Managing Projects with MS Project 2010

Session: 5

Project Dependencies

Objectives

- Define dependent and co-dependent tasks
- Describe how to compare types of dependencies
- Explain how to create, modify, view, and delete dependency links
- Explain how to work with lag time and lead time

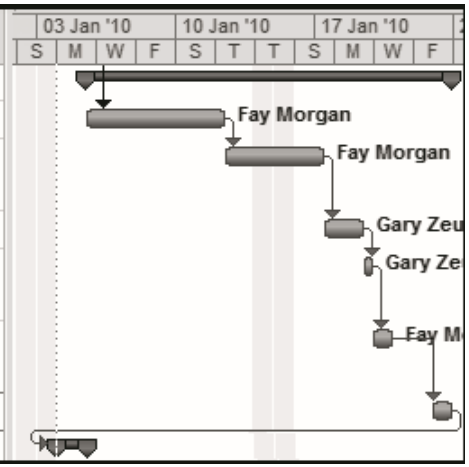
Introduction

- MS Project assumes by default that all tasks start on the project start date simultaneously.
- Tasks are created with their default constraint ‘as soon as possible’ and with no dependencies.
- Practically, all the tasks in a project cannot start at the same time.
- Tasks will have dependency links between them in a project plan.
- Dependencies can be considered as timing relationships between tasks.

Dependent Tasks

- Dependency tasks are tasks that are dependent on other tasks, as either a predecessor or a successor.
- Any two tasks can become a predecessor-successor pair if they have a timing relationship between them.
- A task can have multiple dependency links.
- Project managers should not establish a dependency link between two tasks just to prevent resources working on the tasks simultaneously.
- Such dependency becomes a resource dependency rather than a task dependency and may affect the project schedule, causing resource over-allocation.
- Following figure illustrates a graphical representation of taskbars in **Gantt Chart** view with predecessors and successors between tasks:

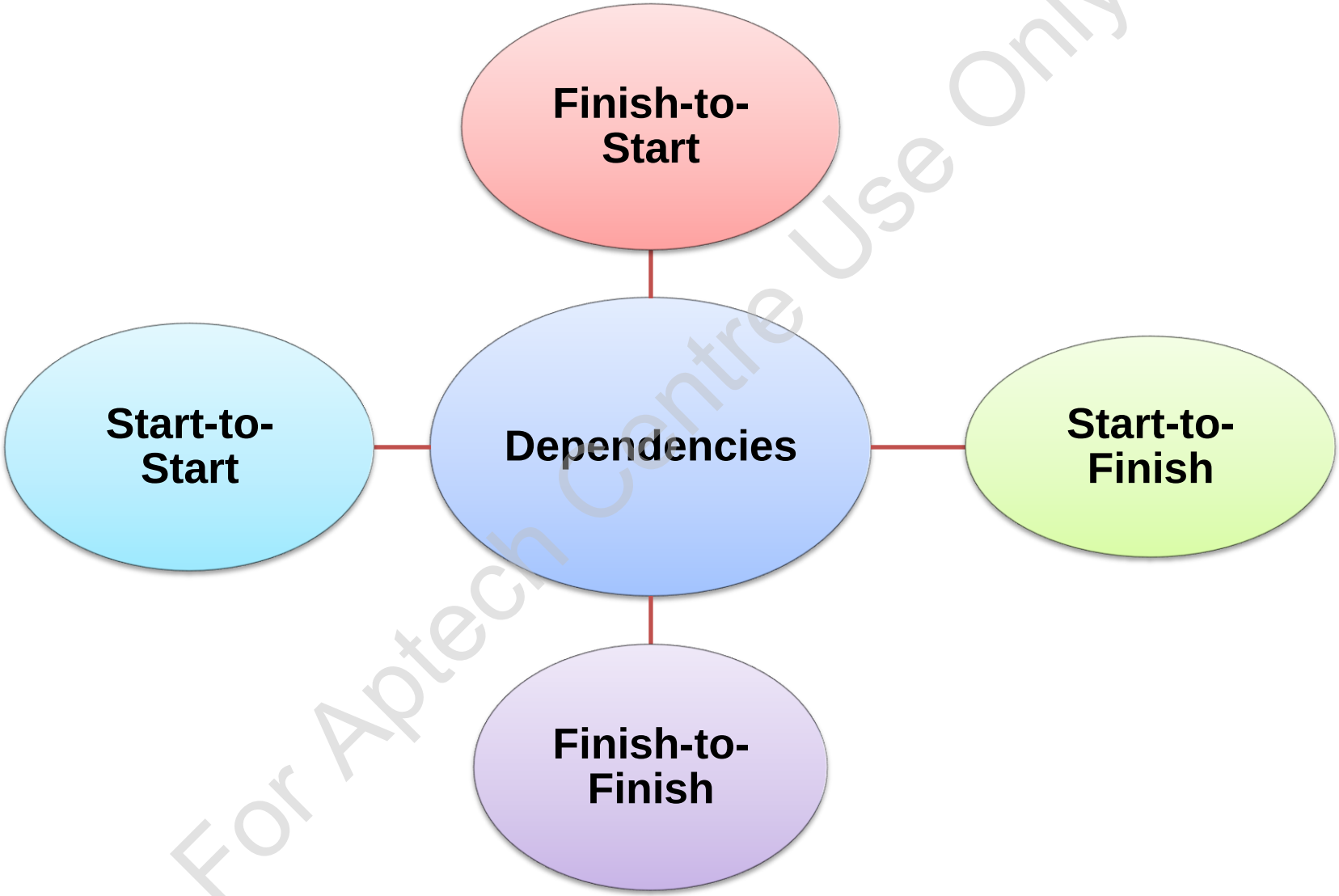
Task Name	Duration	Start	Finish
Analysis/Software Requirements	**12.5 days**	**Thu 07-01-10**	**Mon 25-01-10**
Conduct needs analysis	5 days	Thu 07-01-10	Thu 14-01-10
Draft preliminary software specifications	3 days	Thu 14-01-10	Tue 19-01-10
Develop preliminary budget	2 days	Tue 19-01-10	Thu 21-01-10
Review software specifications/budget with team	4 hrs	Thu 21-01-10	Thu 21-01-10
Incorporate feedback on software specifications	1 day	Fri 22-01-10	Fri 22-01-10
Develop delivery timeline	1 day	Mon 25-01-10	Mon 25-01-10
Status meeting with customer	**1.5 days**	**Mon 04-01-10**	**Tue 05-01-10**



