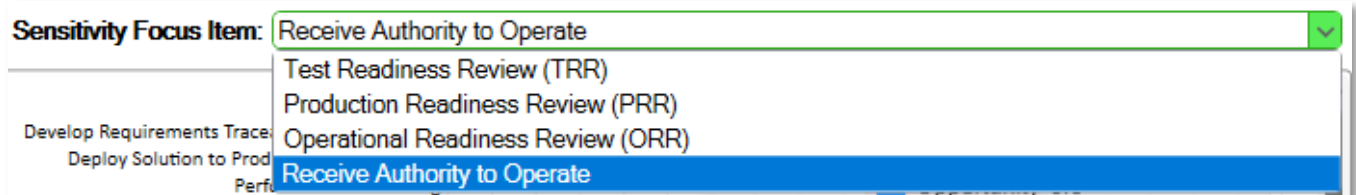
The results table contains the underlying data used to generate the Tornado Chart. Each row corresponds to an item with sensitivity to the selected key event.

The results table contains the following columns:

- **Task Name** – The name of the activity, Risk, or Opportunity that was has sensitivity.
- **Best-Case Date** – The resulting completion date of the selected Key Event when the item is evaluated using its Best-Case duration estimate or when an Opportunity is realized.
- **Worst-Case Date** – The resulting completion date of the selected Key Event when the activity is evaluated using its Worst-Case duration estimate or when a Risk is realized.
- **Opportunity** – The number of schedule days the Key Event would be accelerated relative to its current finish. Larger values indicate greater potential to improve the Key Event completion date.
- **Risk** – The number of schedule days the Key Event would be delayed relative to its current finish. Larger values indicate a greater potential to adversely impact the Key Event completion date.
- **Total Sensitivity** – The combined schedule impact of the item, calculated as the sum of the Opportunity and Risk values. This metric is used to rank activities within the Sensitivity Analysis and represents the total range of schedule movement that the activity can introduce to the Key Event.

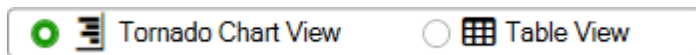
Observing and Distributing Results

Although the Sensitivity Analysis calculates results for all Key Events during a single simulation, the results are displayed for only one Key Event at a time. To switch to the results for a different Key Event, use the **Sensitivity Focus Item** drop-down menu and select the desired item:



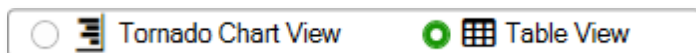
Sensitivity results can be displayed in one of two views:

- **Tornado Chart View**



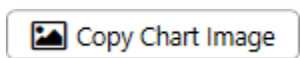
This view displays only the Tornado Chart representation of the results

- **Table View**



This view displays only the detailed table representation of the results.

The Tornado Chart can be copied to the clipboard by clicking the **Copy Chart Image** button below the results view:



Sensitivity results can also be exported to an Excel workbook, where results can be more easily distributed to others, by clicking the **Export** button:

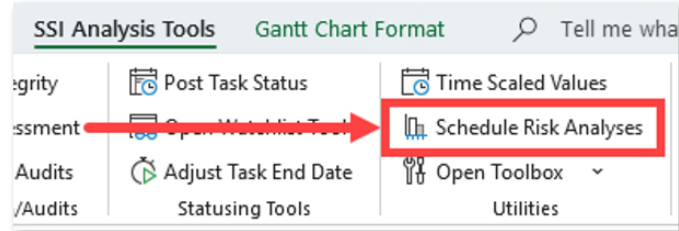


To export results, choose either **All** to export results for every Key Event or **Current** to export results for the currently selected Key Event. After selecting the desired option, click **Export**.

