Pertmaster - Risk Register Module

Pertmaster Risk Register Module

This document is an extract from the Pertmaster help file version h2.62.

Table Of Contents

1   Risk Register - Details

Requires Risk Register module ('Pertmaster Products' in the on-line documentation)

Help Version

This documentation applies to Risk Register module version 1.9. See Risk Register | Help | About

Overview

If the risks in a project and their impact on the project tasks can be estimated, then the Risk Register module can be used to quantify how the risks impact the entire project.

For example a risk "Poor ground conditions" could impact a task called "Dig Trench".

To model this in the Risk Register module we would need to identify:

l   Chance of "Poor ground conditions" occuring, e.g. 25%.

l   Impact on duration of "Dig Trench", e.g. an additional 10 to 20 days

l   Impact on cost of "Dig Trench", e.g. an additional £5000 to £8000.

Steps for using Risk Register module

1.   Define the project risks: ID, description, probability, default duration and cost impact: Register | Edit Risk Register

2.   Map the project risks to tasks (or tasks to risks): Register | Assign Risks

3.   Build the risk plan: Register | Build Risk Plan

4.   Run the risk analysis: Risk | Run Risk Analysis

1. Creating and assigning a resource for fixed costs

When a risk impacts a task it may increase the fixed cost. Pertmaster requires a resource that is then used to assign fixed cost impacts.

Note Even if your risks only have a duration impact you still need to have a resource for cost impacts.

If there are no resources in the project Pertmaster will offer to create one for you.

Alternatively to create a resource yourself for modelling fixed cost impact:

l   Plan | Resources

l   Enter the name ZFIXED under the first free cell under Name.
    Note The resource does not have to be named ZFIXED, however the view retrieved after building the risk plan looks for this resource name when formatting the barchart column details. If another resource name is used it will be necessary to modify the RiskView.vue file if you wish it to recognise the resource name.

l   Enter a description: Fixed cost resource for register

l   Leave the calendar as 7 day.

l   Change the loading to Spread.
    Note If the resource is given a Normal loading the cost will then be related to the duration and applied every day.

l   Change the cost to 1

l   Leave other settings as their defaults.

2a. Adding risks to the register manually

A risk is defined with a risk ID, description and a probability.

To edit the risk register:

l   Register | Edit Risk Register

l   The first time you edit the risk register you must select the resource that will be used to model fixed costs. Select a resource for Resource for Fixed Cost (e.g. ZFIXED).

l   Click Add.

l   A default Risk ID automatically created for you. Change this if required.

l   Enter the risk Description.
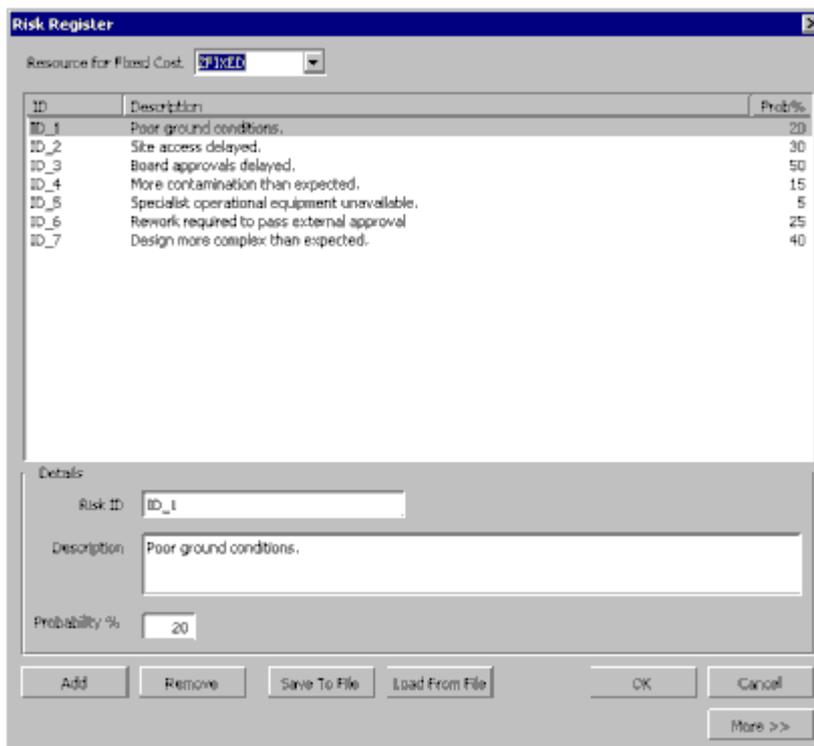
l   Enter the Probability.

l   Click OK.