Co-dependent Tasks

- Project managers should not set start dates of tasks close apart, as changes in projects are bound to happen.
- One of the best practices is to build time logic between tasks than assigning specific dates to them.
- MS Project auto calculates and adjusts dates based on the time logic.
- MS Project adjusts dates accordingly while tracking such activities in the project plan.

Types of Dependencies 1-2



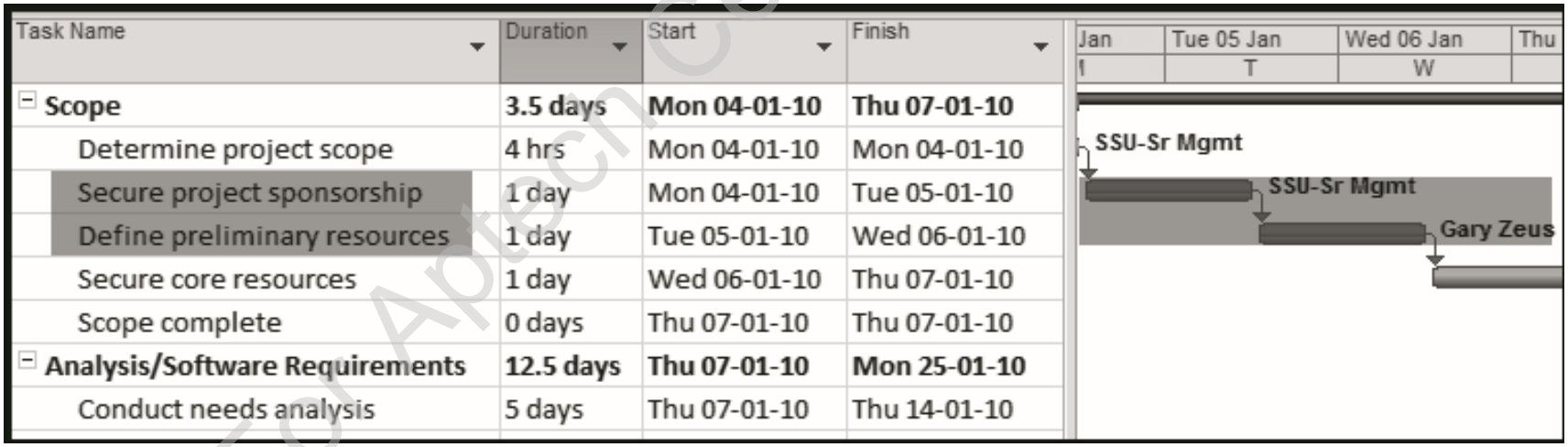
Types of Dependencies 2-2

- Steps to set a dependency type in MS Project are as follows:

1. Open the project and select a task to create a dependency.
2. Double-click the **task** to display **Task Information** dialog box.
3. Click the **Predecessor** tab to display **Finish-to-Start** as the default value for the task.
4. Change the **Type** value to the desired Dependency Type such as **Start-to-Start (SS)** or **Finish-to-Finish (FF)** or **Start-to-Finish (SF)** or None.
5. Click **OK** to save the information.

Finish-to-Start

- Finish-to-Start is the most common dependency type.
- In this, the predecessor task must complete before the successor task starts.
- It is the default dependency type for any two dependent tasks in MS Project.
- In case of Finish-to-Start dependency, project managers can have the same team working on one task to move on to its successor task.
- Following figure illustrates a Finish-to-Start dependency indicated in the **Gantt Chart**, by the successor taskbar starting where the predecessor taskbar ends:

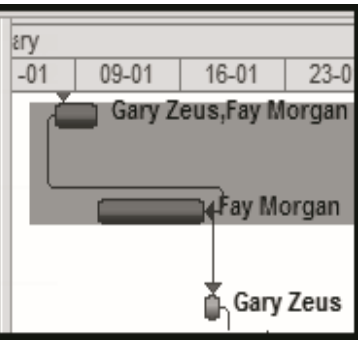


Task Name	Duration	Start	Finish
Scope	**3.5 days**	**Mon 04-01-10**	**Thu 07-01-10**
Determine project scope	4 hrs	Mon 04-01-10	Mon 04-01-10
Secure project sponsorship	1 day	Mon 04-01-10	Tue 05-01-10
Define preliminary resources	1 day	Tue 05-01-10	Wed 06-01-10
Secure core resources	1 day	Wed 06-01-10	Thu 07-01-10
Scope complete	0 days	Thu 07-01-10	Thu 07-01-10
Analysis/Software Requirements	**12.5 days**	**Thu 07-01-10**	**Mon 25-01-10**
Conduct needs analysis	5 days	Thu 07-01-10	Thu 14-01-10

