

# **R11i - Managing Engineering Change Orders**

**Student Guide**

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# Preface

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## Profile

### Before You Begin This Course

Before you begin this course, you should have the following qualifications:

- Thorough knowledge of setting up items and bills of material as well as the typical business requirements for processing engineering changes.
- Working experience with Oracle Engineering and Oracle Bills Of Material.

### Prerequisites

- R11i – Setting Up and Implementing Engineering.

### How This Course Is Organized

R11i – Managing Engineering Change Orders is an instructor-led course featuring lecture and hands-on exercises. Online demonstrations and written practice sessions reinforce the concepts and skills introduced.

## Related Publications

### Oracle Publications

Title	Part Number
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None	
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### Additional Publications

- System release bulletins
- Installation and user's guides
- *read.me* files
- *Oracle Magazine*

# Typographic Conventions

## Typographic Conventions in Text

Convention	Element	Example
Bold italic	Glossary term (if there is a glossary)	The <b><i>algorithm</i></b> inserts the new key.
Caps and lowercase	Buttons, check boxes, triggers, windows	Click the Executable button. Select the Can't Delete Card check box. Assign a When-Validate-Item trigger to the ORD block. Open the Master Schedule window.
Courier new, case sensitive (default is lowercase)	Code output, directory names, filenames, passwords, pathnames, URLs, user input, usernames	Code output: <code>debug.set ('I', 300);</code> Directory: <code>bin (DOS), \$FMHOME (UNIX)</code> Filename: Locate the <code>init.ora</code> file. Password: User <code>tiger</code> as your password. Pathname: Open <code>c:\my_docs\projects</code> URL: Go to <code>http://www.oracle.com</code> User input: Enter <code>300</code> Username: Log on as <code>scott</code>
Initial cap	Graphics labels (unless the term is a proper noun)	Customer address ( <i>but</i> Oracle Payables)
Italic	Emphasized words and phrases, titles of books and courses, variables	Do <i>not</i> save changes to the database. For further information, see <i>Oracle7 Server SQL Language Reference Manual</i> . Enter <code>user_id@us.oracle.com</code> , where <i>user_id</i> is the name of the user.
Quotation marks	Interface elements with long names that have only initial caps; lesson and chapter titles in cross-references	Select "Include a reusable module component" and click Finish.  This subject is covered in Unit II, Lesson 3, "Working with Objects."
Uppercase	SQL column names, commands, functions, schemas, table names	Use the SELECT command to view information stored in the LAST_NAME column of the EMP table.

Convention	Element	Example
Arrow	Menu paths	Select File—> Save.

Brackets	Key names	Press [Enter].
Commas	Key sequences	Press and release keys one at a time: [Alternate], [F], [D]
Plus signs	Key combinations	Press and hold these keys simultaneously: [Ctrl]+[Alt]+[Del]

## Typographic Conventions in Code

Convention	Element	Example
Caps and lowercase	Oracle Forms triggers	When-Validate-Item
Lowercase	Column names, table names	SELECT last_name FROM s_emp;
	Passwords	DROP USER scott IDENTIFIED BY tiger;
	PL/SQL objects	OG_ACTIVATE_LAYER (OG_GET_LAYER ( 'prod_pie_layer' ) )
Lowercase italic	Syntax variables	CREATE ROLE <i>role</i>
Uppercase	SQL commands and functions	SELECT userid FROM emp;

## Typographic Conventions in Navigation Paths

This course uses simplified navigation paths, such as the following example, to direct you through Oracle Applications.

(N) Invoice > Entry > Invoice Batches Summary (M) Query > Find (B) Approve

This simplified path translates to the following:

1. (N) From the Navigator window, select Invoice > Entry > Invoice Batches Summary.
2. (M) From the menu, select Query > Find.
3. (B) Click the Approve button.

### Notations :

(N) = Navigator

(M) = Menu

(T) = Tab



(I) = Icon

(H) = Hyperlink

(B) = Button

## Typographical Conventions in Help System Paths

This course uses a “navigation path” convention to represent actions you perform to find pertinent information in the Oracle Applications Help System.

The following help navigation path, for example—

(Help) General Ledger > Journals > Enter Journals

—represents the following sequence of actions:

1. In the navigation frame of the help system window, expand the General Ledger entry.
2. Under the General Ledger entry, expand Journals.
3. Under Journals, select Enter Journals.
4. Review the Enter Journals topic that appears in the document frame of the help system window.

## Getting Help

Oracle Applications provides you with a complete online help facility.

Whenever you need assistance, simply choose an item from the Help menu to pinpoint the type of information you want.

