

Natural Engineer

Version 4.3.1

Utilities

for Mainframes

**Manual Order Number: NEE431-080MFR**

This document applies to Natural Engineer version 4.3.1 and to all subsequent releases.

Specifications contained herein are subject to change, and these changes will be reported in subsequent revisions or editions.

Readers' comments are welcomed. Comments may be addressed to the Documentation Department at the address on the back cover. Internet users may send comments to the following e-mail address:

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# ABOUT THIS MANUAL

## Purpose of this manual

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This manual contains the Utilities for Natural Engineer version 4.3.1.

It describes the various utility options available within Natural Engineer, which include:

- Automating the execution of Natural Engineer processes using the Task Scheduler option.
- Review maintenance changes within objects using the Change Management Tracking option.

## Target Audience

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The target audience for this manual is intended to be any User of Natural Engineer 4.3.1 at any level of experience.

## Typographical Conventions used in this manual

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The following conventions are used throughout this manual:

<b>UPPERCASE TIMES</b>	Commands, statements, names of programs and utilities referred to in text paragraphs appear in normal (Times) uppercase.
<b>UPPERCASE BOLD COURIER</b>	In illustrations or examples of commands, items in uppercase bold courier must be typed in as they appear.
< >	Items in angled brackets are placeholders for user-supplied information. For example, if asked to enter <file number>, you must type the number of the required file.
<u>Underlined</u>	Underlined parts of text are hyperlinks to other parts within the online source manual. This manual was written in MS-Word 97 using the "hyperlink" feature.

The following symbols are used for instructions:

⇒	Marks the beginning of an instruction set.
□	Indicates that the instruction set consists of a single step.
1.	Indicates the first of a number of steps.

## How this manual is organized

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This manual is organized to reflect all the Utilities options of Natural Engineer version 4.3.1 in the following chapters:

<b>Chapter</b>	<b>Contents</b>
1	Describes the Task Scheduler option, which provides the facility to automate the execution of the various Environment, Analysis and Modification options. This provides the facility to execute long-running batch tasks in an unattended mode to minimize the impact of machine and human resources.
2	Describes the Change Management Tracking (CMT) option, which provides the facility to review audit trail records of changes applied to individual objects within Natural Engineer.

## **Natural Engineer Utilities**

# **Terminology**

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It is assumed that you are familiar with general Natural and mainframe terminology, as well as the terms and concepts relating to MS-Windows environments. This section explains some terms that are specific to the Natural Engineer product.

## **Analysis**

The Analysis process of Natural Engineer searches application data within the Natural Engineer Repository, according to specified Search Criteria and generates reports on the search results.

## **Application**

An Application is a library or group of related libraries, which define a complete Application. In Natural Engineer, the Application can have a one-to-one relationship with a single library of the same name, or a library of a different name, as well as related steplibs. The Application refers to all the source code from these libraries, which Natural Engineer loads into the Repository.

## **Browser**

An Internet Browser such as Microsoft Internet Explorer™ or Netscape™.

## **Category**

Categories in Natural Engineer specify whether and how a Modification is applied to the Natural code. Valid categories are: Automatic change, Manual change, Reject the default Modification, No change to the data item, and the data item is in Generated Code.

A category is further broken down according to type of change (for example: Keyword, Literal, Data Item, Database Access, Definition).

## **Consistency**

An option in the Analysis process that causes Natural Engineer to trace an Impact through the code, using left and right argument resolution to identify further code impacted by the code found.

## **Environment**

The Environment process is the means by which Natural Engineer generates a structured view of the application code in the Natural Engineer Repository. This provides application analysis reports and inventory information on the application and is used as the basis for Impact Analysis.

## **Exception**

An Exception is an Item identified as impacted that does not require a Modification. Where there are a few similar Exception Items, they can be treated as Exceptions, and rejected in the Modification review process. Where there are many similar (therefore not Exceptions), consideration should be given to changing the Search Criteria so they are not identified as impacted in the first place.

## **Generated Code**

This is code which has been generated by a Natural code generator, such as Construct, and which is not normally modified directly in the Natural editor.

## **Impact**

An Impact is an instance of a Natural code Item; e.g., data item or statement (a “hit” scored by the Analysis process) that matches the defined Search Criteria used in the Analysis process.