Start-to-Finish

- In Start-to-Finish dependency, the successor task must finish only after the predecessor task starts.
- If the predecessor is delayed, the successor task will not finish.
- This type of dependency is a bit tricky, as the second task cannot finish until the first task starts.
- However, the second task can finish any time after the first task starts.
- Following figure shows Start-to-Finish dependency link in **Gantt Chart** view:

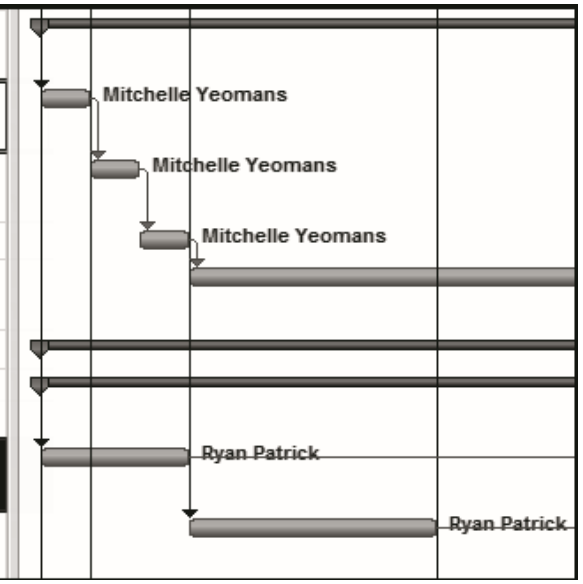
Task Name	Duration	Start	Finish	Resource Names	Predecess
Review software specifications/budget with team	4 hrs	Fri 07-01-11	Mon 10-01-11	Gary Zeus,Fay Morgan	10
Incorporate feedback on software specifications	5.5 days	Mon 10-01-11	Mon 17-01-11	Fay Morgan	11SF
Develop delivery timeline	1 day	Mon 17-01-11	Tue 18-01-11	Gary Zeus	12



Start-to-Start

- Start-to-Start dependency type exists when either two tasks start simultaneously or the second task begins immediately after the first task.
- Project managers use Start-to-Start dependency links to minimize the downtime between tasks or projects and to coordinate resources to utilize the organization's time and assets.
- With this technique, it is possible to simultaneously utilize the necessary resources, without waiting for one task to complete to begin another.
- Following figure illustrates Start-to-Start dependency link between the tasks review functional specifications and develop training specifications for end users:

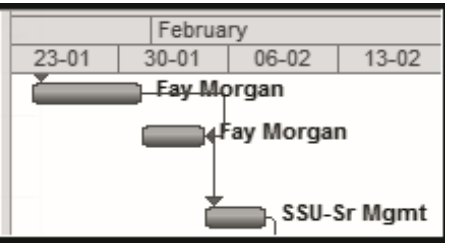
Development	**33 days**	**Mon 08-02-10**	**Wed 24-03-10**	
Review functional specifications	1 day	Mon 08-02-10	Mon 08-02-10	25
Identify modular/tiered design parameters	1 day	Tue 09-02-10	Tue 09-02-10	27
Assign development staff	1 day	Wed 10-02-10	Wed 10-02-10	28
Develop code	15 days	Thu 11-02-10	Wed 03-03-10	29
Testing	**60 days**	**Mon 08-02-10**	**Fri 30-04-10**	
Training	**57 days**	**Mon 08-02-10**	**Tue 27-04-10**	
Develop training specifications for end users	3 days	Mon 08-02-10	Wed 10-02-10	25
Develop training specifications for helpdesk support staff	3 days	Thu 11-02-10	Mon 15-02-10	25



Finish-to-Finish

- A Finish-to-Finish dependency type exists when two tasks must finish at the same time.
- Project managers apply this dependency type by adjusting the expected start date of the successor task or modifying the finish date of the predecessor task.
- The project manager shall perform a detailed analysis of all of the estimated end dates of key deliverables throughout the life of the project.
- The Finish-to-Finish dependency can be decided by subtracting the start date of one task from the end date of the preceding task.
- Following figure illustrates Finish-to-Finish dependency link in **Gantt Chart** view:

Task Name	Duration	Start	Finish	Predecessors
Develop functional specifications	5 days	Mon 24-01-11	Mon 31-01-11	18
Develop prototype based on functional specifications	4 days	Mon 31-01-11	Fri 04-02-11	19FF
Review functional specifications	2 days	Fri 04-02-11	Tue 08-02-11	20



Lag Time and Lead Time 1-2

- A project manager should also assume delays and overflows in the schedule.
- Lead time/lag time values can be defined in terms of either duration or percentages.
- In MS Project, lead time or lag time is specified on the Predecessors tab of the Task Information dialog box.