Figure: The Risk Register dialog for defining risks.

2b Loading risks from an MS Excel spreadsheet

A risk is defined with a risk ID, description and a probability. This information can be loaded in from an MS Excel spreadsheet.

To load an MS Excel risk register:

l   In Pertmaster: Register | Edit Risk Register

l   The first time you edit the risk register you must select the resource that will be used to model fixed costs. Select a resource for Resource for Fixed Cost (e.g. ZFIXED).

l   Click Load from File

l   Browse for the the file "RegisterSample.xls"

l   Click Open

2c. Default risk impacts

The default risk impacts can be defined in the Risk Register dialog. The defaults are assigned when a risk is mapped to a task. They can then be overridden on a per assignment basis. Defaults can be defined as values or percentages.

l   Click the More >> button to display the default impacts

Note You may not want to enter default risk impacts. The impact each risk has on a task can be entered when the risk is mapped to a task.

The default risk impacts are:

Min Duration - the default minimum duration impact (must be at least one unit)
Max Duration - the default maximum duration impact (must be at least one unit)
Min Fixed Cost - the default minimum cost impact.
Max Fixed Cost - the default maximum cost impact.

3a. Assigning Tasks to Risks

Once the risks have been defined they can be assigned to the tasks they affect.

Each risk can affect one or more tasks and the impact on each task can be different. The time and/or cost impact a risk has on a particular task can be expressed as a value or a percentage.

To assign tasks to risks:

l   Register | Assign Risks

l   Select a risk under Risks in this plan.

l   Under Tasks find and select the task you wish to assign to the selected risk.

l   Click Map.

l   When a task is assigned to a risk the default risk impacts are automatically assigned. If no defaults were set up, or you wish to change the impacts, then enter the required impacts under Min Dur, Max Dur, Min Cost and Max Cost. The impacts can be entered as a value or a percentage. To enter a percentage include the % symbol.

    Note A risk must have a duration impact of at least 1, it cannot be 0. The cost impact can be 0 or negative.
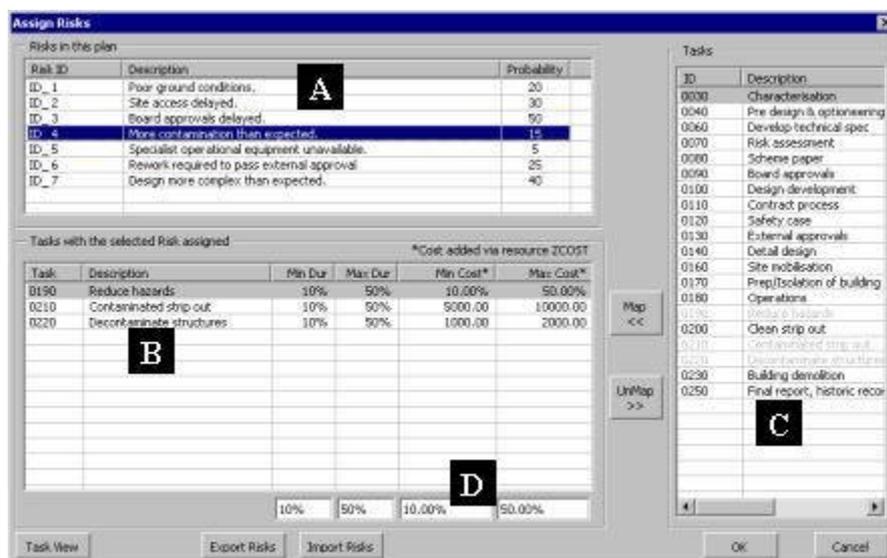

Figure: The Assign Risk dialog displaying the Risk View
A = List of risks and their probabilities.
B = The tasks that have been assigned to the risk selected in A.
C = The list of tasks. Tasks are displayed in grey text if they have been assigned to risk selected in A.
D = The impacts the selected risk has on the selected task.

l   Click OK to accept changes.