## **Iteration**

An Iteration is one examination cycle of a field identified according to the specified Search Criteria. For example, one Iteration is reading the field right to left. Multiple Iterations are performed when the option of ‘Consistency’ or Multi Search is requested for Analysis, and Natural Engineer performs as many Iterations as necessary to exhaust all possibilities of expressing and tracing the field, and can be limited by a setting in the NATENG.INI file.

## **Library**

A single library of source code, which exists in the Natural system file.

## **Natural Engineer Utilities**

### **Modification**

A Modification is a change suggested or made to an object or data item resulting in the required compliance of that object or data item. Modifications in Natural Engineer are classified according to Category and Type.

### **Presentation Split Process**

The Presentation Split Process is a sub-function of the Object Builder function that removes screen I/O statements from current application objects and places them in generated subprograms.

### **Soft Link**

A Soft Link is where a link between two objects has been defined using an alphanumeric variable rather than a literal constant.

### **Technical Split Process**

The Technical Split Process is a sub-function of the Object Builder function that results in the encapsulation of each database access within the application, into a sub-program so that the application is separated into 'presentation and logic' and 'database access'.

### **Type**

The Type of Modification available, for example: Data Item, Keyword and Literal.

### **TLM**

Text Logic Members are used to contain the code required to support inclusion of common code into the application. An example of this is the code to include into an application before updating a database.

## Related Literature

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The complete set of Natural Engineer manuals consists of:

**1. Natural Engineer Concepts and Facilities (NEE431-006ALL)**

The Concepts and Facilities manual describes the many application systems problems and solutions offered by Natural Engineer, providing some guidelines and usage that can be applied to Natural applications.

**2. Natural Engineer Release Notes (NEE431-008ALL)**

The Release Notes describe all the information relating to the new features, upgrades to existing functions and documentation updates that have been applied to Natural Engineer 4.3.1.

**3. Natural Engineer Installation Guide (NEE431-010ALL)**

The Installation Guide provides information on how to install Natural Engineer on both PC and mainframe platforms.

**4. Natural Engineer Administration Guide (NEE431-040WIN)**

**Natural Engineer Administration Guide (NEE431-040MFR)**

The Administration Guide provides information on all the various control settings available to control the usage of the different functions within Natural Engineer.

**5. Natural Engineer Application Management (NEE431-020WIN)**

**Natural Engineer Application Management (NEE431-020MFR)**

The Application Management manual describes all the functions required to add Natural applications into the Repository.

**6. Natural Engineer Application Documentation (NEE431-022WIN)**

**Natural Engineer Application Documentation (NEE431-022MFR)**

The Application Documentation manual describes all the available functions to document a Natural application within the Repository. These functions will help enhance / supplement any existing systems documentation such as BSD / CSD / Specifications etc.

## **Natural Engineer Utilities**

### **7. Natural Engineer Application Analysis and Modification (NEE431-023WIN)**

#### **Natural Engineer Application Analysis and Modification (NEE431-023MFR)**

The Application Analysis and Modification manual describes all the available functions to carry out analysis of Natural applications; including basic keyword searches. The modification process is described and detailed to show how it can be applied to modify single selected objects within a Natural application, or the entire Natural application in one single execution.

### **8. Natural Engineer Application Restructuring (NEE431-024WIN)**

#### **Natural Engineer Application Restructuring (NEE431-024MFR)**

The Application Restructuring manual describes the analysis and modification functionality required to carryout some of the more sophisticated functions such as Object Builder.

### **9. Natural Engineer Utilities (NEE431-080WIN)**

#### **Natural Engineer Utilities (NEE431-080MFR)**

The Utilities manual describes all the available utilities found within Natural Engineer and, when and how they should be used.

### **10. Natural Engineer Reporting (NEE431-025ALL)**

The Reporting manual describes each of the reports available in detail, providing report layouts, how to trigger the report and when the report data becomes available. The various report-producing mediums within Natural Engineer are also described.

### **11. Natural Engineer Batch Processing [Mainframes] (NEE431-026MFR)**

The Batch Processing manual describes the various batch jobs (JCL) and their functionality.

# TASK SCHEDULER

## Chapter Overview

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This chapter describes the Task Scheduler option within Natural Engineer, which is used to manage and execute automatically Natural Engineer Environment, Impact and Modification tasks. These tasks will execute in unattended batch mode.

The topics covered in this chapter are:

1. Task Scheduler overview
2. Task Scheduler Summary screen
3. Task Details screen
4. Task Scheduler Initiator Batch Job

## Task Scheduler Overview

---

The Task Scheduler option allows you to specify tasks to be executed at a specified date and time. These tasks may be scheduled to run with a frequency of once, daily, weekly or monthly and may also have dependencies on other defined tasks to allow a series of tasks to run in a controlled sequence.