Lag Time

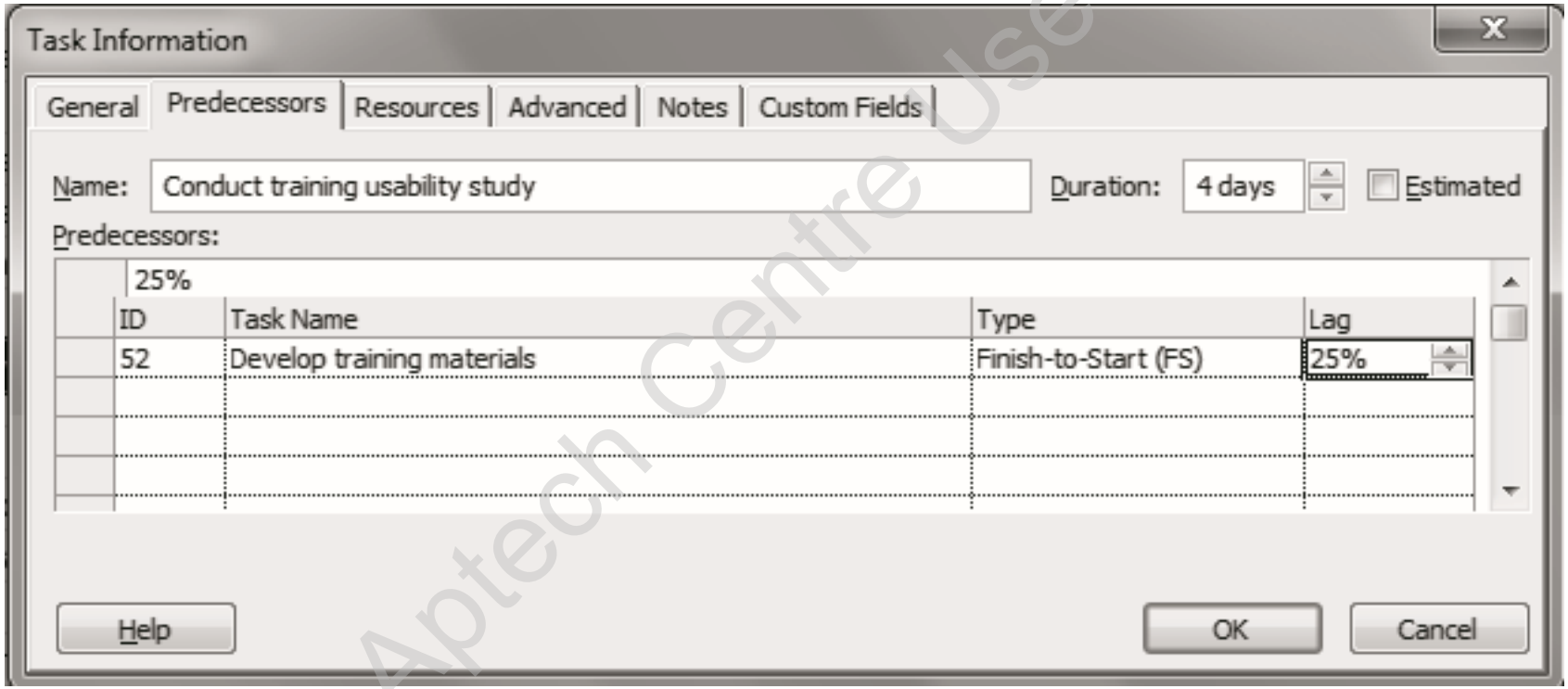
- Lag time is the delay between tasks.
- Lag time is created by entering a positive value in duration in the Lag field.

Lead Time

- Lead time refers to the time overlap between tasks.
- Lead time/lag time values can be defined in terms of either duration or percentages.
- Lead time is created by entering a negative value for duration in the Lag field.

Lag Time and Lead Time 2-2

- Following figure displays Predecessors tab with Lag time in **Task Information** dialog box:



Creating and Modifying Dependency Links

- Creating dependency links between tasks in MS Project involves the following three steps:

1. Create a dependency link.
2. Specify the dependency type.
3. Build in any lag or lead time.

Creating a Dependency Link 1-2

- If users wish to change the dependency type, they can edit the dependency type or build a lag or lead time.
- Users need to perform the following steps to establish a Finish-to-Start dependency link:

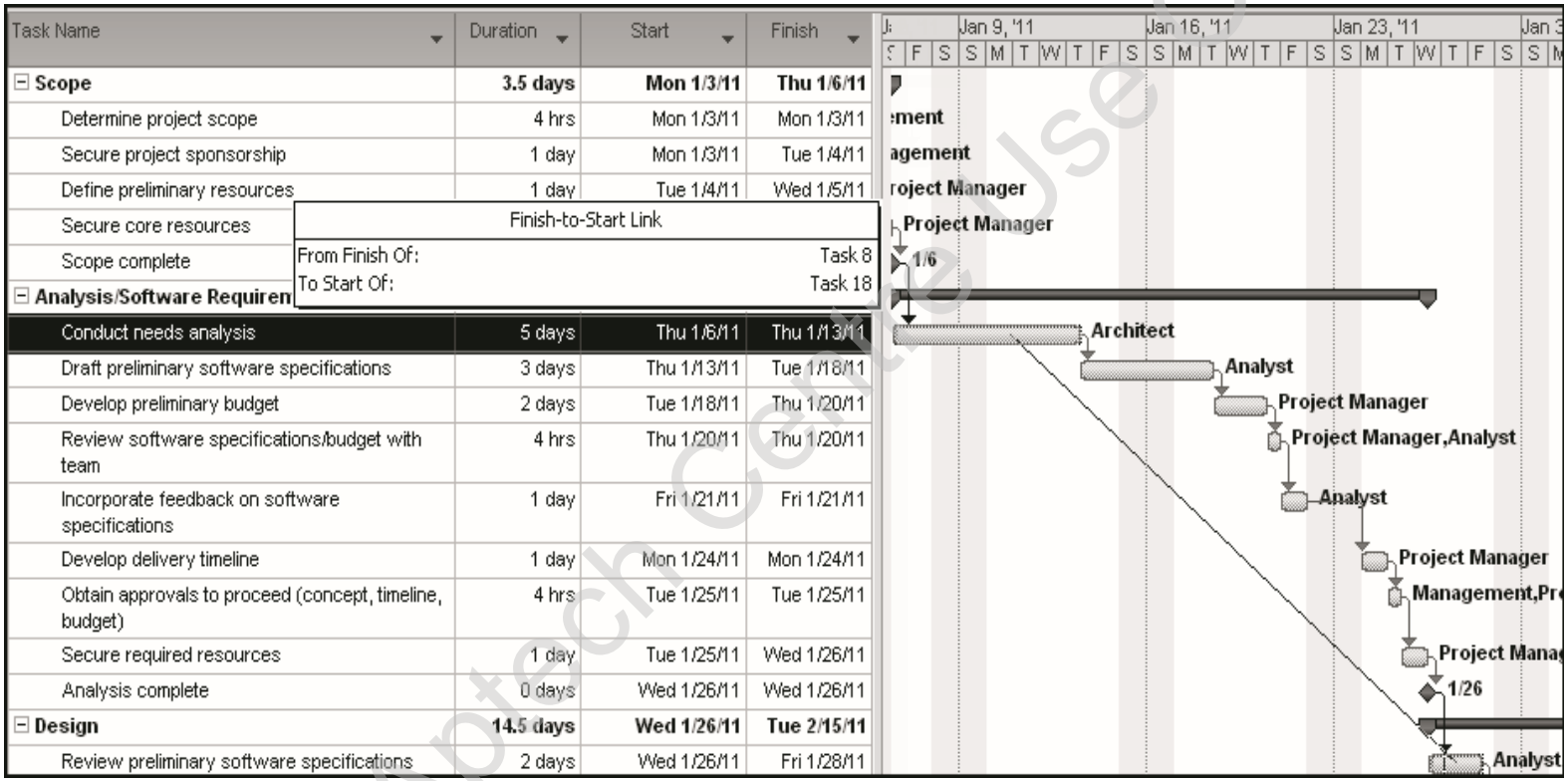
Open the **Gantt Chart** to display the tasks.