3b. Assigning Risks to Tasks

The details above describe how tasks can be assigned to risks. However it is possible to assign risks to tasks.

To assign risks to tasks:

l   Register | Assign Risks

l   Click on the Task View button (bottom left hand corner) and the location of the tasks and risks are swapped over.

l Select a task under Tasks in this plan.

l Under Risks find and select the risk you wish to assign to the selected task.

l Click Map.

l When a risk is assigned to a task the default risk impacts are automatically assigned. If no defaults were set up, or you wish to change the impacts, then enter the required impacts under Min Dur, Max Dur, Min Cost and Max Cost. The impacts can be entered as a value or a percentage. To enter a percentage include the % symbol.

Note A risk must have a duration impact of at least 1, it cannot be 0. The cost impact can be 0 or negative.
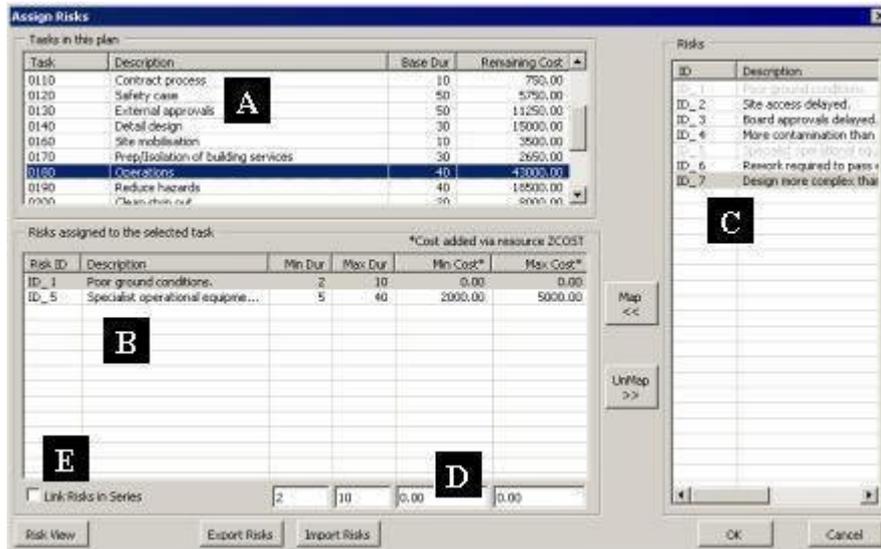

Figure: The Assign Risk dialog displaying the Task View
A = List of tasks and their durations and remaining costs.
B = The risks that have been assigned to the task selected in A.
C = The list of risks. Risks are displayed in grey text if they have been assigned to the task selected in A.
D = The impacts the selected risk has on the selected task.
E = The Link Risks in Series option.

Note In the Task View the option Link Risks in Series is available. Checking this option will mean the duration impacts will be run in series. See details under 3c. Tasks impacted by multiple risks.

3c. Tasks impacted by multiple risks

If a task is mapped to more than one risk, then during the risk analysis there is a chance that all, some or none of the risks will occur. When more than one risk occurs the duration of the task is increased by largest duration impact (i.e. duration risks are in parallel). The cost of the task is increased by the sum of the risk costs.

Note A task's duration can be increased by the sum of all the risk duration impacts if required (i.e. duration risks are in series). To choose this option see note under 3b. Assigning Risks to Tasks.

4. Building the risk plan

Once the risks have been entered and assigned the risk plan can be built. Building the risk plan creates a copy of the plan, saves and closes the original plan and automatically adds tasks, logic and uncertainty to model the risk assignments that have been made.