Once the task or tasks have been specified, they are ready for execution and will be triggered by the Task Scheduler Initiator batch job. This must be invoked in order for the tasks to be released for execution (if their individual specifications have been attained).

Each task execution will have a history log entry available showing the execution events for that task. Any tasks that have experienced problems during execution will be highlighted with a status of 'Error' in the Task Scheduler Summary screen.

### Using the Task Scheduler

The Task Scheduler allows long executing tasks for individual applications to be scheduled to run overnight or at weekends, in order that the normal working day is less disrupted waiting on these tasks to complete.

For example: If an extract and load of a very large application is required, where the extract and load processes are likely to take several hours each to complete, then a task can be scheduled to start executing at the end of the normal working day (i.e., overnight). The task can then be reviewed the next working day.

### Using the Frequency Task option

A frequency can be set for any tasks that are to be repeated many times. This means a task need only be specified the once, but with the appropriate frequency set, it will execute each time it is initiated via the Task Scheduler.

For example: Natural Engineer is being used to maintain an application where various modifications are being applied using the modification options of Natural Engineer. The application has been specified within Natural Engineer to apply all the modifications to the base application library. To maintain integrity of the modified application on the Repository, the Extract Source Code function with Synchronize Source Code option activated requires running once a week. A task would be set up with the correct details specified to run Extract Source Code with a frequency of 'Weekly' set.

## Using the Dependency Task option

Task dependencies can be specified, so that, tasks are only initiated provided the previous task has completed.

For example: Task 0001 is specified to run an Extract Source Code function for an application. A second task, 0002, is specified to run the Load Repository function for the same application with a dependency of task 0001 set. When the initiator is run, task 0002 will not execute until task 0001 has completed.

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## Natural Engineer Utilities

### Task Scheduler Summary Screen

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The Task Scheduler Summary screen is accessed by selecting option ‘T’ (Task Scheduler) from the Utilities Menu screen.

The Task Scheduler Summary screen utilizes left and right screen scrolling to show the complete information for each task. When the screen is positioned to the left, all the task execution information is displayed. When the screen is scrolled to the right, all the task function information is displayed.

The following Figure 1-1 illustrates the Task Scheduler Summary screen displaying the task execution information.

```

- Task Scheduler Summary -

Task User      Date          Time  Freq  Depn  Status  Application
- 0040 XGSLXX   09/09/2001  14:29           Complete HOSPITAL
- 0041 XGSLXX   09/09/2001  14:35           Missed   HOSPITAL
- 0042 XGSLXX   10/09/2001  22:00  Week           PAYROLL

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help           Exit  Add           Prev  Next           W<   W>   Main

```

**Figure 1-1 Task Scheduler Summary screen displaying task execution information**

The following Figure 1-2 illustrates the Task Scheduler Summary screen displaying the task function information.

```

- Task Scheduler Summary -

Task User      Date      Application Function Grp Function Name      Ver
- 0001 XGSLXX  09/09/2001 NEEDOCN   Environment  Extract Source Code
- 0002 XGSLXX  09/09/2001 NEEDOCN   Environment  Load Repository
- 0003 XGSLXX  10/09/2001 PAYROLL   Analysis     Impact Execution   01

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help      Exit  Add      Prev Next      W<  W>      Main

```

Figure 1-2 Task Scheduler Summary screen displaying task function information

SCREEN ITEMS	DESCRIPTION
<b>Select</b>	Select task to perform various task administration options. Valid selections are: 'V' View task details. 'U' Update task details. 'R' Reset task. 'D' Delete task. 'L' View task log. Invokes the Task Log screen. 'S' Suspend task.
<b>Task</b>	The task id that has been assigned for the task. This is an internally generated sequential number starting from 0001. Deleted task numbers are reused.
<b>User</b>	The user id of the person that added the task.
<b>Date</b>	The task execution start date specified in the Task Details screen.