Click the predecessor taskbar and drag the mouse pointer over to the successor taskbar. A box appears while dragging the mouse and the pointer changes to a little chain link.

When the tool tip indicates the task number to link to, release the mouse button. This establishes a Finish-to-Start dependency between the two tasks.

Creating a Dependency Link 2-2

- Following figure illustrates creating dependency link between two tasks:

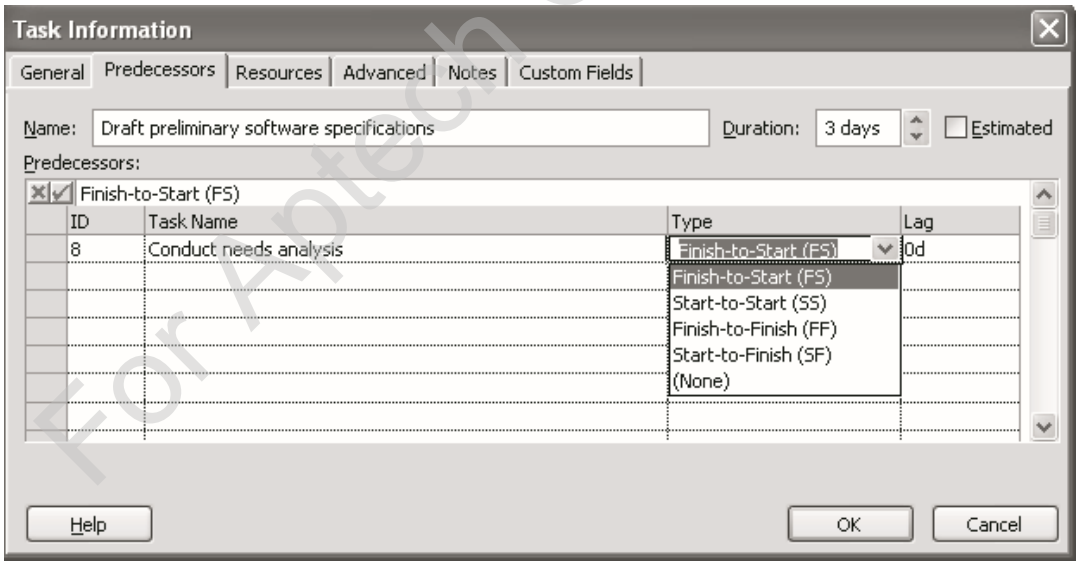


- Alternatively, the user can establish a Finish-to-Start dependency link by clicking the predecessor task in the **Tracking Gantt** table, holding the **Ctrl** key and clicking the successor task, and then clicking the **Link Tasks** button in the **Schedule** group of the **Task** tab.

Modifying a Dependency Link 1-2

- The process of modifying an existing dependency relationship involves the following steps:

1. Note the Task ID for which the dependency link needs to be modified.
2. Select its successor task in the **Tracking Gantt** table and click the **Information** button on the **Task** tab to display **Task Information** dialog box.
3. Click the **Predecessors** tab to establish dependency links.
4. Select the Predecessors **Task Name** and select the **Type** from the drop-down list as shown in following figure:



Modifying a Dependency Link 2-2

5. • If the need is to change to the existing dependency, in the **ID** column, replace the task ID of the existing predecessor task with the task ID of the new predecessor task.
6. • If the need is to add a new dependency link, click in the blank ID column and enter the task ID number for the predecessor task. The **Task Name** column changes automatically to reflect the predecessor task name.
7. • Click the **Type** field and select the appropriate dependency type from the drop-down list.
8. • To add lag or lead time, click the **Lag** field and use the arrows to set the amount of time.
9. • Enter a positive number for lag time and a negative number to specify lead time.
10. • Click **OK** to save the information.

Deleting a Dependency Link 1-3

- Project schedules might undergo edits during the life cycle of a project to accommodate uncertainties.
- Project managers can delete dependency links either from the **Gantt Chart** view or using the Task Information dialog box.
- Following are the steps to delete a dependency link from the **Gantt Chart** view:

Select the two tasks whose dependency needs to be deleted.