The built risk plan is then ready to be risk analysed (Risk | Run Risk Analysis)

For each iteration of the risk analysis, the risks will impact the project time and cost.

User fields used by Risk Register module

The Risk Register module stores risk and assignment details in the plan and task user fields.

When using the Risk Register module the user fields should not contain other data.

The following user fields are required:

Field	Stores
Task User Notes2	Task assignment (Risk ID, Risk duration and cost impact)
Plan User Text26	Name of resource used for assigning cost impacts
Plan User Text27	Risks (ID, Description, Probability, Default duration and cost impacts)

Saving and loading risks and assignments

The risks and assignments can be save to a file.

This is useful when the original project was imported from another and it has now been updated. The project can be re-imported and the risks and assignments loaded.

Use the menu commands:

l   Register | Save Risks and Assignments

l   Register | Load Risks and Assignments

Saving and loading only risks

You may wish to transfer the risks from one plan to another.

The Save to File and Load from File buttons in the Risk Register dialog can be used:

l   Register | Edit Risk Register

l   Use Save to File or Load from File buttons. The risks can be saved and opened in MS Excel format or as a data file (.dat)

Creating a compatible MS Excel Risk Register

1. The only columns required are a column titled "RiskDescription" and a column titled "Probability"

2. If no RiskID column is added Pertmaster will assign ID's automatically when loaded into the Risk Register.

3. The column titles can be in any order in a single row. However the titles must be within the first 50 rows and columns.

4. Pertmaster assumes the risks detailed below the column titles continue until a blank row is found.

5. Probability can be a value from 0% to 100%

6. Values entered in the columns that define the default impacts can be absolute values or percentages.

7. MinDurImpact and MaxDurImpact must be at least 1

RiskID	RiskDescription	Probability	MinDurImpact	MaxDurImpa
ID_1	Poor ground conditions.	20%	1	
ID_2	Site access delayed.	30%	1	
ID_3	Board approvals delayed.	50%	1	
ID_4	More contamination than expected.	15%	1	
ID_5	Specialist operational equipment unavailable.	5%	1	
ID_6	Rework required to pass external approval	25%	1	
ID_7	Design more complex than expected.	40%	1	

2   Risk Register - Tutorial

Requires Risk Register licence ('Pertmaster Products' in the on-line documentation)

Help Version

This documentation applies to Risk Register module version 1.9. See Risk Register | Help | About

Tutorial Overview

This tutorial demonstrates the steps required to use the Risk Register module to add and assign risks to tasks.

Open the sample plan

l   File | Open | Samples

l   Locate and open "RegisterSample01.pln"

Add or edit the project Risks

The sample project already has risks entered. These can be viewed in the Risk Register dialog.

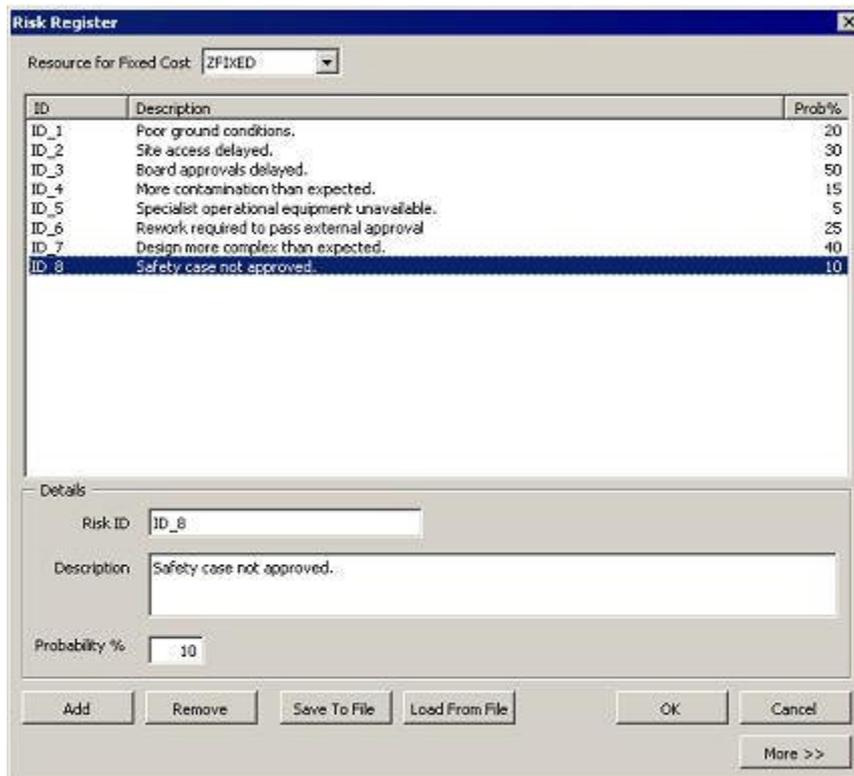l   Register | Edit Risk Register. This will display the Risk Register dialog:

