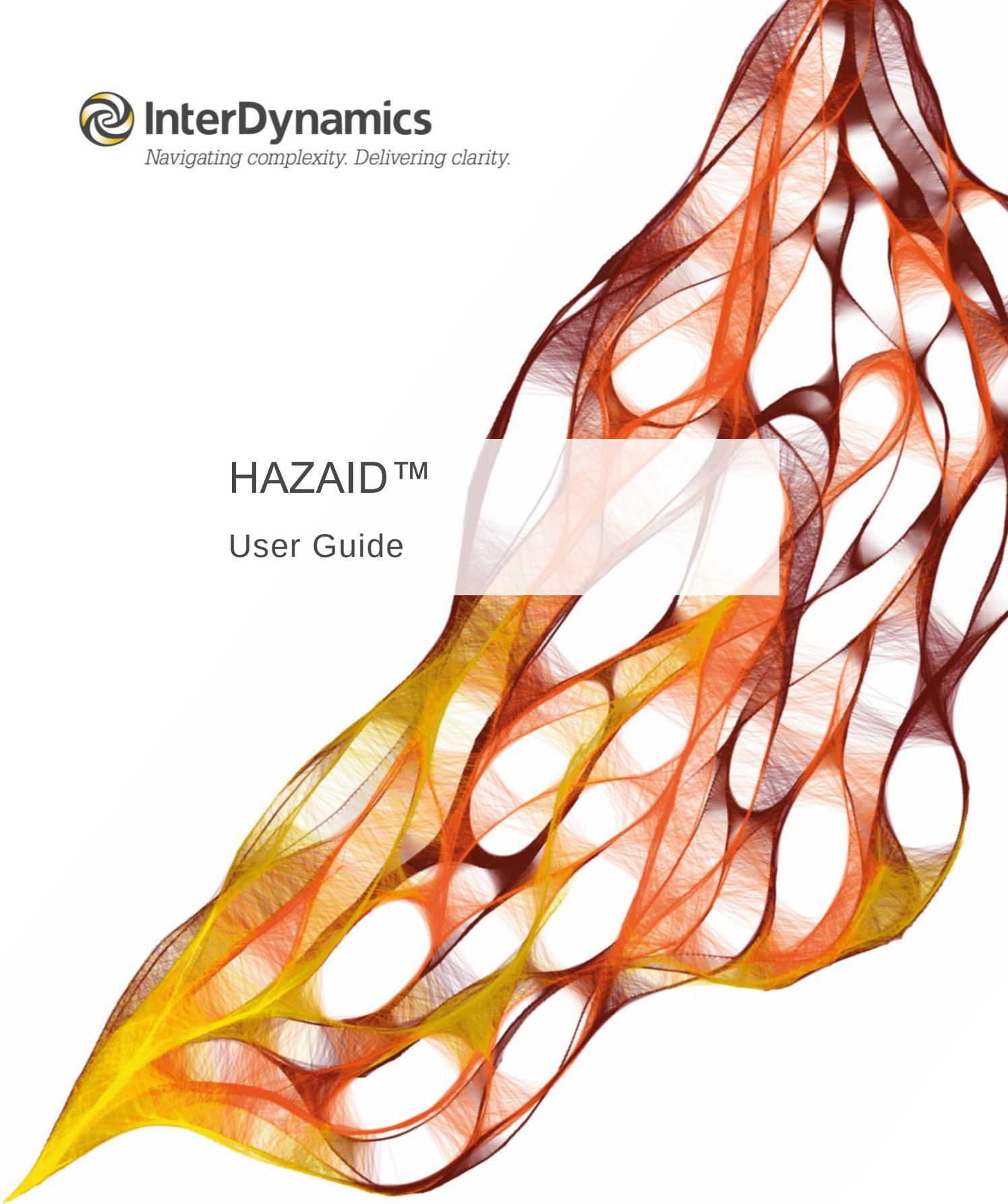
InterDynamics

Navigating complexity. Delivering clarity.



HAZAID™

User Guide

enquire@interdynamics.com

www.interdynamics.com

InterDynamics
Navigating complexity. Delivering clarity.

Contents

1. HAZAID Introductory Notes

HAZAID Hazard Analysis Tool is a hazard cataloguing and risk assessment Tool used to record the Fatigue Hazard Analysis (FHA) risk assessment information gathered during an FHA workshop. It is highly visual and interactive, and is used to ensure a high standard is maintained for information captured during the workshop process. HAZAID prompts participants to catalogue hazards and assess fatigue risk associated with their roles and environment.

The process of Hazard Analysis follows the HAZAID control panel from top to bottom, starting with setting **Definitions** to finishing with **Report**. Under each heading is a number of related tabs.

1.1. HAZAID Fatigue Hazard Analysis Process

Fatigue Hazard Scenarios are defined by:

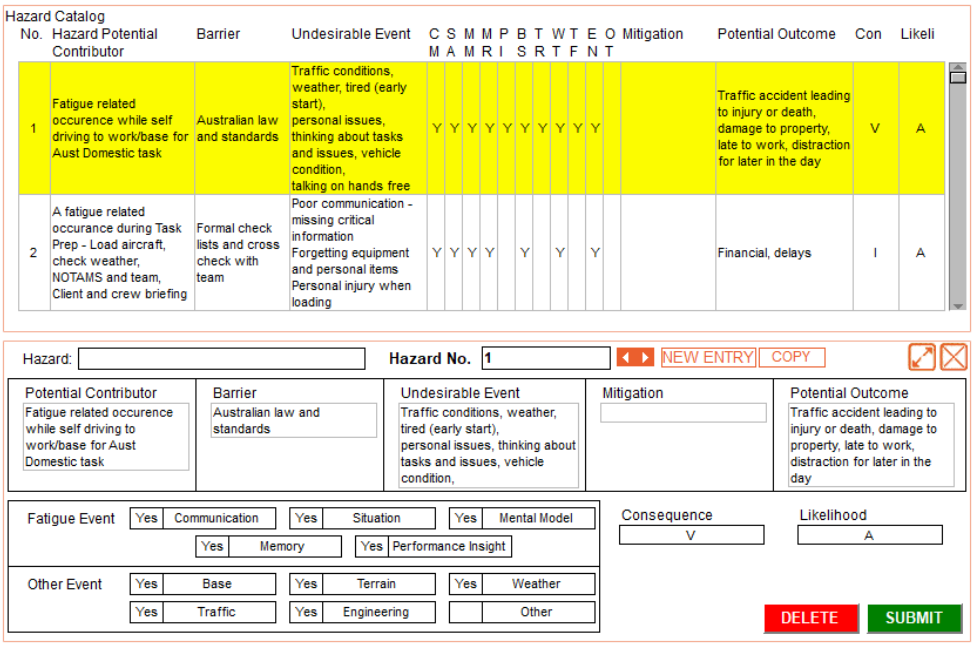
- Tasks (WHAT / WHERE?) – e.g. operation of equipment.
- Triggers (HOW / WHY?) which include errors caused by one or more fatigue impairments (e.g. communication, situation assessment / mental models / memory / performance insight and any other type of trigger (e.g. weather, equipment defects, lack of fuel, schedule recovery)
- Effects (HOW BAD – HOW BIG, HOW OFTEN?)

Risk assessment (severity/probability) of each scenario is then determined by:

- Reports of accident and incidents that are part of the organisations' safety management system;
- Details and statistics of accidents and incidents that are available from Safety Authorities (such as a Civil Aviation Safety Authority) who have responsibility for industry wide safety; and
- Details and statistics of accidents and incidents for the organisations' industry that are available from the organisations' insurer.

Existing Controls are noted and the effect on the organisation as a result of a scenario is then determined and noted, e.g.

- Increased scrutiny by safety authorities and insurers;
- Down-time due to equipment malfunction caused by user error; or
- Poor market image.