### To display help for a current window:

1. Choose Window Help from the Help menu, click the Help button on the toolbar, or hold down the Control key and type 'h'.

A web browser window appears, containing search and navigation frames on the left, and a frame that displays help documents on the right.

The document frame provides information on the window containing the cursor. The navigation frame displays the top-level topics for your responsibility, arranged in a tree control.

2. If the document frame contains a list of topics associated with the window, click on a topic of interest to display more detailed information.

3. You can navigate to other topics of interest in the help system, or choose Close from your web browser's File menu to close help.

## **Searching for Help**

You can perform a search to find the Oracle Applications help information you want. Simply enter your query in the text field located in the top-left frame of the browser window when viewing help, then click the adjacent Find button.

A list of titles, ranked by relevance and linked to the documents in question, is returned from your search in the right-hand document frame. Click on whichever title seems to best answer your needs to display the complete document in this frame. If the document doesn't fully answer your questions, use your browser's Back button to return to the list of titles and try another.

# **R11i - Managing Engineering Change Orders**

## **Chapter 1**

# **R11i - Managing Engineering Change Orders**

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### Objectives

- **After completing this lesson, you should be able to do the following:**
  - **Create engineering change orders**
  - **Recognize the effects of engineering change orders on bills of material**
  - **Approve, schedule, and implement engineering change orders**
  - **Understand the new ECO Business Object Interface**

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## Agenda

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### Agenda

- Overview of Engineering Change Orders
- Engineering Change Order Life Cycle
- Engineering Change Order Business Object Interface
- Summary
- Practice

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## Lesson 1: Overview of Engineering Change Orders

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### Lesson 1: Overview of Engineering Change Orders

- ✓ • **Overview of Engineering Change Orders**
- Engineering Change Order Life Cycle
- Engineering Change Order Business Object Interface
- Summary
- Practice

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### Overview

- An engineering change order (ECO) is an order to change bills of material.
- An engineering change order cannot be used to change routings.
- You can control the engineering change order approval process by using Oracle Workflow.
- You can track the components being discontinued, the new components being added, and their effectivity dates.
- You can also enter any information on substitution components.

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**Help: Oracle Manufacturing Applications > Oracle Engineering > Engineering Change Orders > Overview**

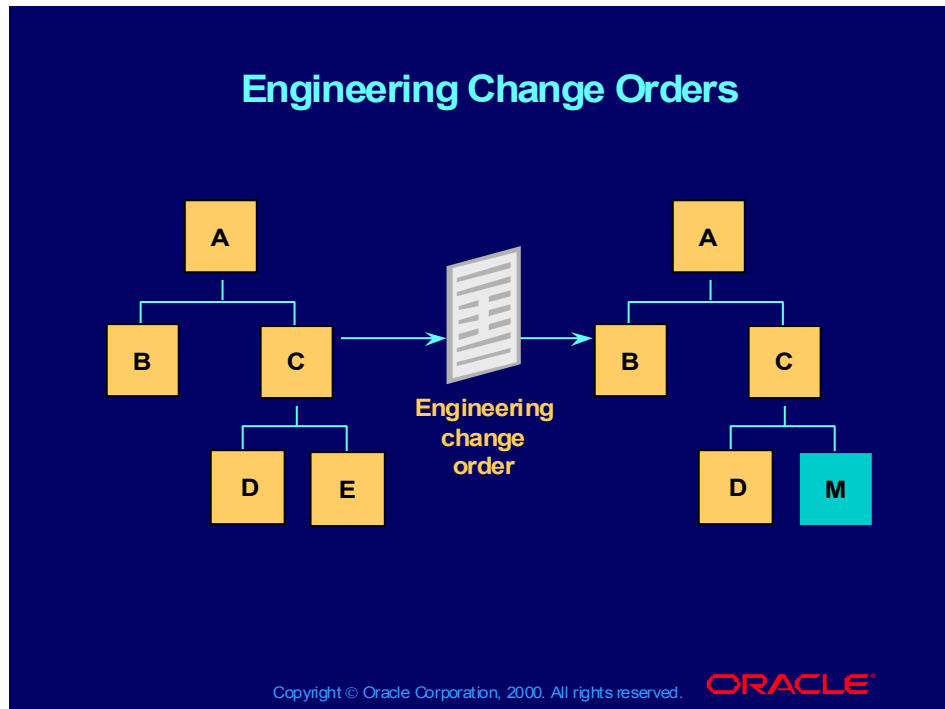
**... Engineering Change Orders > ECOs on Items and Bills**

**... Engineering Change Orders > ECO Access Control**



## Engineering Change Orders

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### Engineering Change Orders

- An engineering change order (ECO) is an order to change bills of material to add, change and delete components.
- You cannot use an ECO to change routings.
- ECO's can be used to change both engineering and manufacturing bills of material.
- ECO's can specify changes to one or more revised items.