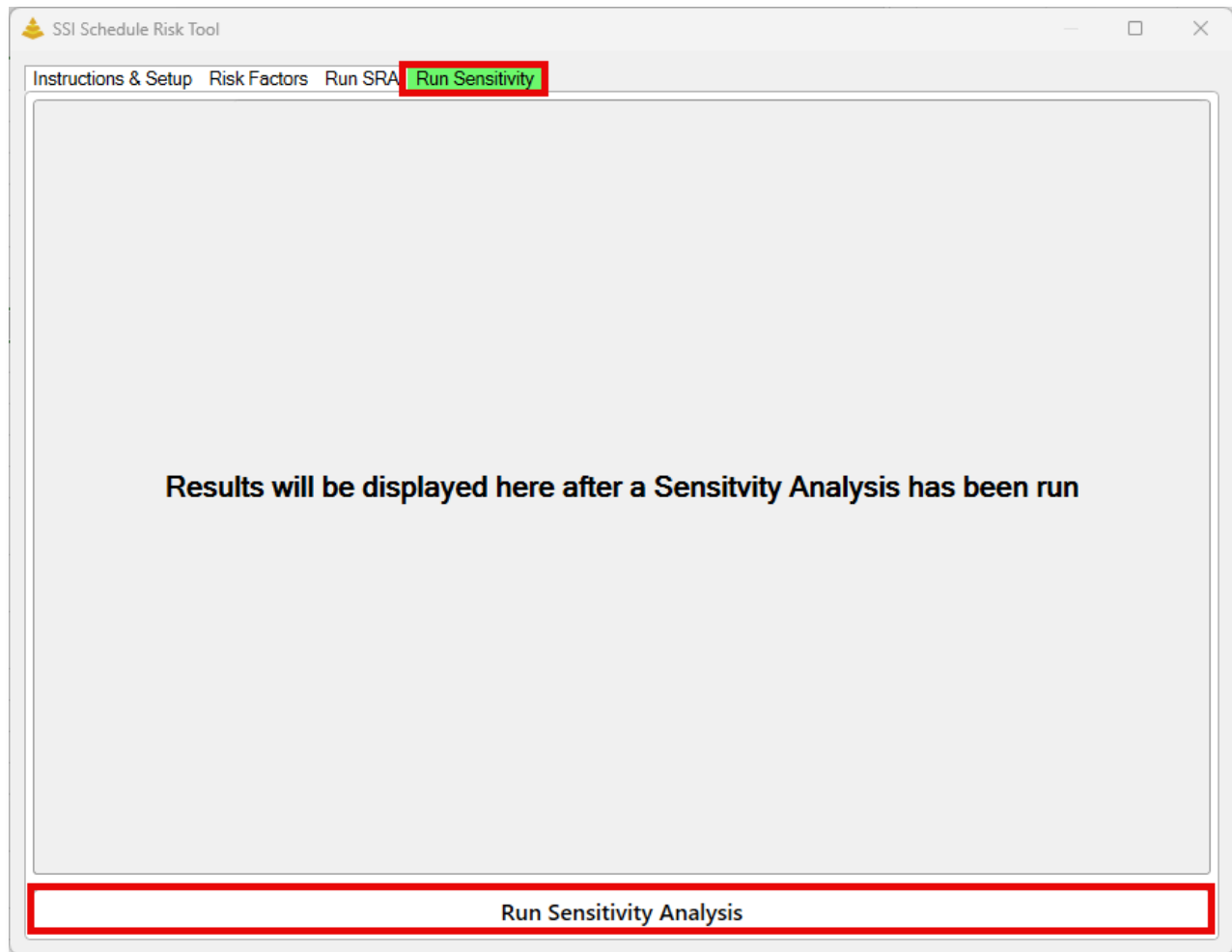
Class Exercise 4 – Performing a Sensitivity Analysis