Figure: Risk Register dialog for adding and editing risks.

l   Existing risks can be edited or additional risks added.

l   Click Add. A Risk ID will be entered with a default value.

l   Enter in the Description
    "Safety case not approved."

l   Enter the Probability
    10

l   The Default Impacts are optional. We will leave these and assign the impacts when the risk is assigned to a task.

Assign Risks

Having created the risks in the project they can be mapped to the tasks they affect. This project already

has several risks mapped to tasks.

We will assign the risk added in the previous step to the task "Safety case not approved".

l   Register | Assign Risks. This displays the Assign Risks dialog.

l   Under Risks in this plan click on "ID_8, Safety case not approved."

l   Under Tasks click on "0120, Safety case".

l   Click on Map to assign task to the risk.

l   Enter the following impacts the risk has on the task:
    Min Dur = 5
    Max Dur = 10
    Min Cost = 1500
    Max Cost = 3000

    Description of impact: 10% of the time the "Safety case not approved" risk will impact the task "Safety case". This will add 5 to 10 days to its duration and 1500 to 3000 to its fixed cost. The "Safety case" task has a variable cost of 90 per day therefore any duration increase will also increase its total variable cost.

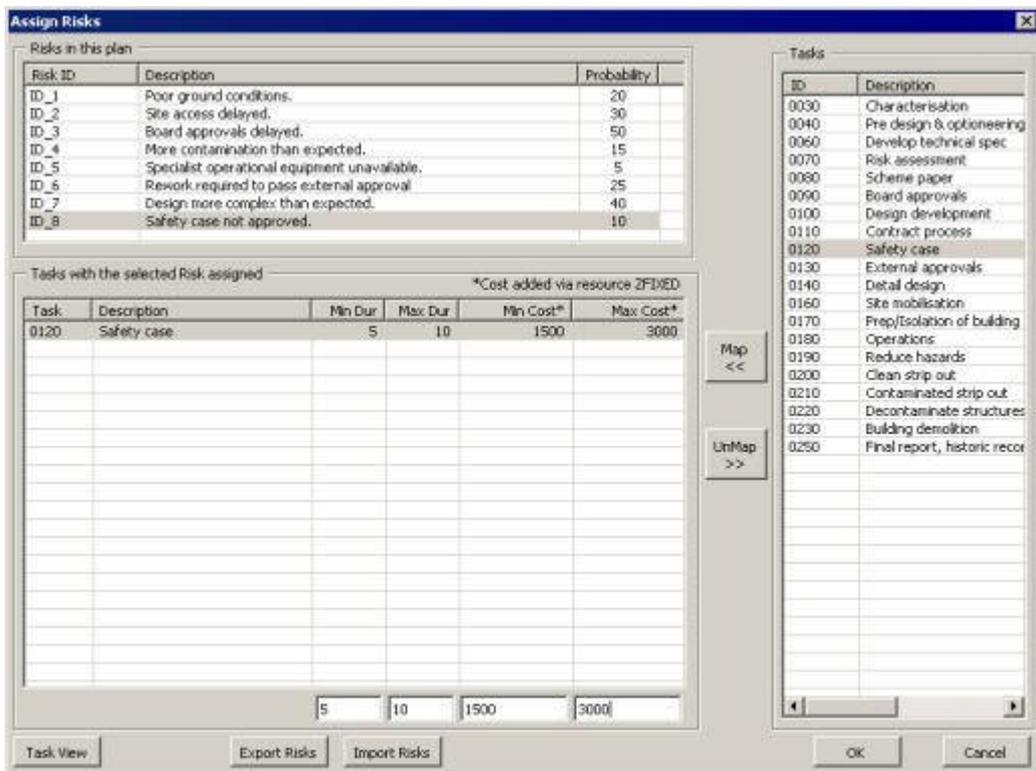   Note Clicking on other risks will display the tasks each risk has been assigned to.