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### Engineering Change Orders

- ECO's can be subjected to a review process, managed with either Oracle Engineering or Oracle Workflow.
- When implementing the ECO, you can force the ECO to increment the bill of material revision when it changes the revised item.
- Bills of material can be changed without ECO's using the Bills of Material Form. Or personal profiles can be set to prohibit direct updates without an ECO.

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## Lesson 2: Engineering Change Order Life Cycle

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### Lesson 2: Engineering Change Order Life Cycle

- Overview of Engineering Change Orders
- ✓ • **Engineering Change Order Life Cycle**
- Engineering Change Order Business Object Interface
- Summary
- Practice

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### ECO Life Cycle

- When processing ECO's you typically follow a set pattern of action.
- These actions correspond to the ECO revised item statuses and ECO approval statuses.
- ECO revised item status refers to the overall status of the ECO and to the individual status of each revised item on the ECO.
- ECO approval status refers to the process of requesting and obtaining approval for the ECO from a list of approvers.

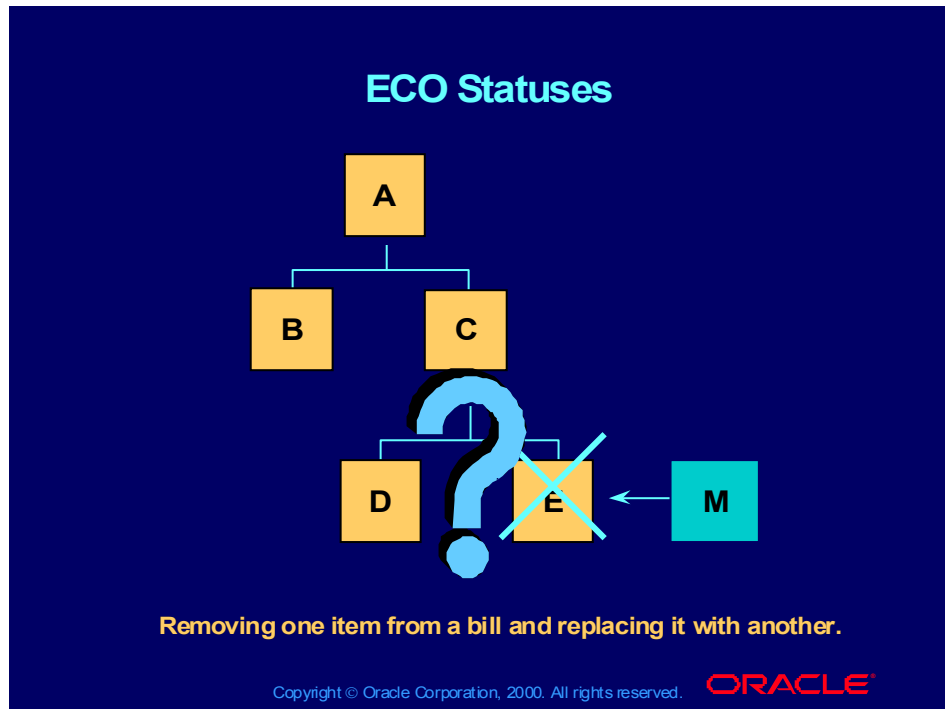
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**Help: Oracle Manufacturing Applications > Oracle Engineering > Engineering Change Orders > ECO Life Cycle**

## ECO Statuses

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### ECO Statuses

- **ECO Approval Statuses**
  - **Not Ready** - You are not ready to ask for approval
  - **Ready to Approve** - You are ready to ask the approvers to review
  - **Approval Requested** - Approvers have been asked to review
  - **Approved** - The decision has been made to approve the ECO
  - **Rejected** - The decision has been made to reject the ECO
  - **Processing Error** - An error occurred in the workflow approval process

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**Help: Oracle Manufacturing Applications > Oracle Engineering > Engineering Change Orders > ECO Statuses**

**... Engineering Change Orders > ECO Approval Process > ECO Approval Statuses**

### ECO Statuses

- **ECO Revised Item Statuses**
  - **Open** - You are preparing the information
  - **Release** - You can manually implement the change
  - **Schedule** - The implementation concurrent process implements the change
  - **Implement** - You have successfully changed the bill of material
  - **Hold** - You have temporarily decided not to implement a Released or Scheduled change
  - **Cancel** - you have permanently decided not to implement the change

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**Help: Oracle Manufacturing Applications > Oracle Engineering > Engineering Change Orders > ECO Revised Item Statuses**