1. Use the ExampleProjectSRA.mpp file from the previous exercise.

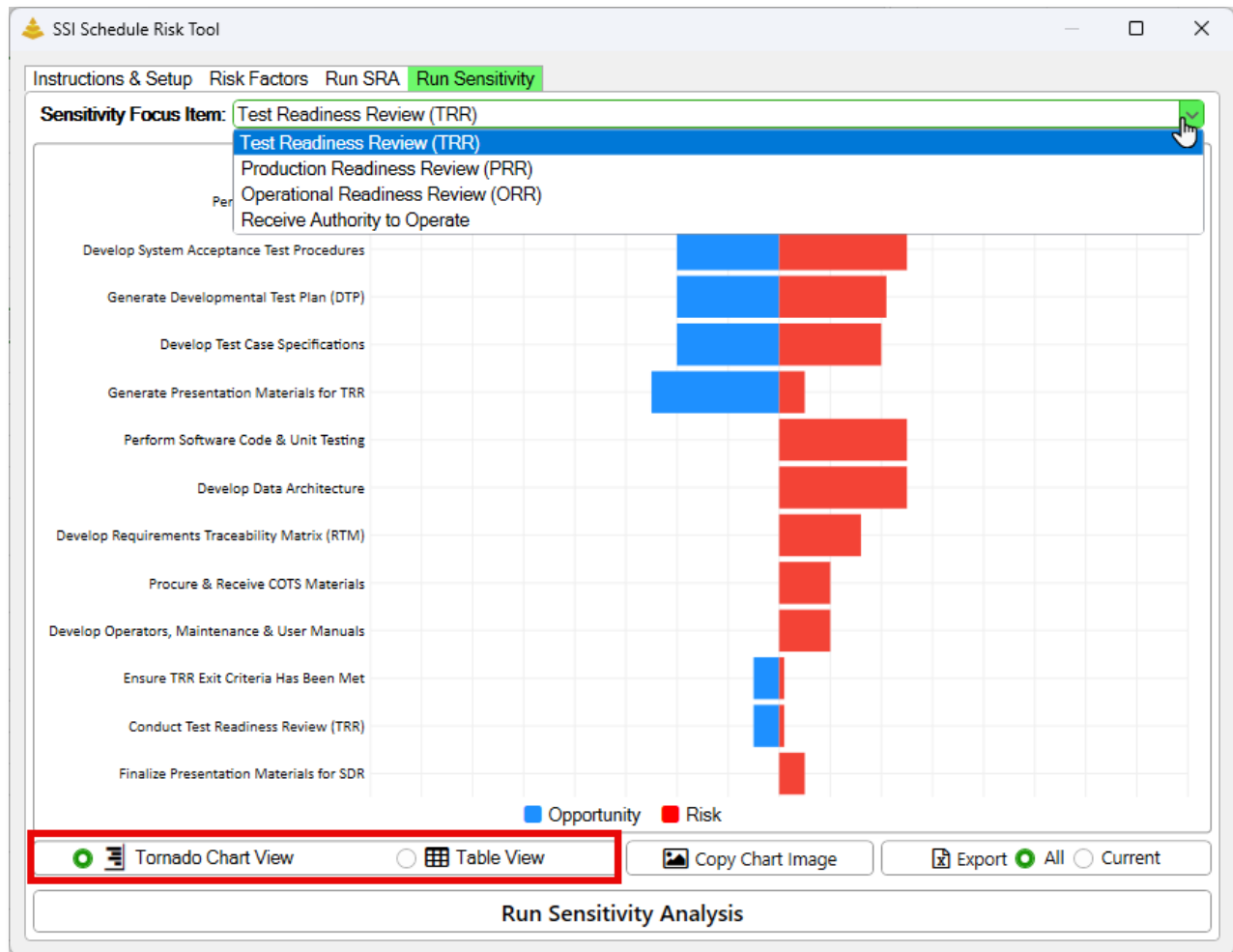
2. Click **Schedule Risk Analyses** from the **SSI Analysis Tools** ribbon.



3. Navigate to the **Run Sensitivity Tab** and click the button to **Run Sensitivity Analysis** at the bottom of the form.



- Observe the results for the first **Sensitivity Focus Item**. Toggle between the results for the different **Sensitivity Focus Items** that were flagged in the first exercise.