Hazard Catalog

No.	Hazard Potential Contributor	Barrier	Undesirable Event	CM	SA	MM	MR	PI	BS	TR	WT	TF	EN	OT	Mitigation	Potential Outcome	Con	Likeli
1	Fatigue related occurence while self driving to work/base for Aust Domestic task	Australian law and standards	Traffic conditions, weather, tired (early start), personal issues, thinking about tasks and issues, vehicle condition, talking on hands free	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			Traffic accident leading to injury or death, damage to property, late to work, distraction for later in the day	V	A
2	A fatigue related occurance during Task Prep - Load aircraft, check weather, NOTAMS and team, Client and crew briefing	Formal check lists and cross check with team	Poor communication - missing critical information Forgetting equipment and personal items Personal injury when loading	Y	Y	Y	Y		Y		Y		Y			Financial, delays	I	A

Hazard: | Hazard No. 1 | NEW ENTRY | COPY

Potential Contributor	Barrier	Undesirable Event	Mitigation	Potential Outcome
Fatigue related occurence while self driving to work/base for Aust Domestic task	Australian law and standards	Traffic conditions, weather, tired (early start), personal issues, thinking about tasks and issues, vehicle condition,		Traffic accident leading to injury or death, damage to property, late to work, distraction for later in the day

Fatigue Event: Yes Communication | Yes Situation | Yes Mental Model | Yes Memory | Yes Performance Insight

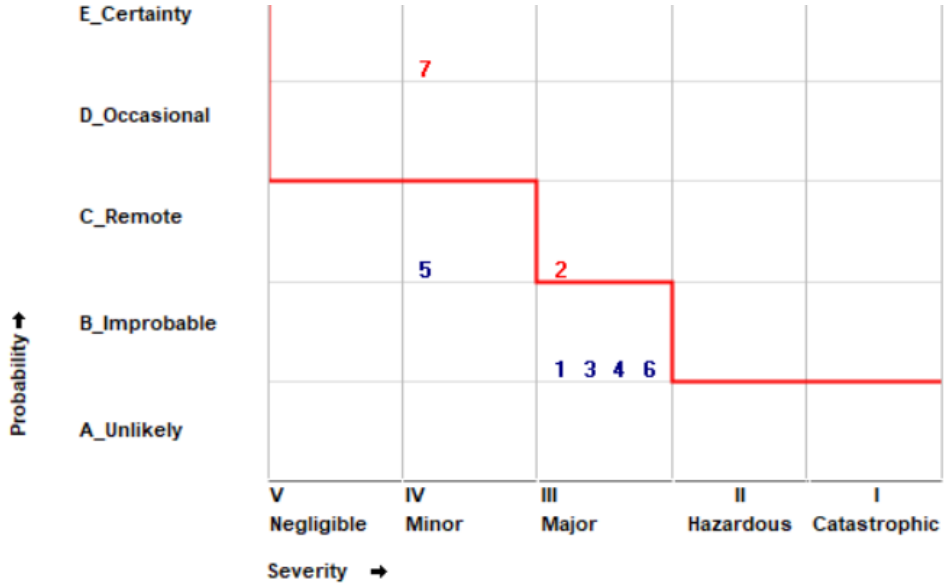
Other Event: Yes Base | Yes Terrain | Yes Weather | Yes Traffic | Yes Engineering | Other

Consequence: V

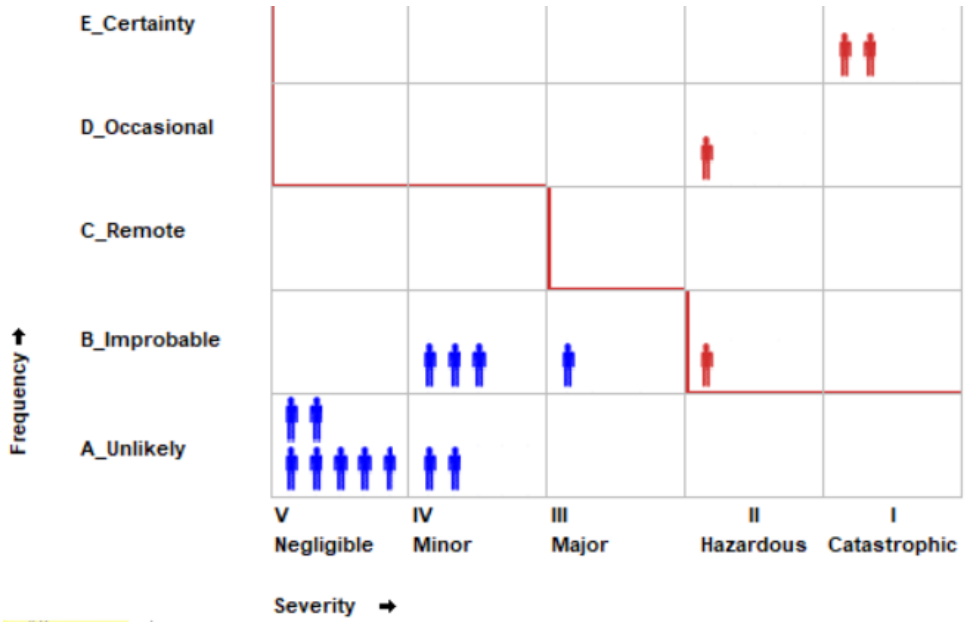
Likelihood: A

DELETE | SUBMIT

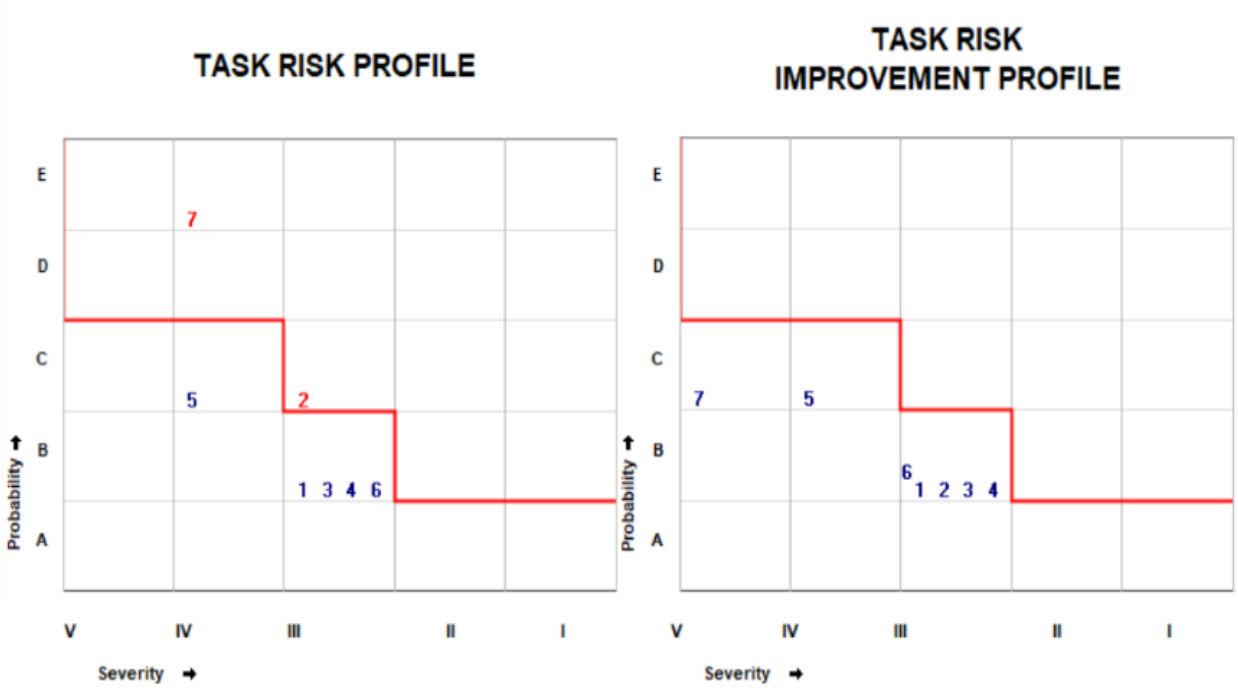
During the FHA, HAZAID is used to establish a catalogue of hazards, and Consequences and Probability are identified.



Once the hazards have been entered, HAZAID offers a Task Risk Matrix identifying which Hazards have an unacceptable consequence based on the probability of the occurrence.



By loading a FAID Quantum Hours of Work dataset, it is then possible to view the Fatigue Matrix based on selected Fatigue Tolerance Levels.



At the end of the FHA process, improvement actions are assigned to hazards which are considered to have unacceptable consequences to the organisation. During this process, implementation dates can be set and costs can be allocated to the improvement action. The above figure shows a comparison between the Task Risk Matrix and the Improvement Actions Task Risk Matrix

Outcomes of a Fatigue Hazard Analysis (FHA) using HAZAID include:

- Setting of appropriate benchmark figures for FAID Score and KSS Tolerance Levels, and Target Compliance percentages, for specific tasks or roles
- Increased employee engagement and contribution in the identification of acceptable fatigue related risk exposure levels, and other necessary controls that can inform

the development and continuous improvement of the Fatigue Management Plan; leading to the reduction of overall fatigue-related risk, and greater acceptance and effectiveness of risk improvement actions (including the use of FAID Quantum)
- Treatments/controls that are transparent, agreed & specific to each team/group/department
- Acceptable & unacceptable fatigue-related risks identified and made clear to all
- Security of knowing that the Fatigue Risk Management component of the Safety Management System is being based on data from objective analysis & organisational experience
- Documented records of outcomes and the level of rigour applied to determining tolerable levels of fatigue related risk exposure and recommended treatments
- Prioritisation for risk reduction investments
- Benchmark data for future review of fatigue-related exposures and controls
- Fatigue Risk Management controls that are transparent, agreed and understood at all levels, and sit above regulatory compliance-based systems
- Increased employee confidence in the ongoing commitment by the organisation to reducing fatigue-related risk through regular reviews and best practice processes
- Improved knowledge and communication through information about fatigue-related risk & scientific facts of sleep deprivation being available to all
- Consistent, repeatable, fatigue-related risk assessment & documentation processes