### ECO Life Cycle - without Approval

To implement ECO's without an approval process:

- Enter the change information
  - ECO approval status = Approved
  - ECO revised item status = Open
- Implement the change
  - ECO approval status = Approved
  - ECO revised item status = Released or Scheduled (for manual or auto implementation)
- After the change is completed
  - ECO approval status = Approved
  - ECO revised item status = Implemented

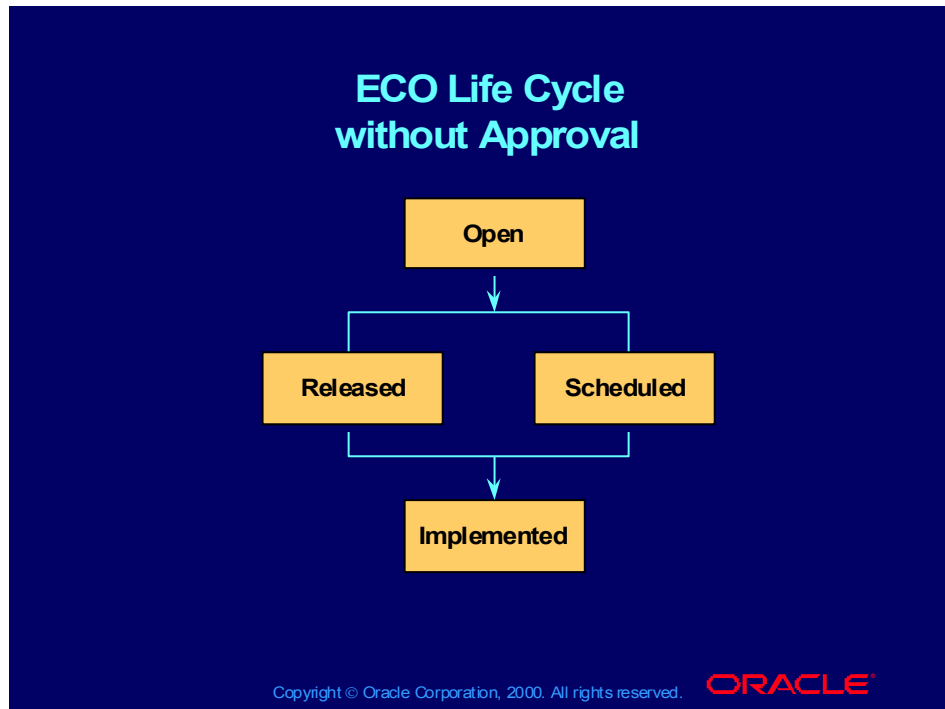
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**Help: Oracle Manufacturing Applications > Oracle Engineering > Engineering Change Orders > ECO Approval Process > ECO Approvals**

## ECO Life Cycle without Approval

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### ECO Life Cycle - with Approval

To implement ECO's with an approval process:

- Enter the change information
  - ECO approval status = Not Ready
  - ECO revised item status = Open
- Prepare the change information for review
  - ECO approval status = Ready to Approve
  - ECO revised item status = Open
- Send the information to the approvers
  - ECO approval status = Approval Requested
  - ECO revised item status = Open
- Change is not approved
  - ECO approval status = Rejected

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### ECO Life Cycle - with Approval

Continued:

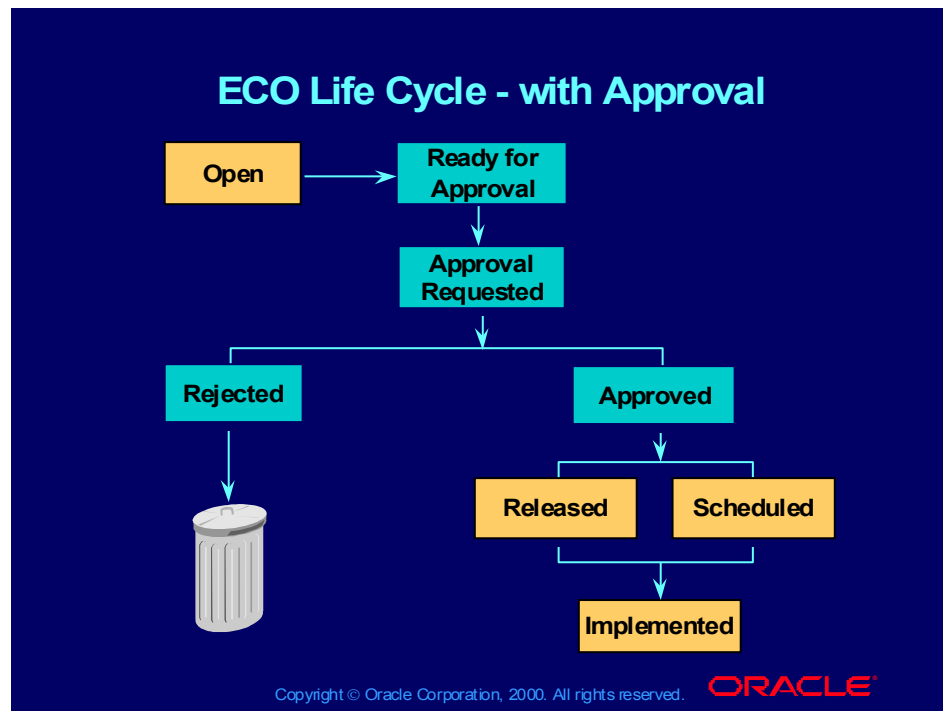
- ECO revised item status = Canceled
- Change is approved
  - ECO approval status = Approved
  - ECO revised item status = Open
- Implement the approved change
  - ECO approval status = Approved
  - ECO revised item status = Released or Scheduled (for manual or auto implementation)
- After the approved change is completed
  - ECO approval status = Approved
  - ECO revised item status = Implemented