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## Natural Engineer Utilities

SCREEN ITEMS	DESCRIPTION
<b>Time</b>	The task execution start time specified in the Task Details screen.
<b>Freq</b>	<p>The task frequency. This controls the amount of executions for the task. The following frequencies are available:</p> <p>‘O’ Task will execute once only.</p> <p>‘D’ Task will execute daily at the same time based on the original date and time specified.</p> <p>‘W’ Task will execute weekly at the same time based on the original date and time specified.</p> <p>‘M’ Task will execute monthly at the same time based on the original date and time specified.</p>
<b>Depn</b>	The tasks’ dependency on other scheduled tasks. This will contain the task id of the task that needs to complete before this task will execute.
<b>Status</b>	<p>The task status. The following are available:</p> <p>‘ ‘ Task is waiting for the specified start date and time, i.e., a date and time have been set in the future.</p> <p><b>Missed</b> Task has missed the specified date and time and is ready for execution the next time the Initiator is invoked.</p> <p><b>Error</b> Task has experienced an error during execution.</p> <p><b>Complete</b> Task has completed successfully.</p> <p><b>In Progress</b> Task is currently executing.</p> <p><b>Suspended</b> Task has been suspended and will not be released for execution until the Release option is used from the context menu.</p>
<b>Application</b>	The name of the application being used by the task.
<b>Function Grp</b>	<p>The main function area being used by the task. The function groups available are:</p> <ul style="list-style-type: none"> <li>▪ <b>Environment</b></li> <li>▪ <b>Analysis</b></li> <li>▪ <b>Modification</b></li> </ul>

SCREEN ITEMS	DESCRIPTION
<b>Function Name</b>	<p>The name of the sub-function within the main function. The sub-functions available are:</p> <p>For the function group Environment:</p> <ul style="list-style-type: none"> <li>▪ <b>Extract Source Code</b></li> <li>▪ <b>Load Repository</b></li> <li>▪ <b>Extract &amp; Load</b></li> <li>▪ <b>Extract, Load &amp; Impact</b></li> <li>▪ <b>Environment Bulk Reports</b></li> </ul> <p>For the function group Analysis:</p> <ul style="list-style-type: none"> <li>▪ <b>Impact Execution</b></li> <li>▪ <b>Impact Bulk Reports</b></li> </ul> <p>For the function group Modification:</p> <ul style="list-style-type: none"> <li>▪ <b>Modify All</b></li> <li>▪ <b>Modification Bulk Reports</b></li> </ul>
<b>Ver</b>	<p>The impact version number being used by the task. This is only applicable to function names: Impact Execution and Modify All. All other tasks will show '00'.</p>

PFKEYS	DESCRIPTION
<b>PF1</b>	Activates the help function.
<b>PF3</b>	Exit from the current function and return to previous screen.
<b>PF4</b>	Add new Task. Invokes the Task Details screen.
<b>PF7</b>	Displays previous page.
<b>PF8</b>	Displays next page.
<b>PF10</b>	Scrolls screen display to the left.
<b>PF11</b>	Scrolls screen display to the right.
<b>PF12</b>	Returns to the Natural Engineer Main Menu.

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## Natural Engineer Utilities

### Task Scheduler Task Log Screen

The Task Log screen is displayed when a task is selected using option 'L' from the Task Scheduler Summary screen.

The Task Log screen will show history details of activity for the selected task.

The following Figure 1-3 illustrates the Task Scheduler Task Log screen.

```
          - Task Scheduling - Task Log
                Task Id: 0001
09/09/2001 17:01:12 - Extract HOSPITAL - Started
09/09/2001 17:01:14 - Extract HOSPITAL - Completed

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help           Exit                               W<   W>   Main
```

Figure 1-3 Task Scheduler Task log screen

<b>SCREEN ITEMS</b>	<b>DESCRIPTION</b>
<b>Task Log Entries</b>	Each line details a task event.

<b>PFKEYS</b>	<b>DESCRIPTION</b>
<b>PF1</b>	Activates the help function.
<b>PF3</b>	Exit from the current function and return to previous screen.
<b>PF7</b>	Displays previous page.
<b>PF8</b>	Displays next page.
<b>PF10</b>	Scrolls screen display to the left.
<b>PF11</b>	Scrolls screen display to the right.
<b>PF12</b>	Returns to the Natural Engineer Main Menu.

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## Natural Engineer Utilities

### Task Details Screen

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The Task Details screen is where each task can be specified and added to the Task Scheduler. This screen is also used to update or view the details for a task.

The Task Details screen can be invoked by using 'PF4' (Add) from the Task Scheduler Summary screen, by selecting a task using selection options 'U' (to update task) or 'V' (to view task) from the Task Scheduler Summary screen.