1.2. Fatigue Hazard Analysis

For more details regarding Fatigue Hazard Analysis risk assessment please read:

Establishing a Fatigue Tolerance Level Section 5

Fatigue Hazard Analysis Risk Assessments

2. Introduction

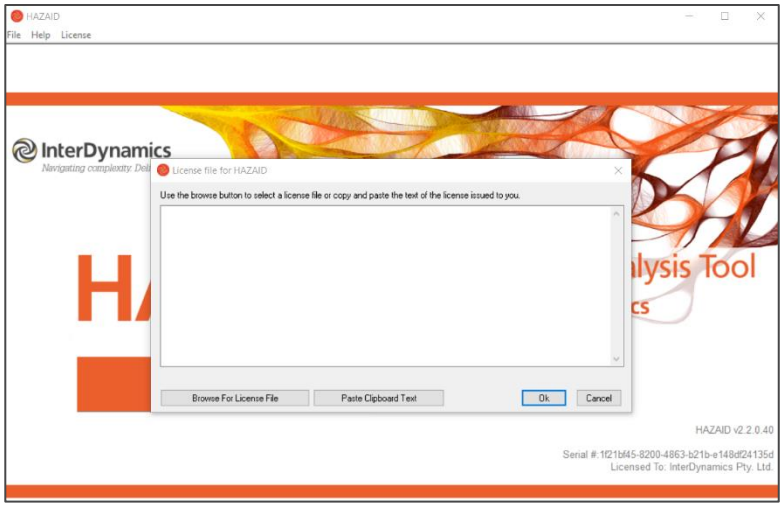
This User Guide incorporates all the functionality of HAZAID.

2.1. Set up

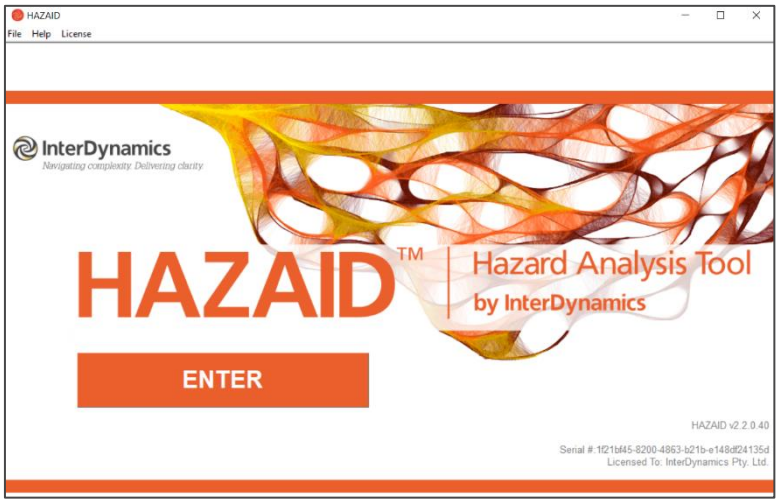
The first time a user loads HAZAID, the user will be taken through HAZAID Setup. Follow the prompts, read the license agreement and choose which features of HAZAID to install.

2.2. First Time User Instructions

Once setup up is complete and HAZAID first loads:



1. A valid license must be submitted. When entering the license file for HAZAID, the user can either:
   a. Use the **Browse For License File** button to select a license file, or
   b. Copy and Paste the text via the **Paste Clipboard Text** button.



2. Once the user has submitted a valid license, select **Enter**.

3. Control Panel

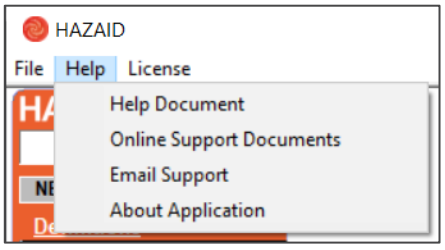
The user can navigate around the HAZAID sections via the orange 'control panel' on the left hand side by simply clicking on the appropriate section to be navigated to it's screen.

The process of Hazard Analysis follows the control panel from top to bottom, starting with setting **Definitions** to finishing with **Report**. Under each heading is a number of related tabs.

The tab that is active is highlighted by yellow text and black background.

3.1. Help

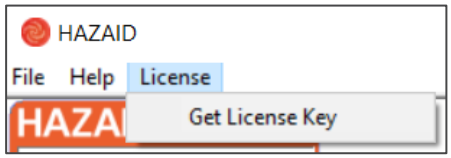
Help can be accessed via the **Help** Menu in the top left corner (second tab from the left).



The Help Menu provides access to:

- A Help Document (includes detailed information regarding terms, concepts and process steps),
- User Guide (internet access required),
- Online Support Documents (internet access required),
- Email Support (internet and email account required), and
- About Application – information relating to the Application such as version and serial number

3.2. License



The **License** tab can be found in the top left corner (third tab from the left).

The License Menu provides access to read in a License Key file via the **Get License Key** selection.

A browse for license file display will appear.

When entering the license file for HAZAID the user can either:

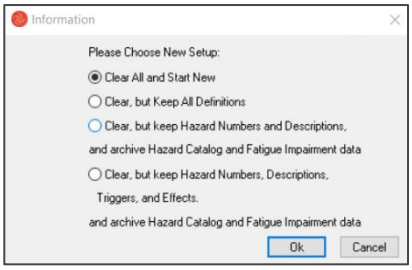
a. Use the **Browse For License File** button to select a license file, or

b. Copy and Paste the text via the **Paste Clipboard Text** button.

4. Start an Analysis

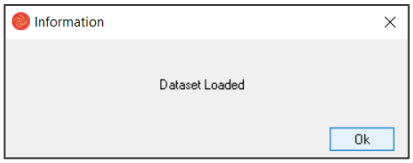
4.1. Start a New Analysis

1. If a previous analysis is loaded, and the user wishes to start a new analysis, select **NEW.** A pop up box will give options to choose what information to keep and clear.
2. To start a new analysis, enter the Title for the new analysis at the top of the control panel in the box reading **<Insert Title>.**



4.2. Load a Saved Analysis

To load a previously saved analysis, select **LOAD** and choose the relevant file (HAZAID Data File) and select open.



4.3. Save Analysis

To save an analysis, at any stage during the FHA process, select **SAVE** and save as a HAZAID Data File. The saved data can be loaded using the **LOAD** button.

5. Definitions

The tabs under Definitions provide information on FHA and allow the user to set definitions for the FHA.

NOTE: In this User Guide 'How Big' is referred to as Consequence and 'Chance' is referred to as Likelihood. If the User has selected alternative definitions for 'How Big' (Severity) and 'Chance' (Probability), than these will be displayed throughout HAZAID in place of Consequence and/or Likelihood.

5.1. Guidelines

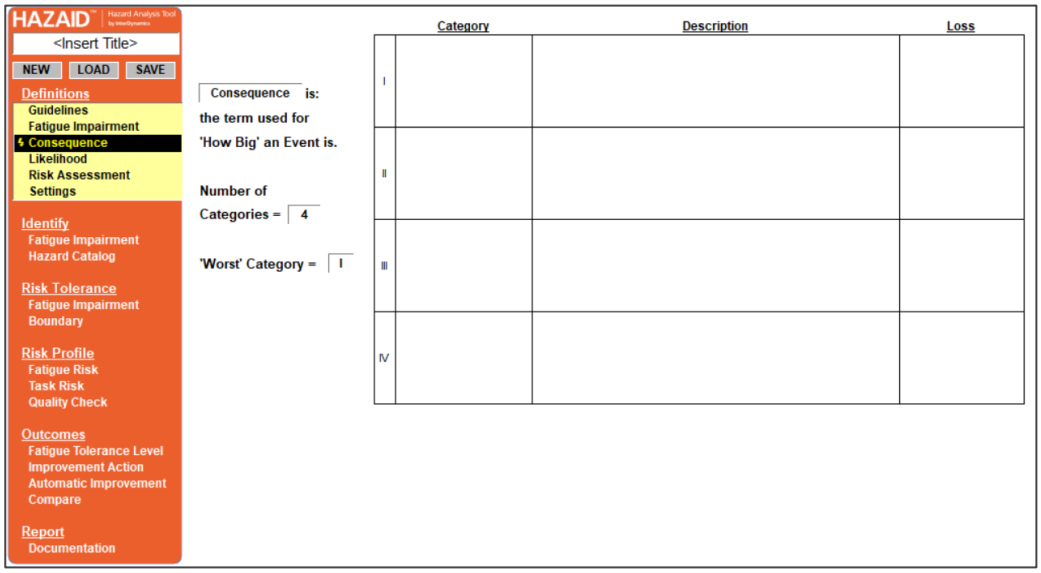
The **Guidelines** tab provides information on the scope of HAZAID.

5.2. Fatigue Impairment

The **Fatigue Impairment** tab provides information on categories of fatigue related impairments, descriptions and symptoms.

5.3. Consequence

The **Consequence** tab allows the user to set the consequence terminiology and categories used in the Risk Assessment Matrix.