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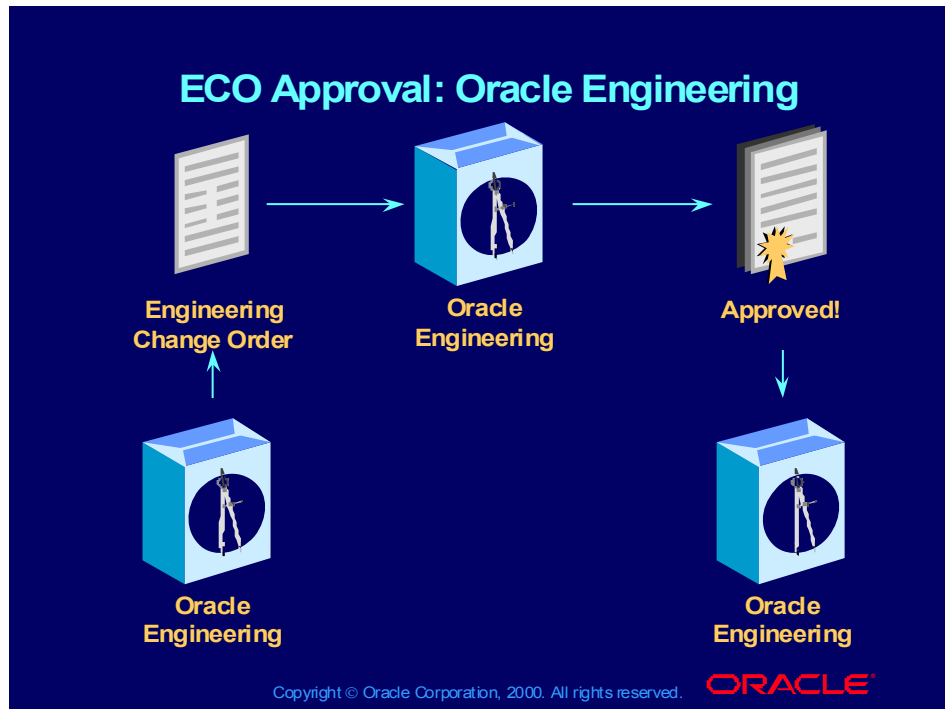
## ECO Life Cycle - with Approval

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## ECO Approval: Oracle Engineering

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### ECO Approval: Oracle Engineering

#### Managing the approval process using Engineering:

- **Setup the approval process**
  - Create approval lists
  - Assign an approval list to the ECO
  - Assign an ECO change type to the ECO (one not associated with an Oracle Workflow)
- **The Oracle Engineering approval process steps**
  - Set ECO approval status to: Approval Requested
  - Oracle Alert sends email to the reviewers
  - Each approver responds: approved/rejected
  - The responses are reviewed and the ECO approval status is set to Approved or Rejected