The following Figure 1-4 illustrates the Task Scheduler Task Details screen.

```

- Task Details -

Task Id: 0004

Start Date: 09 / 09 / 2001 (DD/MM/YYYY)
Time: 14 : 55 (HH:MM)

Job Id: XGSLXX04 Job Class: _
Dependency: _____ Frequency: _

Application:
Function Group:
Function:

Comments:
_____

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help      Exit      Save Appl Pref Func Vers ECrt ICrt Main
```

Figure 1-4 Task Scheduler Task Details screen

SCREEN ITEMS	DESCRIPTION
<b>Start Date</b>	The date the task is to execute using date DD/MM/YYYY format. The default date will be the current date when the Task Details screen was invoked.
<b>Start Time</b>	The time the task is to execute using time HH:MM format. The default time will be the current time when the Task Details screen was invoked.
<b>Job Id</b>	The Job name. This defaults to the first 4 characters of the logon id plus the task id.
<b>Job Class</b>	The Job Class to be used during execution.
<b>Dependency</b>	Select a task id on which this task is to be dependent on. Task ids available will be the current tasks available in the Task Scheduler Summary screen.
<b>Frequency</b>	The task frequency. This controls the amount of executions for the task. The following frequencies are available: ‘O’ Task will execute once only. ‘D’ Task will execute daily at the same time based on the original date and time specified. ‘W’ Task will execute weekly at the same time based on the original date and time specified. ‘M’ Task will execute monthly at the same time based on the original date and time specified.
<b>Application</b>	The name of the application that this task is to reference.
<b>Function Group</b>	The main function area being used by the task. The function groups available are: <ul style="list-style-type: none"> <li>▪ <b>Environment</b></li> <li>▪ <b>Analysis</b></li> <li>▪ <b>Modification</b></li> </ul>

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<b>SCREEN ITEMS</b>	<b>DESCRIPTION</b>
<b>Function Name</b>	<p>The name of the sub-function within the main function. The sub-functions available are:</p> <p>For the function group Environment:</p> <ul style="list-style-type: none"><li>▪ <b>Extract Source Code</b></li><li>▪ <b>Load Repository</b></li><li>▪ <b>Extract &amp; Load</b></li><li>▪ <b>Extract, Load &amp; Impact</b></li><li>▪ <b>Environment Bulk Reports</b></li></ul> <p>For the function group Analysis:</p> <ul style="list-style-type: none"><li>▪ <b>Impact Execution</b></li><li>▪ <b>Impact Bulk Reports</b></li></ul> <p>For the function group Modification:</p> <ul style="list-style-type: none"><li>▪ <b>Modify All</b></li><li>▪ <b>Modification Bulk Reports</b></li></ul>
<b>Comments</b>	<p>Up to 72 characters of text can be entered to serve as a comment for the task. These are treated as information only.</p>

<b>PFKEYS</b>	<b>DESCRIPTION</b>
<b>PF1</b>	Activates the help function.
<b>PF3</b>	Exit from the current function and return to previous screen.
<b>PF5</b>	Saves the Task details specified and return back to the Task Scheduler Summary screen.
<b>PF6</b>	Invokes the Select an Application screen. An existing application can be selected or a new application name input.
<b>PF7</b>	Invokes the Application Preferences screen. Application Preferences can be specified and saved for the selected application.
<b>PF8</b>	<p>Invokes a series of pop-up windows to select first the Function Group and then the Function Name to be used for the task.</p> <p>The Function Groups available are:</p> <ul style="list-style-type: none"><li>▪ <b>Environment</b></li><li>▪ <b>Analysis</b></li><li>▪ <b>Modification</b></li></ul> <p>The Function Names available are:</p> <p>For the function group Environment:</p> <ul style="list-style-type: none"><li>▪ <b>Extract Source Code</b></li><li>▪ <b>Load Repository</b></li><li>▪ <b>Extract &amp; Load</b></li><li>▪ <b>Extract, Load &amp; Impact</b></li><li>▪ <b>Environment Bulk Reports</b></li></ul> <p>For the function group Analysis:</p> <ul style="list-style-type: none"><li>▪ <b>Impact Execution</b></li><li>▪ <b>Impact Bulk Reports</b></li></ul> <p>For the function group Modification:</p> <ul style="list-style-type: none"><li>▪ <b>Modify All</b></li><li>▪ <b>Modification Bulk Reports</b></li></ul>

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## Natural Engineer Utilities