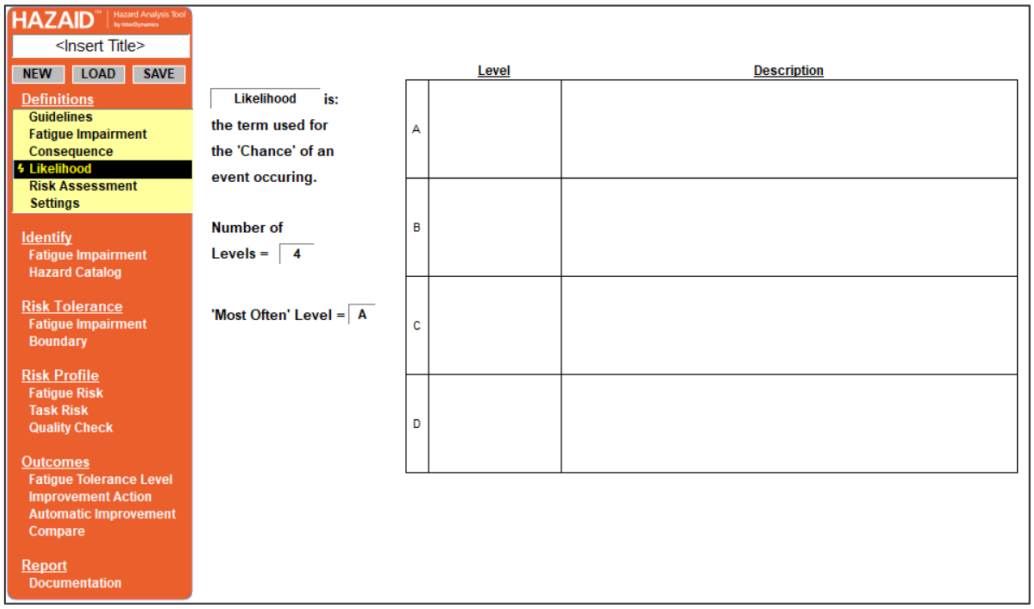
1. To select term used for 'How Big' an event is, click on the **Consequence** box and a drop down will appear, allowing the user to select **Consequence** or **Severity**.
2. Select the box next to **Number of Categories** and a drop down will appear to select the number of categories (between 2 and 6) for the risk matrix.
3. Select the box next to **Worst Category** to set whether "I" represents most severe (worst category), or "I" represents least severe consequence.

4. Once the term, number and direction of scale have been set, fill in the chart for each level of consequence, providing a category name, description and defining loss. Click in the relevant box and type description. See example below of what this chart may look like once complete.

	Category	Description	Loss
I	Extreme	Death	Huge Financial loss > $200,000
II	Major	Extensive injuries	Major loss of production capability <$200,000
III	Medium	Medical treatment required.	Medium financial loss <$20,000
IV	Minor	No injuries.	Low financial loss <$5,000

5.4. Likelihood

The **Likelihood** tab allows the user to set the terminology for likelihood and levels used in the Risk Assessment Matrix.



1. To select term used for the ‘Chance’ of an event occuring, click on **Likelihood** box and a drop down will appear, allowing the user to select **Likelihood** or **Probability**.
2. Select the box next to **Number of Levels** and a drop down will appear to select the number of levels (between 2 and 6) for the risk matrix.
3. Select the box next to **Most Often** to set whether “A” represents most likely or “A” represents least likely to occur.

4. Once the term, number and direction of scale have been set, fill in the chart for each level of likelihood, providing a level name and description. Click in the relevant box and type description. See example below of what this chart may look like once complete.

	Level	Description
A	Almost certain	Is expected to occur in most circumstances
B	Likely	Will probably occur in most circumstances
C	Possible	Could occur at some time
D	Unlikely	May only occur in exceptional circumstances

5.5. Risk Assessment

The **Risk Assessment** tab allows the user to set the number of risks defined, allocate descriptions and display colours and set Risk Assessment Matrix.

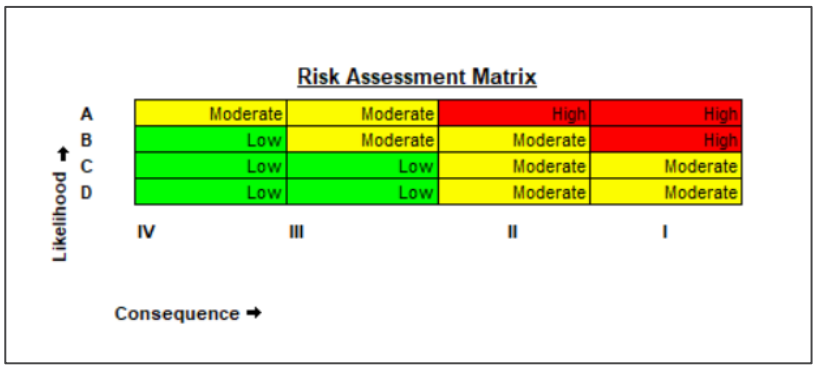
1. To select number of risks levels, click in box next to **Number of Risks** and a drop down menu will appear allowing the user to select between 2 and 6 risks.
2. Using the Risk Controls chart, select each cell to define each risk level and provide a description of control level required for each risk level and display colours. See below for example of completed chart.

Number of Risks = 3

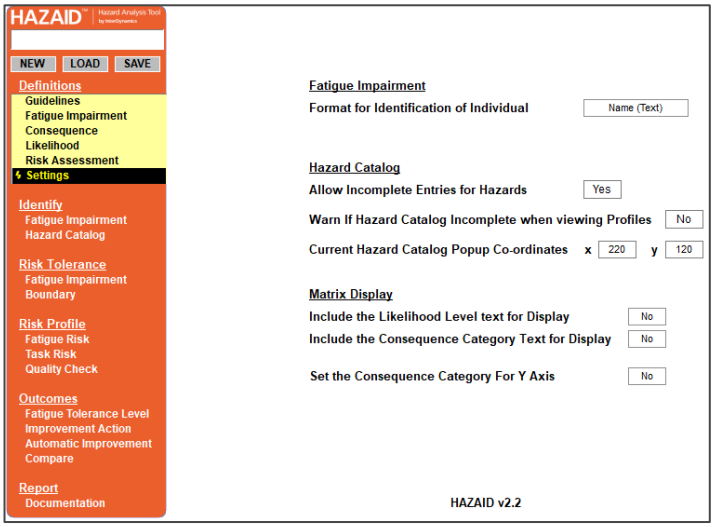
Risk Controls

Risk	Description (for example)	Display
High	Stop process immediately and take the necessary corrective action monitor the corrective action closely.	
Moderate	Put temporary controls in place as a minimum until permanent controls can be established.	
Low	Plan and put controls in place as soon as is practical.	

3. Set the Risk Assessment Matrix risk levels. With highest risk in top, right corner, click in each cell to set/change risk. See below for example of completed matrix.



5.6. Settings

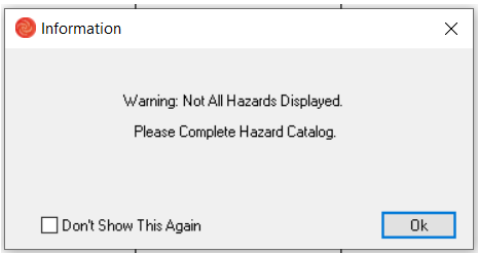


5.6.1. Fatigue Impairment

1. **Format for Identification of Individual**: This allows the user to use **Name** (text), or **ID** (value), which allows sorting of the names alphabetically or the IDs numerically.

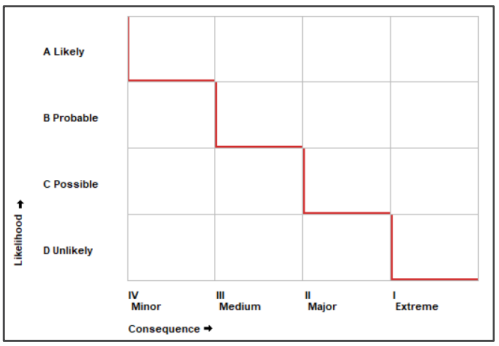
5.6.2. Hazard Catalog

1. **Allow Incomplete Entries for Hazards**: Set **Yes** to allow incomplete hazard entries to be saved to the Hazard Catalog. If set to **No**, an incomplete hazard entry will not be able to be saved to the Hazard Catalog and the **Submit** SUBMIT button will not appear on the hazard entry until all fields are complete.
2. **Warn If Hazard Catalog Incomplete when viewing Profiles**: (This setting option will only appear Yes to Allow Incomplete Entries for Hazards has been selected above.). Set **Yes** for a pop up to appear when an incomplete hazard entry is submitted and to advise that there is an incomplete hazard entry in the catalog. Set **No** to not have a pop up warning.



3. **Current Hazard Catalog Popup Co-ordinates:** Allows the user to alter co-ordinates of Hazard Catalog Popup during Outcomes process.