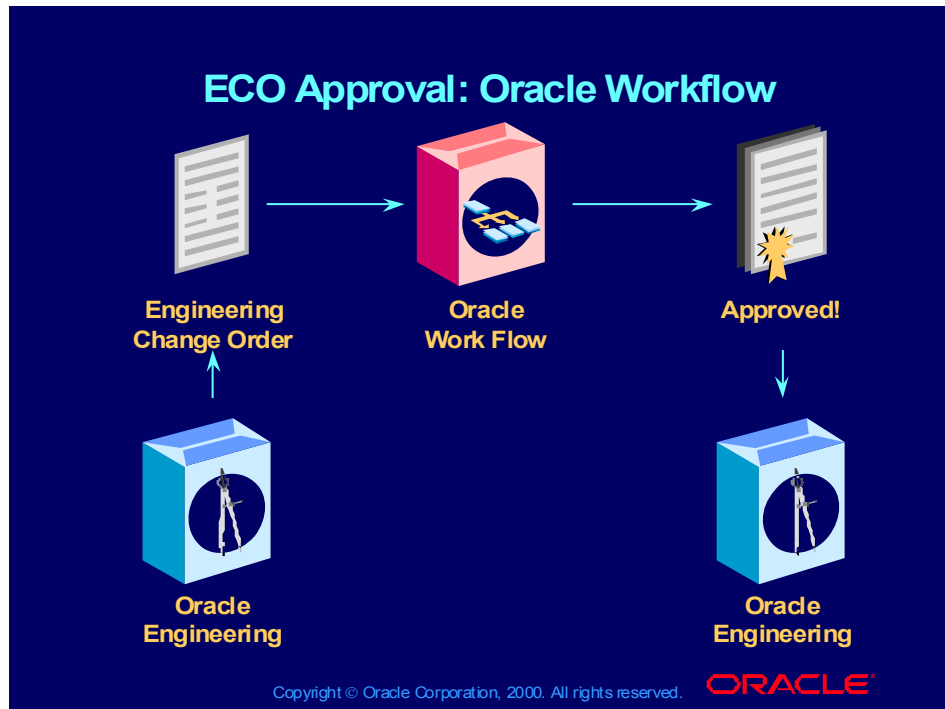
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**Help: Oracle Manufacturing Applications > Oracle Engineering > Engineering Change Orders > ECO Approval Process > Defining ECO Approval Lists**

## ECO Approval: Oracle Workflow

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### ECO Approval: Oracle Workflow

#### Managing the approval process using Workflow:

- Setup the workflow approval process
  - Create a workflow or use a seeded workflow for approval with processes to perform actions and notifications to contact employees for decisions
  - Assign an approvers list as a 'role' to the workflow notification activity
  - Assign the workflow to an ECO change type
  - Assign the ECO change type to the ECO

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**Help: Oracle Manufacturing Applications > Oracle Engineering > Engineering Change Orders > ECO Approval Process > Workflow for ECO Approvals**

### ECO Approval: Oracle Workflow

**Continued:**

- **The Oracle Workflow approval process steps**
  - Choose submit on the Engineering Change Orders form
  - The workflow notifies all employees in the role
  - Each approver responds: approved/rejected
  - Oracle Workflow tabulates the responses, makes an approval decision, performs follow up activities and returns control to Oracle Engineering.
  - If an error occurs the ECO approval status becomes: Processing Error

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### **ECO Approval: Oracle Workflow**

**For example the standard approval processing workflow delivered in Oracle Engineering:**

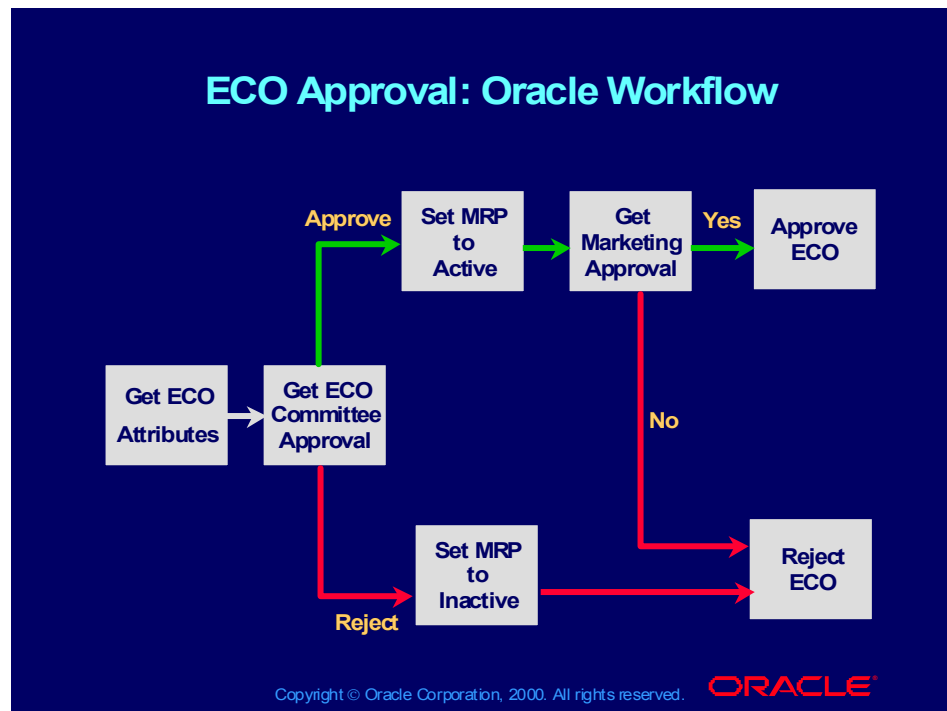
- **Requires unanimous approval from the reviewers to approve the ECO**
- **Sets MRP Active to selected or clear**
- **Sets the ECO approval status to Approved or Rejected**