Figure: The Assign Risks dialog for mapping risks to tasks and defining impacts.

Build the risk model

The risks and impacts defined can now be added to the plan.

Building the risk model closes the current plan and automatically creates a copy.

The copied plan is named using the current filename plus the text "-Risk" e.g. "RegisterSample01-Risk.pln".

The copied plan is a temporary file that is used to run the analysis. If you wish to modify the plan or risk assignments you should return to the original plan "RegisterSample01.pln" use the File | Open command.

Build the risk model:

l   Save the changes made to the tutorial file.

l   Register | Build Risk Plan

Run risk analysis

Now the risk plan has been built a risk analysis can be run as normal.

l   Risk | Run Risk Analysis.

If the warnings are switched on in Pertmaster (Risk | Warnings command) you will receive a warning message dialog as shown below. This is a standard warning dialog. Each task added to model the a risk impact is given a zero remaining duration (this prevents these tasks from affecting the project finish date prior to running the risk analysis). Also each task added to model a risk impact is assigned a minimum and maximum duration. As the zero remaining duration will be outside the range of the minimum and maximum durations, this standard warning is displayed and can be OK'ed.
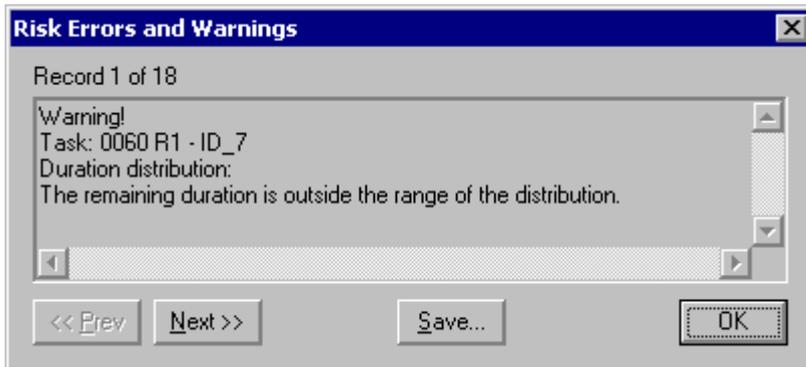

Figure: Standard warning dialog that indicates the duration of each risk task is outside the range of the minimum and maximum durations. This is to be expected when running a risk analysis built using the Risk Register and the dialog can be OK'ed.

3   Risk Register - Advanced details

Overview

When the Register | Build Risk Plan command is used Pertmaster builds a risk model that includes all of the risk assignments and their corresponding duration and/or cost impacts. The method used to build this risk model is detailed below.

How risk probability is modeled

Each risk in the project has a probability of occurrence. When the risk plan is built, Pertmaster creates a task for each risk and assigns the probability to the Task Existence. These "risk" tasks are displayed under a summary task called "Risks" at the end of the built plan.

Figure: Tasks added to end of project to model risks and probabilities

When the risk analysis is run the "risk" tasks will exist or not exist based on the Task Existence percentages assigned.

The "risk" tasks are used to drive the duration and cost impact tasks. This is achieved using Task Existence Correlation. Task Existence Correlation ensures that when a task exists (or does not exist), all

the correlated impact tasks also exist (or do not exist).

How duration impact is modeled

When the risk plan is built additional tasks are added to model the duration impacts. These tasks are assigned a uniform distribution with minimum and maximum values equal to the minimum and maximum duration impacts.