5.6.3. Matrix Display



1. **Include the Likelihood Level text for Display:** Set **Yes** to display the likelihood level text alongside each numeric value in Risk Assessment Matrix, Risk Tolerance Boundary etc. Set **No** to display numeric value only with no level text displayed.
2. **Include the Consequence Category Text for Display:** Set **Yes** to display the consequence category text alongside each numeric value in Risk Assessment Matrix, Risk Tolerance Boundary etc. Set **No** to display numeric value only with no category text displayed.
3. **Set the Consequence Category for Y Axis:** Select **No** for Consequence to be displayed on X Axis (and Likelihood on Y Axis). Select **Yes** for Consequence to be displayed on Y Axis (and Likelihood on X Axis).

6. Identify

6.1. Fatigue Impairment

The Fatigue Impairment tab allows the user to import and view hours of work data report saved from FAID Quantum.

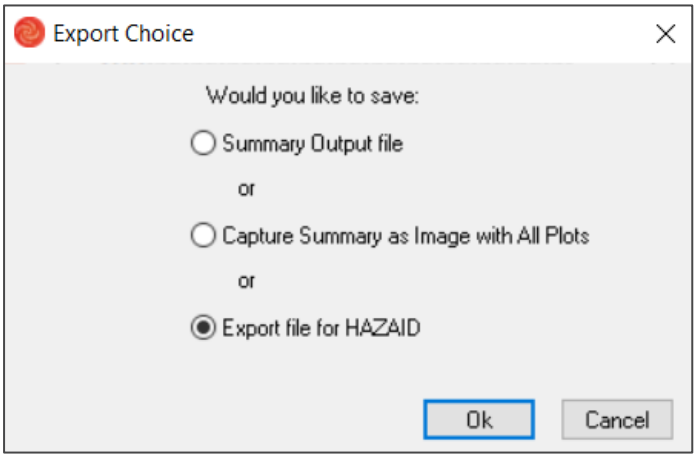
This data is then used in the 'Risk Profile: Fatigue Risk' and 'Outcomes: Fatigue Tolerance Level' steps.

6.1.1. Import Hours of Work Data

6.1.1.1. Export Data from FAID Quantum

To import hours of work data, the user must first create an export file for HAZAID in FAID Quantum. To do this:

1. Perform analysis on relevant work schedule in FAID Quantum.
2. In 'Outputs: Summary' select the **Export** button 
3. A pop up will appear. Select **Export file for HAZAID.** Then select **Ok**



4. Save the file (will save as .dat file)

NOTE: If the version of FAID Quantum being used does not provide the **Export file for HAZAID** option, please contact InterDynamics to obtain the appropriate license key.

6.1.1.2. Import Data into HAZAID

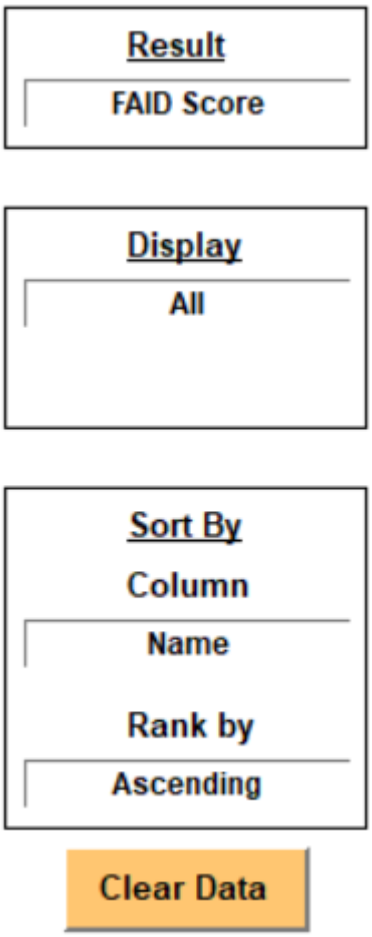
To import hours of work data into HAZAID:

1. Select 

2. Select and open the appropriate file (.dat file)
3. If fatigue impairment data is already present in HAZAID, the user will be asked if they would like to append the fatigue impairment data to the table? If **Yes**, the data will be added to the current data. If **No**, the data will replace the current data.

6.1.2. View Fatigue Impairment Data

Once hours of work data has been loaded, the user can use the display options on the right, to alter the information displayed.



The User can alter the data displayed using the panel on the right hand side.

1. **Result:** Select the box under “Result” to display FAID Score or KSS results.
2. **Display:** Select the box under “Display” to display All FTL/KTL options, or one FTL/KTL only. Select a value in the second box to display results related to this FTL/KTL.

The User can sort the Table using the **Sort By** panel on the right hand side.

3. **Column**: Select the box under “Column” to sort the table by one of the following:
    - Name
    - Peak FAID Score/KSS
    - Peak FAID/KSS Condition
    - FTL/FTL Compliance Rating
    - FTL/KTL Used
4. **Rank by**: Select the box under “Rank by” to sort the table in Ascending or Descending order of the selected Column.

5. **Clear Data**: To clear all fatigue impairment data, select “Clear Data”. A pop up will appear to confirm you want to Clear All. Select Yes/No.

6.2. Hazard Catalog

The Hazard Catalog tab allows the user to enter hazards into the hazard catalog and view/review hazards.

6.2.1. Enter New Hazard

1. To add a new hazard, click **New Entry** 

button in bottom right corner of screen.

2. Hazard entry details can be viewed in bottom section of screen, or pop out 
can be selected to maximise hazard entry view.
3. Fill out all relevant fields for **Hazard, Potential Contributor, Barrier, Undesirable Event, Mitigation, Potential Outcome** by clicking in box and typing text.
4. For **Fatigue Event** and **Other Event** options, select relevant boxes to display **Yes.**

5. Select **Consequence** and **Likelihood** by clicking box and choosing from drop down options.
6. Once complete, select **Submit**  and the Hazard Catalog will be updated.

6.2.2. Copy and Paste Hazard

The option exists to duplicate a hazard by copying and pasting an existing hazard entry. The duplicate will be allocated a new number, and can be edited as needed.

1. To copy an existing hazard, click on the hazard entry to open up the hazard details box at the bottom of the screen.
2. Select the **Copy**  to copy to clipboard.
3. Select **New Entry**  to open a New Hazard entry.
4. Select **Paste**  to paste hazard from clipboard.
5. Any required edits can then be made to the hazard details before saving by selecting **Submit** 

6.2.3. Edit Hazard Details

1. To edit or view details of a hazard entry, click on the hazard to open the hazard entry details in the bottom section of the screen.
2. Click the relevant field to edit and type text or select relevant boxes.
3. Once editing is complete, select **Submit**.
4. The Hazard Catalog will then be updated.

6.2.4. Delete Hazard

1. To delete a hazard from the hazard catalog, click on the hazard to open the hazard entry details in the bottom section of the screen.
2. Select **Delete** 
3. A pop up will appear to confirm to delete the hazard. Select **Yes**.

6.2.5. View Hazard Catalog

The hazard catalog displays the details of all entered hazards. The column headings for Fatigue Event and Other Event are abbreviated as follows:

Communication – CM

Situation – SA

Mental Model – MM

Memory – MR

Performance Insight – PI

Base – BS

Terrain – TR

Weather – WT

Traffic – TF

Engineering – EN

Other - OT

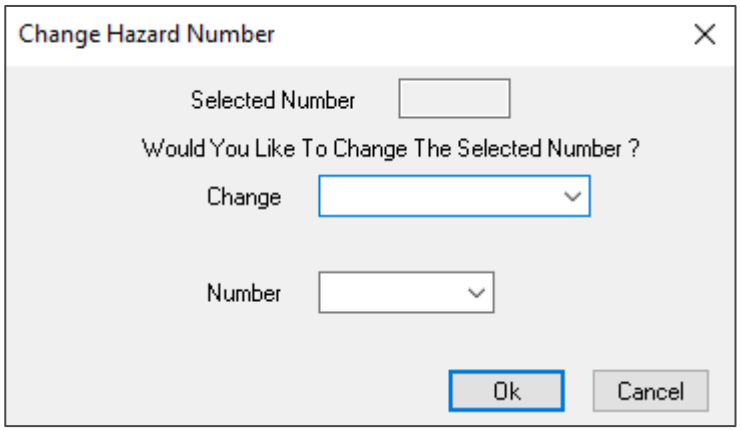
6.2.6. Change Hazard Number

The hazards in the catalog are assigned a number, and displayed in order (lowest to highest). If a Hazard is deleted from the catalog, then the user can click **RENUMBER** RENUMBER to renumber the catalog and replace any missing numbers in order.

The user can change the order/placement of the Hazard in the catalog.