In the **Tracking Gantt** table, select adjacent tasks by dragging and selecting their task IDs. To select non adjacent tasks, click one task ID, press and hold the Ctrl key and then click the nonadjacent task ID.

Click the **Unlink Tasks** button in the **Schedule** group of the **Task** tab.

Deleting a Dependency Link 2-3

- The steps to delete a dependency link using the **Task Information** dialog box are as follows:

Select the successor task name in a dependency link in the Gantt Tracking table.

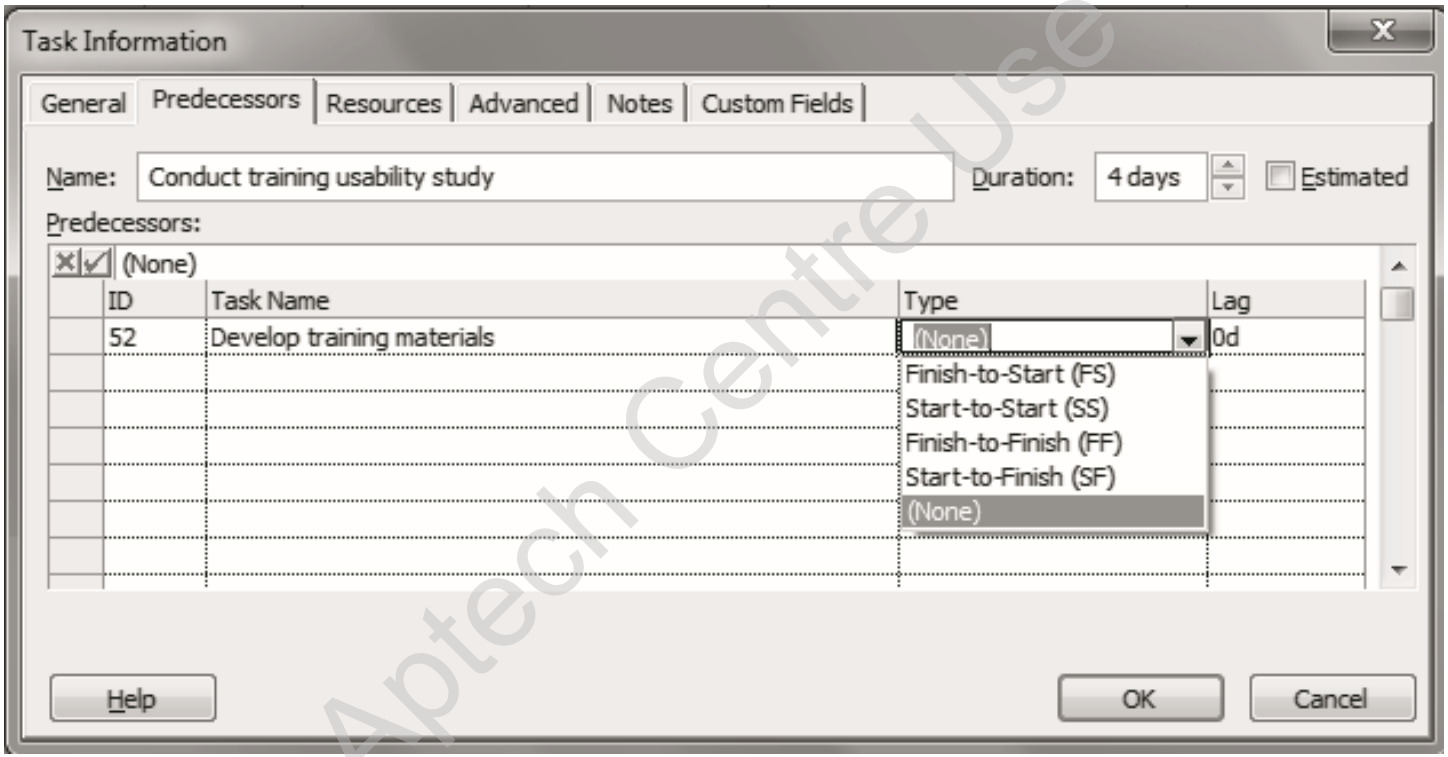
Click the Information button on the Task tab to display **Task Information** dialog box.

On the **Predecessors** tab, from the drop-down list in the **Type** column for the dependency, choose **None**.

Click **OK** to save the changes and delete the dependency.