If a task has more than one risk assigned then a task is added for each risk.

To ensure that the existing logic still functions, the additional tasks are added as subtasks. The logic then flows through the summary task.

In the figures below the task "0180 Operations" has been assigned two risks (ID_1 and ID_5). After building the risk plan the original task now has three additional tasks. One to model the base duration (i.e. 0180B) and two to model the impact of the two risks that have been assigned (i.e. 0180 R1 and 0180 R2).

When the task is impacted by the risks the duration of "0180 Operations" is increased. The succeeding tasks are therefore delayed.
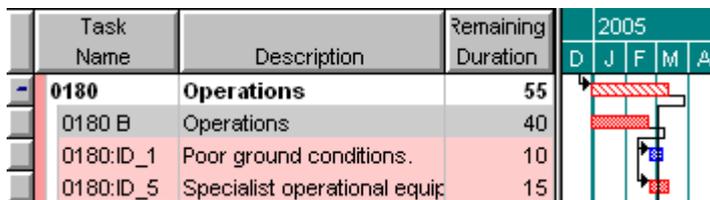

Figure: Duration impacts modeled with tasks in parallel. In this iteration both risks occurred.

As a default the duration impacts are in parallel (i.e. the longest impact delays the project). Alternatively a task can have the impacts linked in series using the Link Risks in Series option in the Assign Risks dialog. This option can be set on a per task basis.
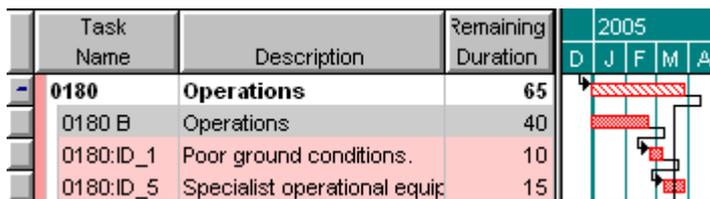

Figure: Duration impacts modeled with tasks in series. In this iteration both risk occurred.

How fixed cost impact is modeled

The fixed cost impact of a risk is modeled by assigning a resource with with a uniform distribution to the task that is being used to model the duration impact.

The minimum and maximum values of the uniform distribution are set to the minimum and maximum duration impacts.

How variable cost impact is modeled

When a risk occurs and causes a duration impact the duration of the task increases.

If the task has resources with Normal loadings assigned then increasing its duration will also proportionally increase the demand for those resources.

If you do not wish the cost of a task to increase when its duration is impacted then ensure that none of the resources assigned have Normal loadings.

Note Resources with Normal loadings duration dependent.

Detailed steps performed when the risk plan is built

Create copy of the plan

l A copy of the plan is made. This is the built plan.

l The built plan filename is formed by adding "-Risk" (e.g. "myplan.pln" --> "myplan-Risk.pln").

Add risks to the built plan

For each risk the following steps are performed when the risk plan is built:

l A new task with a zero duration is created.

l The task name is set to the risk ID (e.g. ID_1). The task description is set to the risk description.

l The task is assigned a task existence equal to the risk probability.

l Each task created is added to summary task called "Risks" at the end of the plan.

Add tasks to model impacts

For each task that has risks assigned the following steps are performed:

l A copy of the original task is created. The copy is the base task.

l The task name of the base task is formed by adding " B" to the original name, e.g. "0010 B".

l Any resources and links are removed from the base task.

l The base task is made a sub task of the original task.

l For each risk assigned an impact task is added.

l The task name of an impact task is formed by adding the Risk ID to the original name, e.g. "0010:ID_1". The description of an impact task is the description of the risk.

l Depending on the option selected the impact tasks are linked in series or parallel to the base task.

l A uniform duration distribution is assigned to each impact task with minimum and maximum values equal to the minimum and maximum duration impacts.

l If there is a fixed cost impact a uniform resource distribution is assigned with the minimum and maximum values equal to the minimum and maximum fixed cost impacts. The resource assigned is defined in the Edit Risks dialog.