1. Right click on a Hazard to bring up the edit menu.

2. Select **Change Number** from the menu
3. A pop-up **Change Hazard Number** will appear with details for:
    a. Hazard Number Selected
    b. Change Option:
        i. Insert Above
        ii. Swap With
        iii. Insert Below
    c. Change With Hazard Number Option

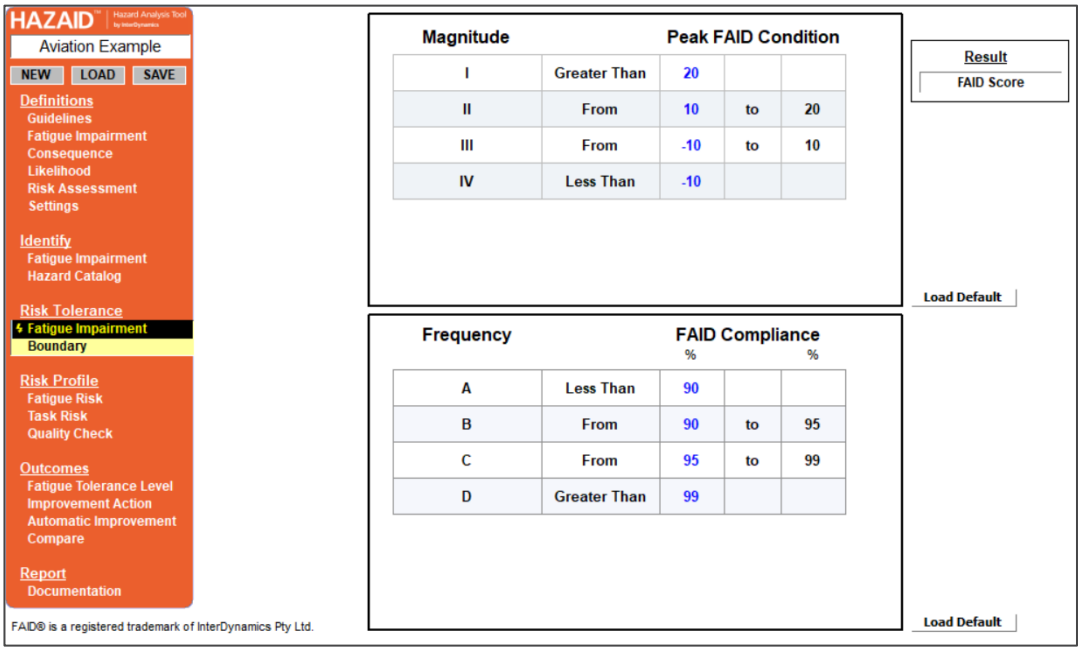


4. Select details and click **OK** to continue with changes.

7. Risk Tolerance

7.1. Fatigue Impairment

The Fatigue Impairment tab allows the user to stipulate the Magnitude for the Peak FAID/KSS Conditions and the Frequency for the FAID Score/KSS Compliance. These values relate to the Risk Profile: Fatigue Risk tab.



The values in the Magnitude chart refer to KSS/FAID Score range relating to the set Tolerance Level (in the Risk Profile – Fatigue Risk tab). (eg. Greater than 20 FAID Score = a FAID Score of 20 higher than the set tolerance level).

The frequency percentages refer to the KSS/FAID Score Compliance percentage to the set Tolerance Level. (Less than 90 = KSS/FAID Score Compliance to the set tolerance level of less than 90 percentage).

The user can change view to display FAID Score or KSS by using the drop down under **Results** in the top right of the screen.

The user can edit the White cells with Blue Text, the rest will automatically update.

The user can load in the default values by selecting on the **Load Default** button.

7.2. Boundary

The Boundary tab allows the user to set the Risk Tolerance Boundary, used in the Risk Profile and Outcomes.

7.2.1. Set Boundary

1. The boundary line will start at the bottom right corner of the matrix. The user is asked if the quadrant (indicated by a question mark in matrix) is Tolerable. Select **Yes** or **No** button.
2. The Risk Tolerance Boundary line will be drawn as per the user's selections.
3. The question mark will then move to the next box. Continue until the selection is complete.

7.2.2. Reset Boundary

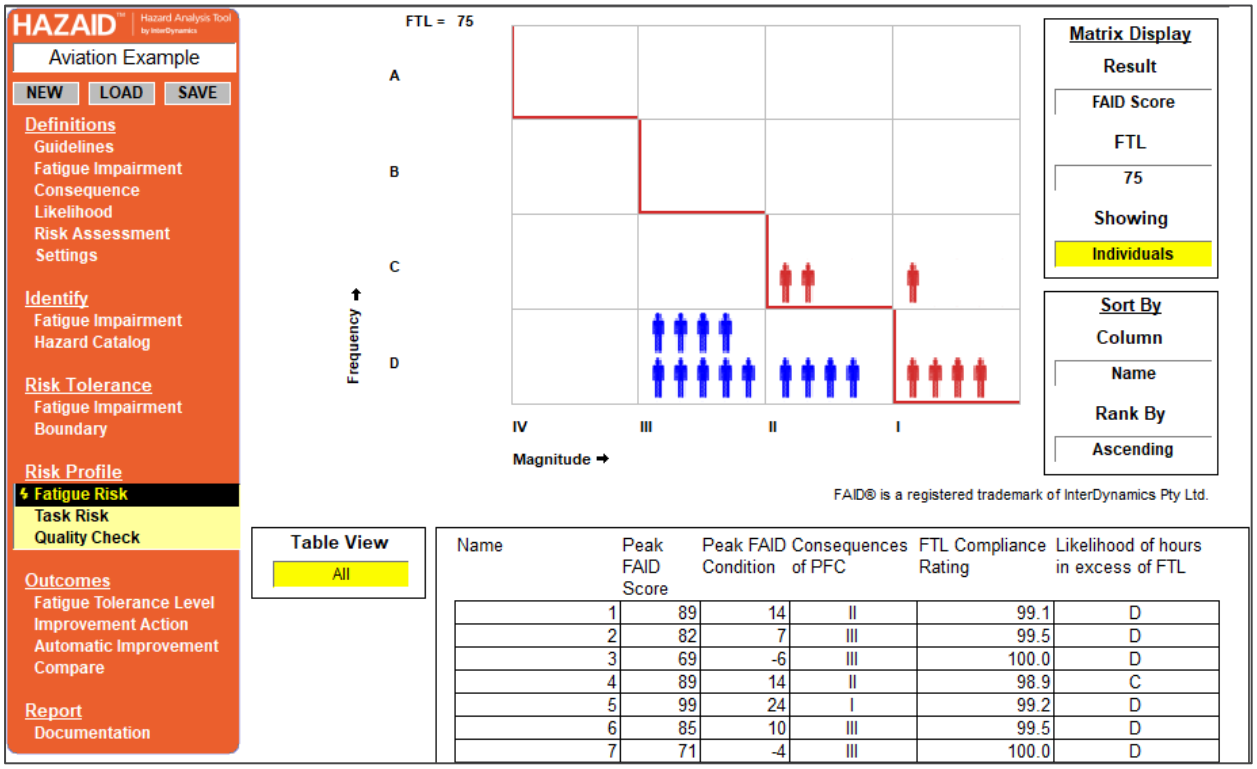
1. To reset the Risk Tolerance Boundary, select **Reset Boundary**. This will clear the previous selection and provide a blank matrix.

8. Risk Profile

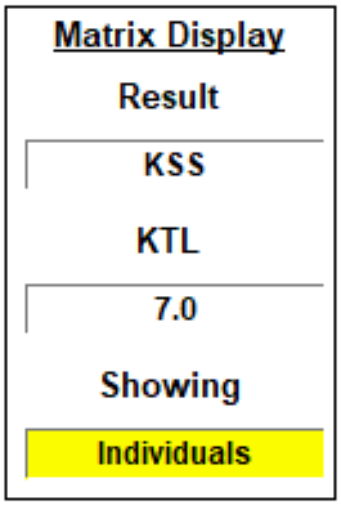
8.1. Fatigue Risk

The Fatigue Risk Matrix displays the individuals relating to the imported hours of work data based on the parameters set for Risk Tolerance – Fatigue Impairment and the FTL/KTL selected.

The Fatigue Risk Table displays Fatigue Impairment data of individuals from the imported hours of work data.

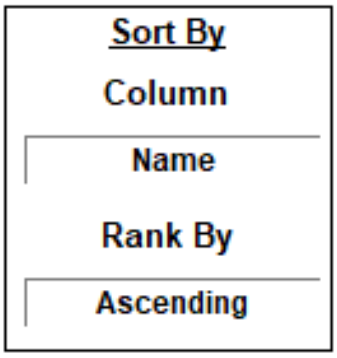


Name	Peak FAID Score	Peak FAID Condition	Consequences of PFC	FTL Compliance Rating	Likelihood of hours in excess of FTL
1	89	14	II	99.1	D
2	82	7	III	99.5	D
3	69	-6	III	100.0	D
4	89	14	II	98.9	C
5	99	24	I	99.2	D
6	85	10	III	99.5	D
7	71	-4	III	100.0	D



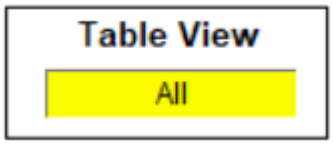
The User can alter the display using the **Matrix Display** panel on the right hand side.