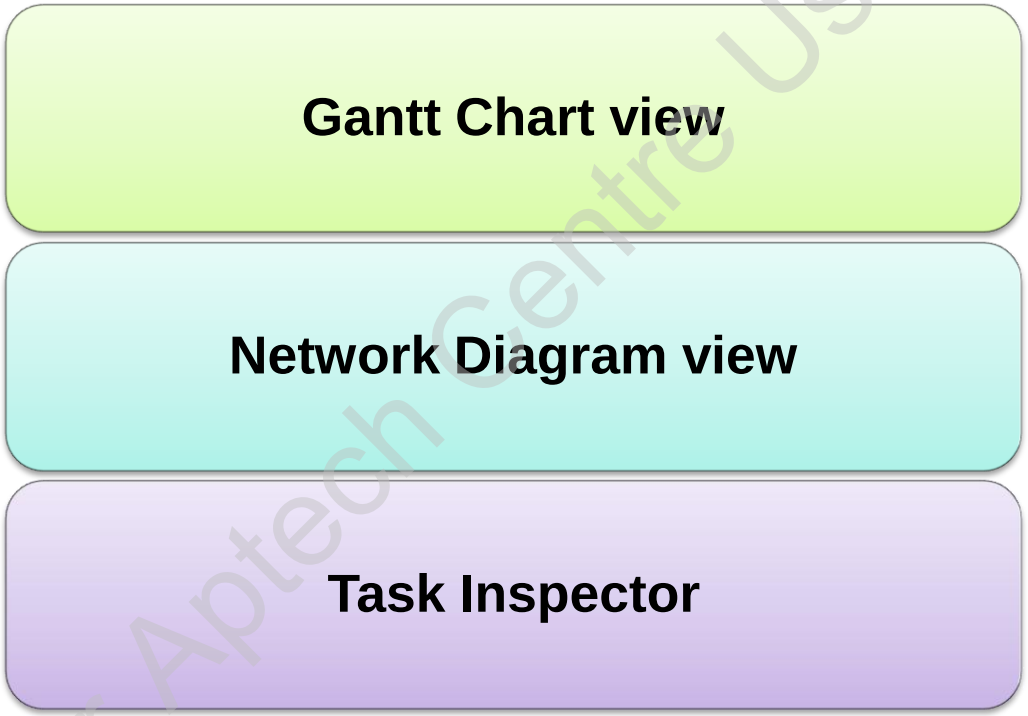
Deleting a Dependency Link 3-3

- Following figure illustrates deletion of dependency links using the **Task Information** dialog box:



Viewing Dependency Links

- Project managers can choose ways to visualize data as needed. MS Project 2010 provides the following ways to view dependencies in a project:

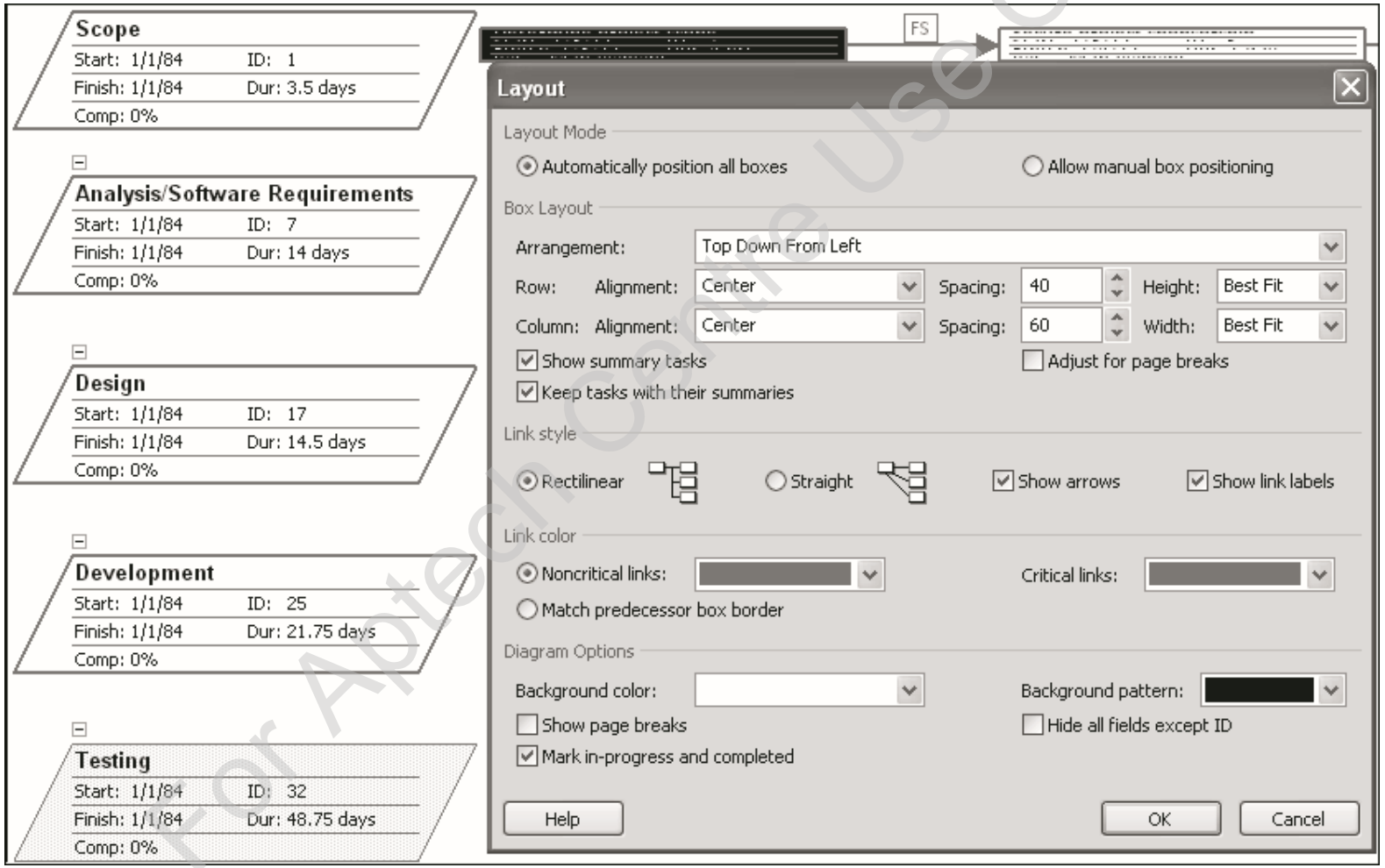


Network Diagram View 1-2

- In the Network Diagram view, each task node displays critical task information.
- Between the nodes are the lines that reveal task dependency links.
- By default, the critical dependency links are displayed in red, and all noncritical tasks are displayed in blue.
- On the Network Diagram view, right-click outside any task node, select **Layout** from the menu, and then select the **Show Link Labels** check box.
- This displays the dependency code for dependency types between tasks, such as FS for Finish-to-Start.