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## ECO Approval: Oracle Workflow

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## Lesson 3: Engineering Change Order Business Objects Interface

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### Lesson 3: Engineering Change Order Business Objects Interface

- Overview of Engineering Change Orders
- Engineering Change Order Life Cycle
- ✓ • **Engineering Change Order Business Object Interface**
- Summary
- Practice

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## ECO Business Object Interface Overview

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### ECO Business Object Interface Overview

- Oracle Engineering enables collaborative product design with your suppliers and customers. Release 11i improves the transfer of information with trading partners by incorporating the ECO Business Object interface.
- Using the ECO Business Object interface, you can simplify your access to Oracle Engineering ECOs through a common, flexible, and robust interface to meet your mission-critical business needs.

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**Help: Oracle Manufacturing Applications > Oracle Engineering > New Features in This Release**

### ECO Business Object Interface

#### Importing ECOs

- You can quickly import ECOs by using the new ECO Business Object interface from any external system, including the Product Data Management (PDM) system. Validation of all ECO information during import clearly identifies change problems, enabling the appropriate decision-makers to resolve errors.

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### ECO Business Object Interface

#### Updating and Deleting ECOs

- You can also use the ECO Business Object interface to update and delete existing ECO information.

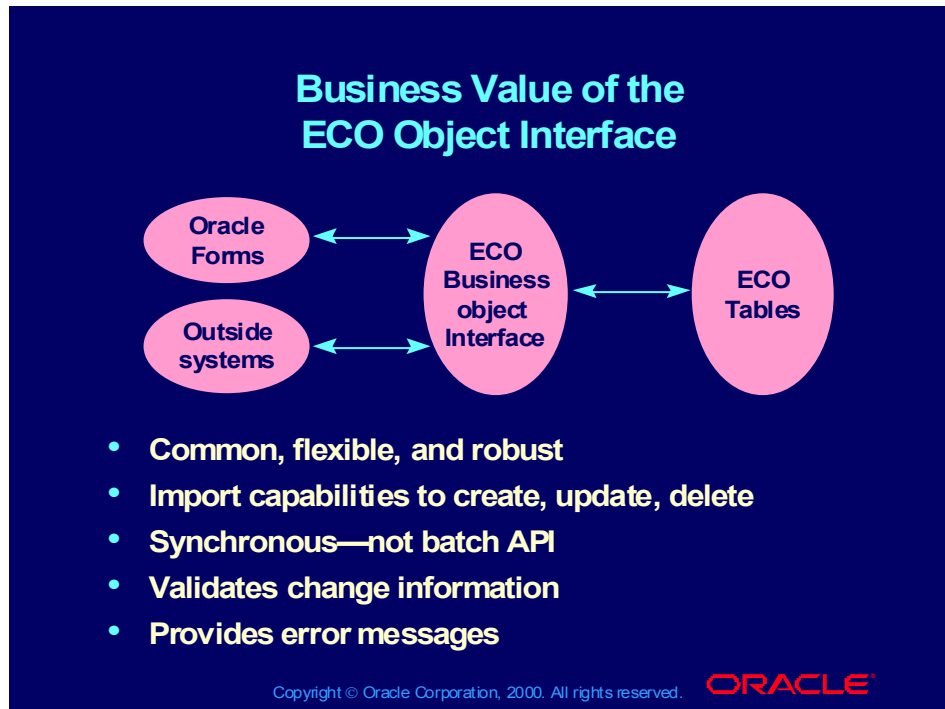
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## Business Value of the ECO Object Interface

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## Lesson 4: Summary

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### Lesson 4: Summary

- Overview of Engineering Change Orders
- Engineering Change Order Life Cycle
- Engineering Change Order Business Object Interface
- ✓ • **Summary**
- Practice

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### Summary

- You should now be able to do the following:
  - Create engineering change orders
  - Recognize the effects of engineering change orders on bills of material
  - Approve, schedule, and implement engineering change orders
  - Understand the ECO business objects interface