6. **Result:** Select the box under result to display FAID Score or KSS results
7. **FTL/KTL:** Select the box under FTL/KTL to set the FAID Score/KSS Fatigue Tolerance Level to be applied.
8. **Showing:** Select the box under Showing to change matrix to display Individuals or display as % of Group.



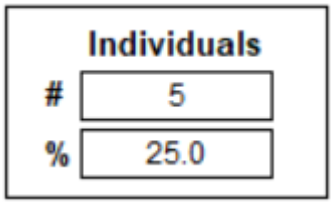
The User can sort the Table using the **Sort By** panel on the right hand side.

1. **Column**: Select the box under “Column” to sort the table by one of the following:
    - Name
    - Peak FAID Score/KSS
    - Peak FAID/KSS Condition
    - Consequences of PFC/PKC
    - FTL/FTL Compliance Rating
    - Likelihood of Hours in Excess of FTL/KTL
2. **Rank by**: Select the box under “Rank by” to sort the table in Ascending or Descending order of the selected Column.



The User can alter what data is displayed in the table using the **Table View** panel to the left of the table.

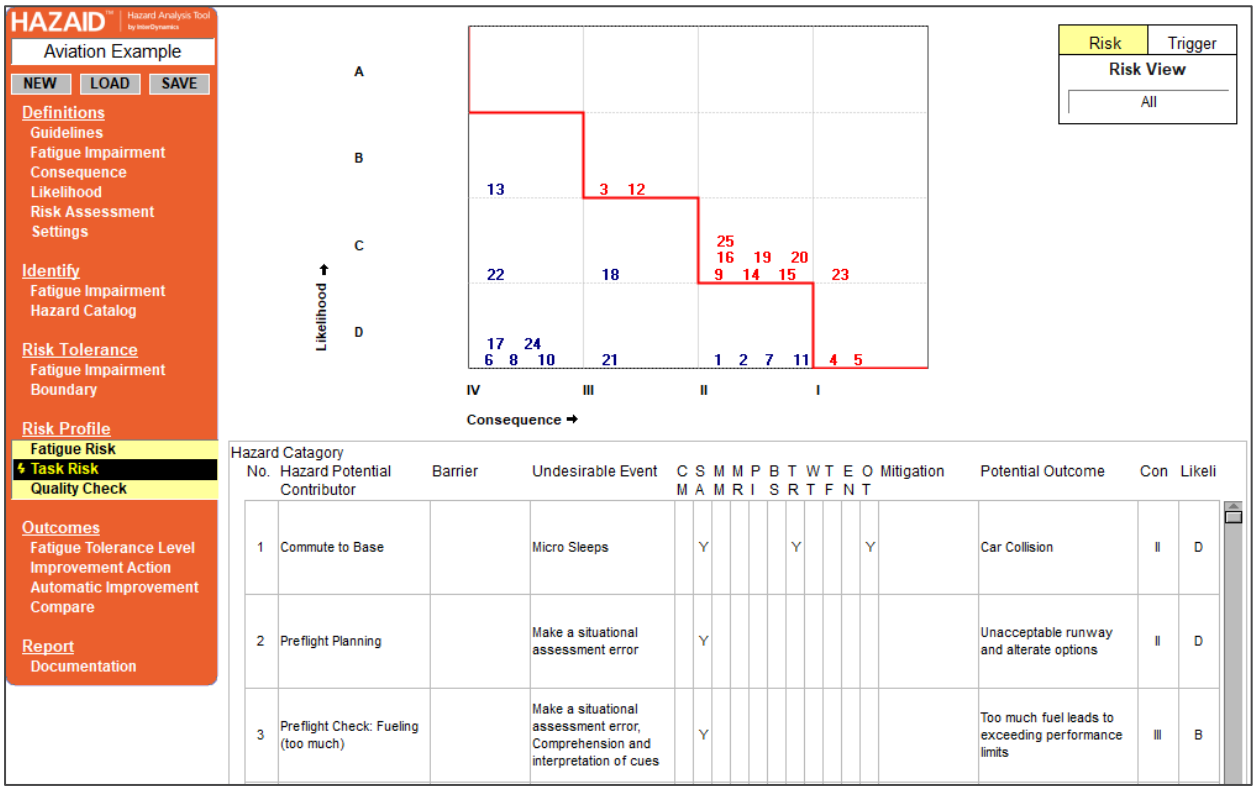
1. **Table View:** Select the box under “Table View” to select **All** or **Matrix Point**. All will display all individuals in the table. Matrix Point will display individuals related to the Frequency and Magnitude selected.
2. **Frequency:** Select the box under “Frequency” to display results from this matrix level.
3. **Magnitude:** Select the box under “Magnitude” to display results from this matrix level.

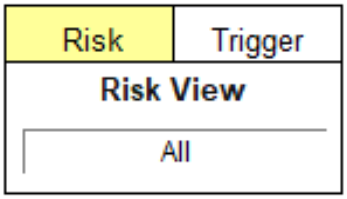


The **Individuals** display to the bottom left of the table, displays the number and percentage of individuals displayed by the Table View selected.

8.2. Task Risk

The Task Risk tab displays the hazards (from the Hazard Catalog) and the Risk Tolerance Boundary in the Matrix and provides details of the hazards in the table below. Hazards displayed in red are above the determined boundary. Hazards displayed in blue are below the determined boundary.





The User can alter the hazards displayed in the table using the panel in the top right or by clicking a box in the matrix.

1. Click on a point of the matrix and just the hazards at this matrix point will be displayed in the table below.
2. **Risk - Risk View**: Select the box under “Risk View” to select **All** or **Matrix Point**. All will display all hazards in the table. Matrix Point will display hazards related to the Likelihood and Consequence selected.
    - **Likelihood:** Select the box under “Likelihood” to display results from this matrix level.
    - **Consequence:** Select the box under “Consequence” to display results from this matrix level.
3. **Trigger - Trigger View**: Select the box under “Trigger View” to display hazards relating to one of the following:
    - Communication
    - Situational Assessment
    - Mental Model
    - Memory
    - Performance Insight
    - Base
    - Terrain
    - Weather
    - Traffic
    - Engineering
    - Other

8.3. Quality Check

The Quality Check tab allows the user to examine the rating of the hazard scenario and make appropriate adjustments.

The user can:

- move the risk tolerance boundary down,
- select a tolerable hazard and either increase the likelihood or consequence
- select an intolerable hazard and mark it as rated incorrectly.

8.3.1. Move the risk tolerance boundary down

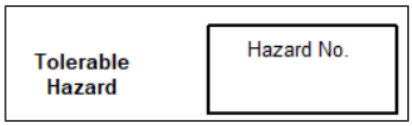
To move the risk tolerance boundary down, click the **Down** 

button at the bottom of the matrix under the relevant risk boundary.

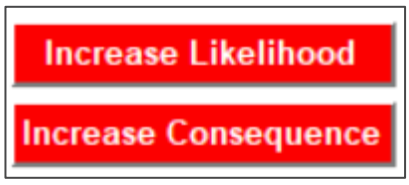
NOTE: To move the boundary back up, return to the **Risk Tolerance – Boundary** tab and reset the boundary.

8.3.2. Select a tolerable hazard and increase likelihood or consequence

To increase the likelihood or consequence of a hazard:



1. Select the Hazard No. from the drop down next to **Tolerable Hazard**. The details of the hazard will appear to the right.



2. Select **Increase Likelihood** or **Increase Consequence** to move the hazard up or across one level on the matrix.

8.3.3. Select an intolerable hazard and mark it as rated incorrectly

To mark a hazard as rated incorrectly:

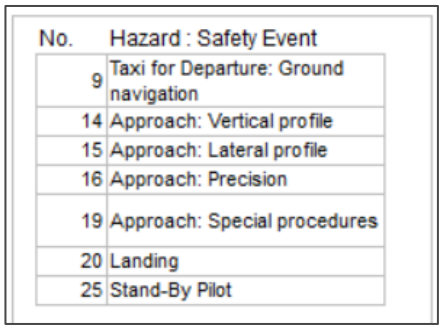
1. Select the Hazard No. from the drop down next to **Intolerable Hazard**. The details of the hazard will appear to the right.
2. Click **Rated Incorrectly** 

. The hazard will become a darker red colour on the Matrix, and the details will be added to the Improvement Catalog.

9. Outcomes

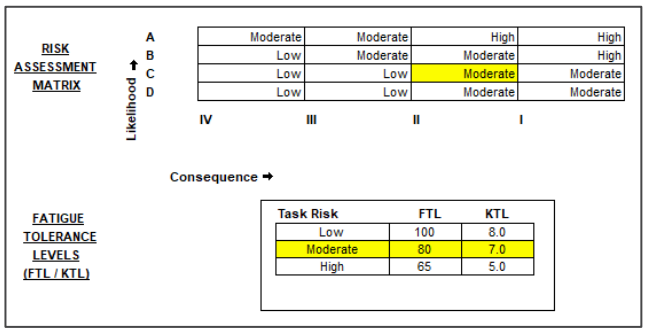
9.1. Fatigue Tolerance Level

The user is presented the Matrix with Risk Tolerance Boundary and the Hazards displayed.