Network Diagram View 2-2

- Following figure displays dependency links in the Network Diagram view:

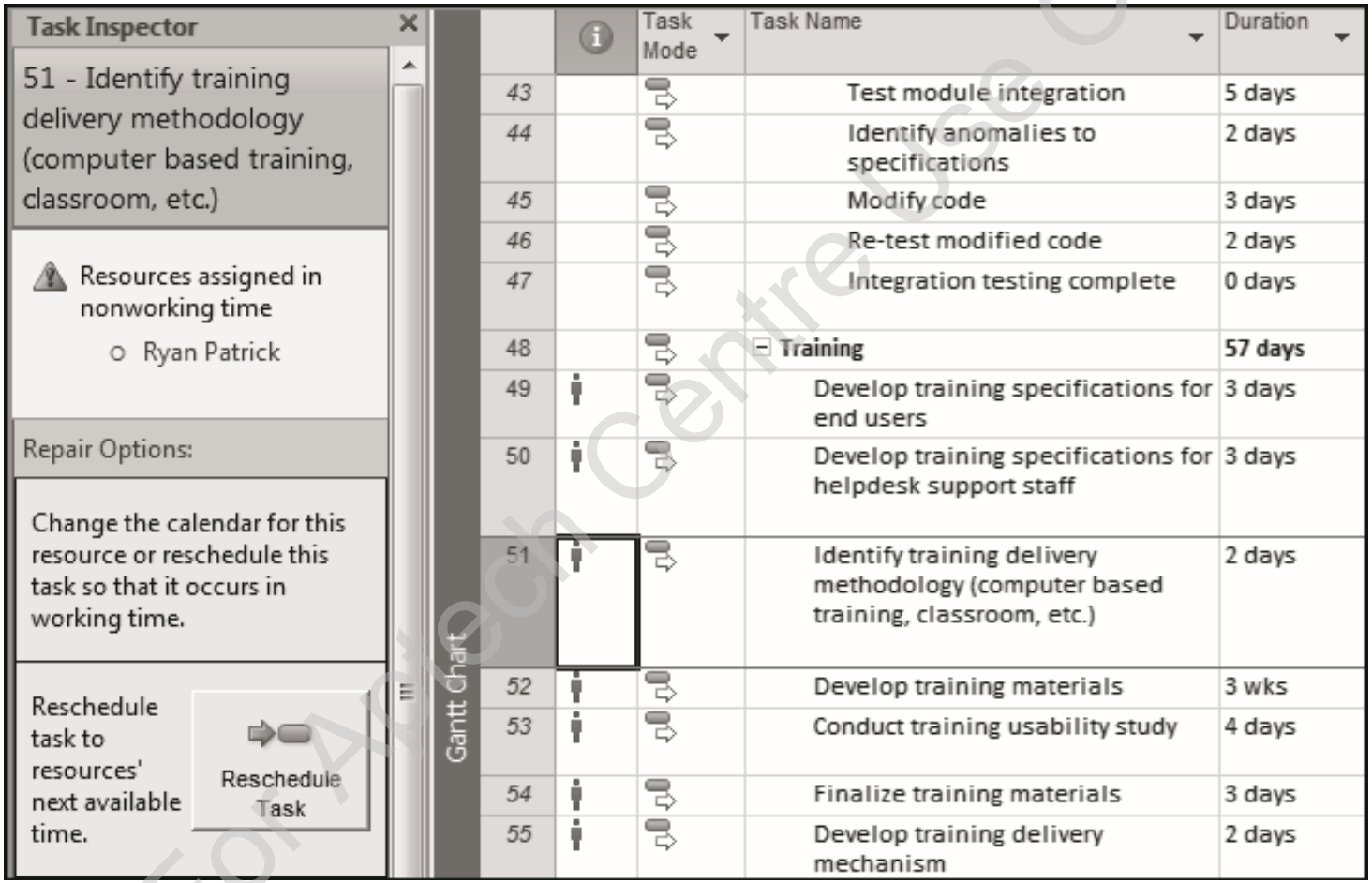


Task Inspector 1-2

- To view dependencies by task, users can select the task in the **Tracking Gantt** table and click the Inspect button in the **Tasks** group of the **Task** tab.
- This displays the complete schedule of the task including its predecessor tasks in the **Task Inspector** on the left on the **Tracking Gantt** table.
- Displaying task ID, successors, and predecessors columns for each task in any view such as **Gantt Chart** view, shows type of dependency with any lead time or lag time in percentages or lengths of time.

Task Inspector 2-2

- Following figure illustrates the display of **Task Inspector**:



Summary

- Dependency tasks are tasks that are dependent on other tasks, as either a predecessor or a successor.
- MS Project identifies four types of dependency links namely, Finish-to-Start, Start-to-Finish, Start-to-Start, and Finish-to-Finish.
- Finish-to-Start is the default dependency type for any two dependent tasks in MS Project.
- To accommodate for delays and overflows in the schedule, it is a good practice for project managers to lead time and lag time for tasks.
- Dependencies can be created between tasks by either a drag and drop action in the Gantt Chart or by holding the Ctrl key and clicking the Link Tasks button in the Schedule group of the Task tab.
- Project managers can edit existing dependencies or add new dependencies any time during the life cycle of a project.
- Managers can delete dependencies from either the Gantt Chart view or using the Task Information dialog box.
- Managers can view task dependencies in a project in three ways: Gantt Chart view, Network Diagram view, or the Task Inspector.