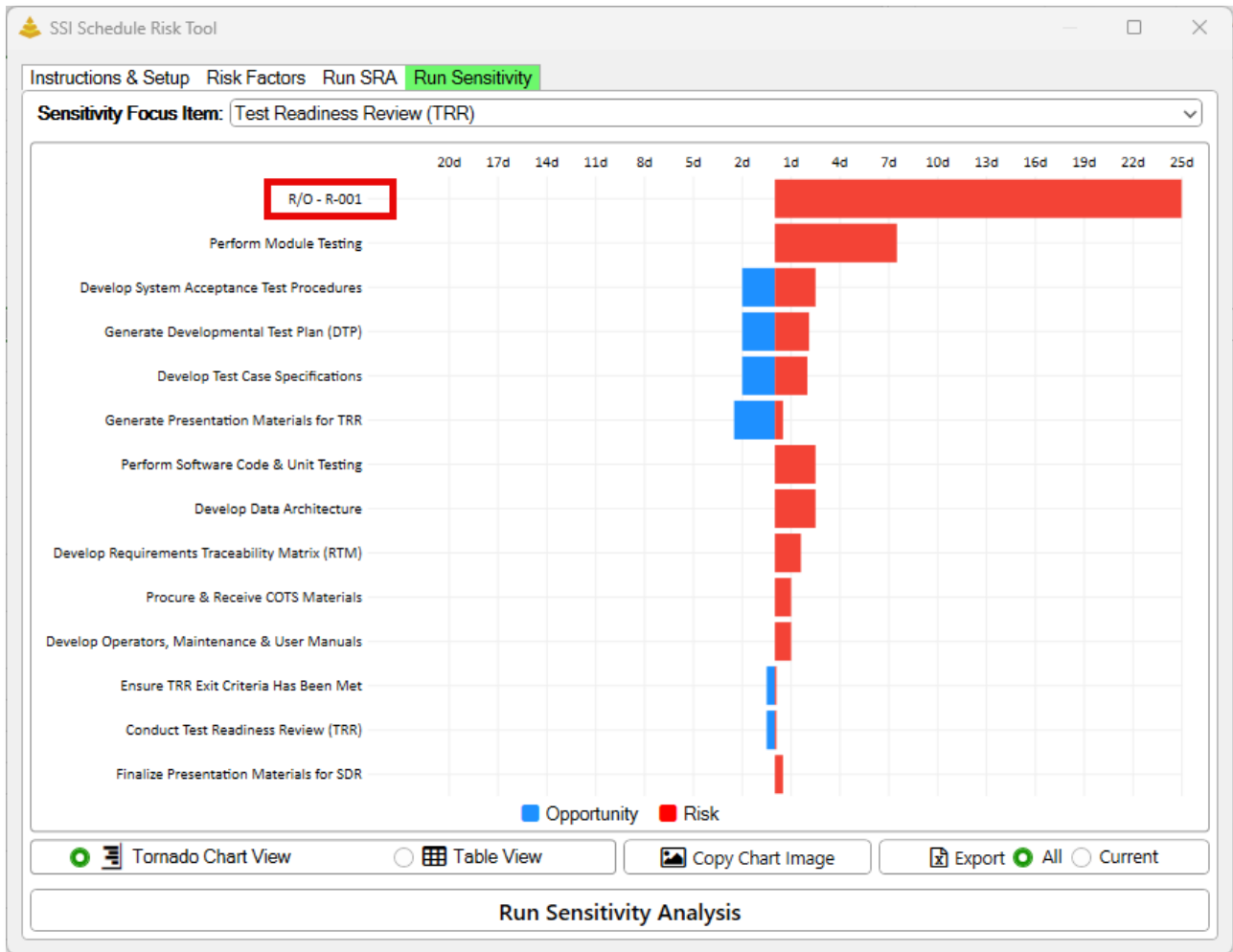


Then, practice changing the display between the **Tornado Chart View** and **Table View**.

- Navigate back to the **Instructions and Set up** Tab. Expand the **Standard Options** roll up and re-check the box to **Simulate risks/opportunities in analyses**.

☒ Simulate risks/opportunities in analyses

6. Re-run the Sensitivity Analyses, this time **WITH** the Risk/Opportunities simulated in the analysis. Observe the **Risk activity** has now been added to the results.



7. Click on the **Export to Excel** button to view the results of your Sensitivity Analyses in an excel workbook. You have the option to export the results for the current focus item or all the results simultaneously!



End of Practice Exercise