No.	Hazard : Safety Event
9	Taxi for Departure: Ground navigation
14	Approach: Vertical profile
15	Approach: Lateral profile
16	Approach: Precision
19	Approach: Special procedures
20	Landing
25	Stand-By Pilot

1. The user can click on a point of the matrix to view the **Hazard description** of all hazards at this level.



RISK ASSESSMENT MATRIX

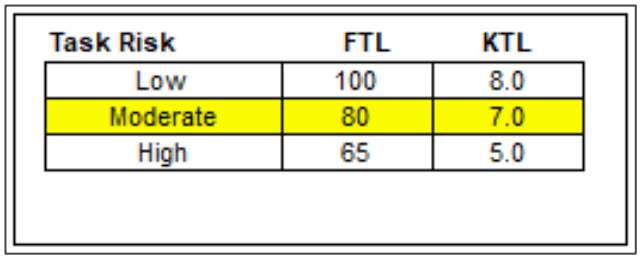
Likelihood	IV	III	II	I
A	Moderate	Moderate	High	High
B	Low	Moderate	Moderate	High
C	Low	Low	Moderate	Moderate
D	Low	Low	Moderate	Moderate

Consequence ➡

FATIGUE TOLERANCE LEVELS (FTL / KTL)

Task Risk	FTL	KTL
Low	100	8.0
Moderate	80	7.0
High	65	5.0

2. The corresponding **Task Risk** will be highlighted in the Risk Assessment Matrix and the Fatigue Tolerance Levels table.



Task Risk	FTL	KTL
Low	100	8.0
Moderate	80	7.0
High	65	5.0

3. The user can nominate a **Fatigue Tolerance Level** for each Task Risk level.
   The Fatigue Tolerance Levels need to be ordered from **Moderate** being the highest fatigue tolerance level, to the **Very High** being the lowest fatigue tolerance level. As the risk of a task increases, the level of fatigue tolerated decreases.

9.2. Improvement Action

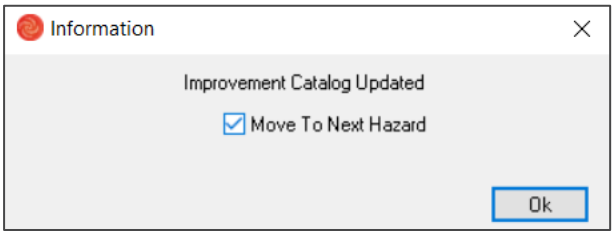
The Improvement Action tab allows the user to view Intolerable Hazards and plan improvements.

The Risk Improvement Catalog displays all Intolerable Hazards, listed from most catastrophic and highest likelihood through to least catastrophic and likelihood. The User is shown the current Task Risk Profile Location, and the Hazard description.

The User can then select a hazard for improvement by clicking on the hazard. The hazard details will be displayed below.

The User can then:

- Describe the **Improvement Action** by typing in the box under Improvement Action.
- Select the appropriate box/s as to how it will be improved under **Improve By** – **Elimination** (ELM), **Reduction** (RED), **Protection** (PRT), **Mitigation** (MIT). A **Yes** will appear.
- Select a new **Target Consequence** and **Target Likelihood** by selecting from the drop down selections.
- Nominate a **By Date** by entering the target date.
- Nominate a **Rough Cost** by typing an amount in the box.
- Then the user can **Submit** it to the Improvement Catalog
- A pop up will then appear asking if the user wishes to **Move to Next Hazard**. Select **Ok** to move to the next hazard, or unselect the box and then Select **Ok** to return to viewing the Risk Improvement Catalog.



The user can also scroll through the Improvement Catalog using the scroll bar to the right and select a row to view the details.

To close the Improvement Entry Details, select  .

To maximise the view of the Improvement Entry Details, select  .

To minimise the view of the Improvement Entry Details, select  .

9.3. Automatic Improvement

The Automatic Improvement tab allows the user to view Tolerable Hazards and plan improvements.

The Catalog displays all Tolerable Hazards, listed from most catastrophic and highest likelihood through to least catastrophic and likelihood. The User is shown the current Task Risk Profile Location, and the Hazard description.

The User can then select a hazard for improvement by clicking on the hazard. The hazard details will be displayed below.

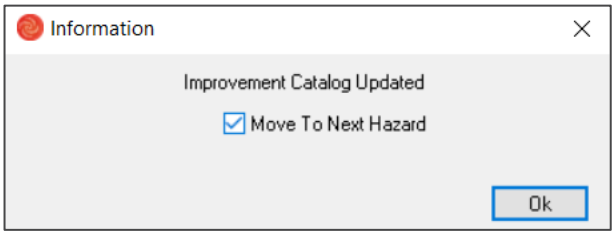
To maximise the view of the Improvement Entry Details, select  .

To minimise the view of the Improvement Entry Details, select  .

The User can then:

- Describe the **Improvement Action** by typing in the box under Improvement Action.
- Select the appropriate box/s as to how it will be improved under **Improve By** – **Minimum Cost** and/or **Minimum Effort**. A **Yes** will appear.

- Nominate a **By Date** by entering the target date.
- Nominate a **Rough Cost** by typing an amount in the box.
- Select a new **Target Consequence** and **Target Likelihood** by selecting from the drop down selections.
- Then the user can **Submit** it to the Improvement Catalog
- A pop up will then appear asking if the user wishes to **Move to Next Hazard**. Select **Ok** to move to the next hazard, or unselect the box and then Select **Ok** to return to viewing the Risk Improvement Catalog.

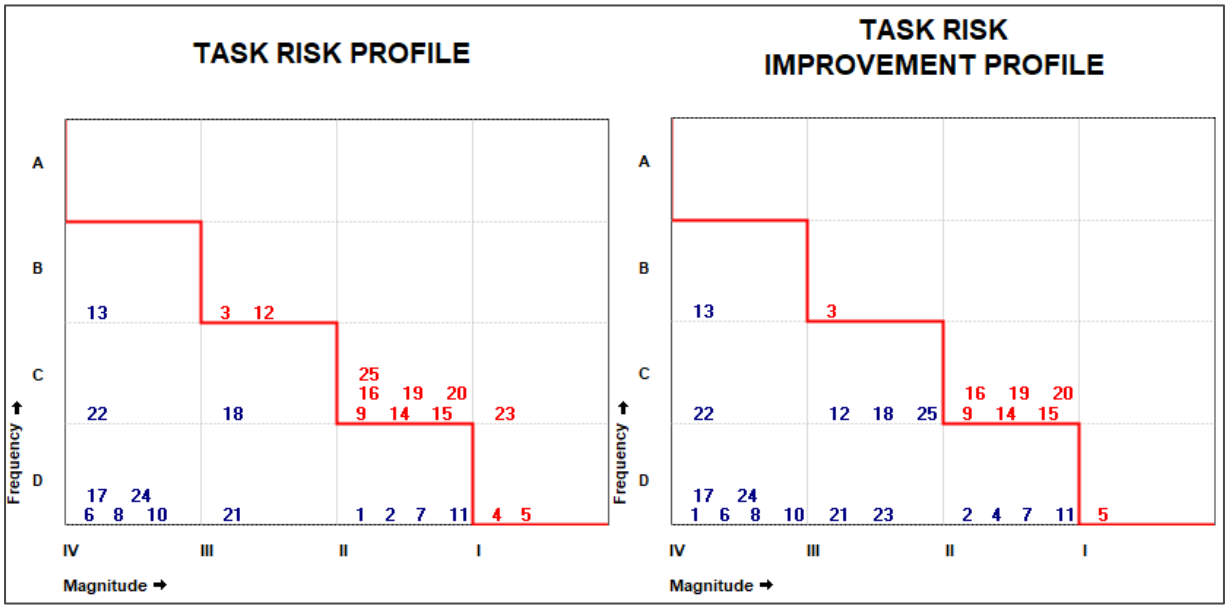


The user can also scroll through the Improvement Catalog using the scroll bar to the right and select a row to view the details.

To close the Improvement Entry Details, select  .

9.4. Compare

The Compare tab allows the user to view the Task Risk Profile, and the Task Risk Improvement Profile and see the possible improvement with the appropriate action implemented.



10. Report

10.1. Documentation

The Documentation tab allows the user to customise a report to print or save.

To add a Report Title, the Organisation, the Participants' names, title and position, the user can type in the relevant box and TAB or ENTER to finalise. Alternatively, the user can select from the drop down provided if relevant text is displayed.

The report details for printing can be selected by clicking the tick box of the Main Categories (which will then include all sub-categories), or selecting certain sub-categories.

Once the user is satisfied with the selection, they can select **Click to Print Report**  button to print the report, or **Click to Create Images for Report**  to save them as images (in bitmap format .bmp).

A hard copy can be printed via a printer, or print to file can be selected, if the user has document publishing software, to save as PDF.