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## Lesson 4: Practice

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### Lesson 4: Practice

- Overview of Engineering Change Orders
- Engineering Change Order Life Cycle
- Engineering Change Order Business Object Interface
- Summary
- ✓ • **Practice**

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### Practice Overview

- **Creating an ECO**
- **Reviewing changes**
- **Comparing current BOM and pending BOM**
- **Rescheduling the ECO**
- **Reviewing effects of pending changes**

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### Practice Overview

- Approving engineering change orders with Oracle Workflow
- Attaching a workflow process to the change type
- Approving an ECO
- Releasing an ECO
- Manually implementing the ECO

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### Practice Solution

1. Change organizations to M1 Seattle Manufacturing  
(N) INV Change Organization
2. Create two Items for your team (XX):
  - Copy from AS10001 to make XX-10001
  - Copy from CM65478 to make XX-65478(N) ENG Prototypes > Items > Master Items (M)  
Tools > Copy From
3. Assign your new items to M1 Seattle Manufacturing  
(N) ENG Prototypes > Items > Master Items (M)  
Tools > Organization Assignment

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### Practice Solution

4. Copy the Bill of Material from AS10001 to XX-10001

(N) ENG Prototypes > Bills > Bills (M) Tools > Copy Bill from

5. Create an ECO as follows:

- ECO: XX-100
- Type: New Prod
- Approval Status: Approved

(N) ENG ECOs > ECOs

- Revised Item: XX-10001
- New Revision: B
- Effective Date: Four weeks from today

(N) ENG ECOs > ECOs (B) Revised Items

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**Help: Oracle Manufacturing Applications > Oracle Engineering >  
Engineering Change Orders > Defining an Engineering Change Order  
... Engineering Change Orders > Defining ECO Revised Items  
... Engineering Change Orders > Defining an ECO Revision**



### Practice Solution

**5. Create an ECO continued:**

- **Disable Component:** CM65478
- **Add Component:** XX-65478

**(N) ENG ECOs > ECOs (B) Revised Items (B) Components**

**6. Review the pending changes on your bill of materials**

**Note: Remember to uncheck the Implemented Only box before finding your bill**

**(N) ENG Prototypes > Bills > Indented Bills**

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**Help: Oracle Manufacturing Applications > Oracle Engineering > Engineering Change Orders > Defining Revised Components**

### Practice Solution

7. Review your new item revision for XX-10001:  
(N) ENG Prototypes > Items > Organization Items  
(M) Tools > Revisions
8. Compare the XX-10001 Current bill of material (Rev A) with the pending bill (Rev B)  
Note: Remember to uncheck both the Implemented Only boxes  
(N) ENG Prototypes > Bills > Comparison
9. Review your pending ECO schedule  
(N) ENG ECOs > Schedules

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**Help: Oracle Manufacturing Applications > Oracle Engineering > Engineering Change Orders > Viewing Item Revisions**

### Practice Solution

**10. Release the ECO**

**(N) ENG ECOs > ECOs (M) Tools > Release**

**11. Reschedule your ECO to one week earlier**

**(N) ENG ECOs > ECOs (M) Tools > Reschedule**

**12. Review the effect of the change to your pending bill of material and revision**

**(N) ENG Prototypes > Bills > Indented Bills**

**(N) ENG ECOs > ECOs (B) Revised Items (B) Revisions**

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**Help: Oracle Manufacturing Applications > Oracle Engineering > Engineering Change Orders > Changing ECO Status  
... Engineering Change Orders > Viewing ECO Approval Status**

### Practice Solution

**13. Manually implement your ECO**

**(N) ENG ECOs > ECOs (M) Tools > Implement**

**14. Review the bill of material to see the effect of implementing the change**

**(N) ENG Prototypes > Bills > Indented Bills**

**15. Create another ECO as follows:**

- ECO: XX-200
- Type: New Prod
- Priority: Standard

**(N) ENG ECOs > ECOs**

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**Help: Oracle Manufacturing Applications > Oracle Engineering > Engineering Change Orders > Implementing ECOs**

### Practice Solution

**15. Create another ECO continued:**

- Revised Item: XX-10001
- New Revision: C
- Effective Date: Four weeks from today

**(N) ENG ECOs > ECOs (B) Revised Items**

**16. Submit your new ECO to launch the workflow for approval**

**(N) ENG ECOs > ECOs (B) Submit**

**17. Approve your ECO**

**(N) ENG ECOs > Notification**

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### Practice Solution

**18. Review your ECO for Approval Status = Approved  
and MRP Active = selected**

**(N) ENG ECOs > ECOs (B) Revised Items**

**19. Manually implement your ECO**

**(N) ENG ECOs > ECOs (M) Tools > Implement**

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