PFKEYS	DESCRIPTION
PF9	<p>Invokes the Impact Version screen. A new version can be created or an existing version selected. This option is only available for the following function names:</p> <ul style="list-style-type: none"> <li>▪ <b>Extract, Load &amp; Impact</b></li> <li>▪ <b>Impact Execution</b></li> <li>▪ <b>Impact Bulk Reports</b></li> <li>▪ <b>Modify All</b></li> <li>▪ <b>Modification Bulk Reports</b></li> </ul> <p><i>Note: The impact versions available are the same as for the application when using the Impact Version option from the Impact Analysis Menu screen.</i></p>
PF10	<p>Invokes the Extract Selection Criteria screen. Extract selection criteria can be specified and saved.</p> <p><i>Note: The criteria specified here are only relevant to the task for which they have been defined. The task criteria are independent of the main application extract selection criteria defined using the Extract Selection Criteria option from the Environment Menu screen.</i></p>
PF11	<p>Invokes the Impact Search Criteria Summary screen. Search criteria can be specified here and saved for the current version.</p> <p><i>Note: The impact search criteria available are the same as for the application when using the Impact Search Criteria option from the Impact Analysis Menu screen.</i></p>
PF12	<p>Returns to the Natural Engineer Main Menu.</p>

## Task Scheduler Initiator Batch Job

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The Task Scheduler tasks are initiated using the Task Scheduler Initiator Batch Job: TASKSCH. This needs to be invoked before any scheduled tasks will be executed.

This batch job needs to be executed in order for the specified scheduled tasks to be released (when their individual criteria have been met).

*Note: For more information refer to Chapter 2 in the Natural Engineer Installation Manual.*



# CHANGE MANAGEMENT TRACKING (CMT)

## Chapter Overview

---

This chapter describes the Change Management Tracking (CMT) option available from the Utilities menu. The CMT option provides the facility to track changes that have been applied to objects within an application using Natural Engineer.

The following topics are covered:

1. Change Management Tracking Overview
2. Change Management Tracking Reports

## Change Management Tracking Overview

---

The CMT option provides audit trail data per object within an application that has used Natural Engineer to administer maintenance changes.

Any updates applied by Natural Engineer to an applications' objects, generate audit trail records for the application on the Repository. These audit trail records contain the before and after images of updated code, a date and time stamp of when the updates were made and the User Id of the person making the update.

The audit trail records are accumulated per object, and are only deleted when the application is deleted from the Repository. This allows for complete tracking of updates for an application during its' maintenance life cycle within Natural Engineer.

The audit trail records can be viewed online or as hardcopy reports using Reporter or Excel spreadsheet format.

## CMT Reports Selection Screen

The CMT Reports Selection screen allows you to review audit trail records for individual or a range of objects within an application using hardcopy reports by submitting a batch job.

The CMT Reports Selection screen is accessed by selecting option 'M' (Change Management Tracking System) from the Utilities Menu screen.

The following Figure 2-1 illustrates the CMT Reports Selection screen.

```

Change Management Tracking   Application: HOSPITAL
Reports Selection           Version: 01

Object:      _____ to _____
or All Objects: N

All Versions:  N

Date Operator:  ___ Date:  __ __ ____ (dd mm yyyy)
                To:  __ __ ____ (dd mm yyyy)

User Id:      _____

Sort Order:   1  Timestamp - Asc

Object Types:  DGLASNHMP3C4   (PF10 to set)

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help  Vers  Exit      Submt                Types      Main

```

Figure 2-1 CMT Reports Selection screen

SCREEN ITEMS	DESCRIPTION
<b>Object</b>	Allows you to select an individual or range of objects to report on. For Example: if XX021P01 is entered, then only audit trail records for XX021P01 will be reported.
<b>All Objects</b>	If selected, then all the objects with audit trail records within the current application will be reported. Valid selections are: 'N' Single object or range of objects. 'Y' All objects
<b>All Versions</b>	If selected, will report on all the versions for each object within the application. Valid selections are: 'N' Reports on current selected version only. 'Y' Reports on all versions.
<b>Date</b>	Allows you to specify date ranges resulting in audit trail records matching the date range being reported only. <b>Date Operator</b> The operator used to qualify the date range specified. Valid operators are: <b>GT – greater than.</b> <b>LT – less than.</b> <b>EQ – equal to.</b> <b>From Date</b> Start from date using format DDMMYYYY. <b>To Date</b> End at date using format DDMMYYYY.
<b>User Id</b>	Allows you to specify a User Id, which will result in audit trail records for the specified user being reported only. This input is case dependent. For Example: 'xx209' will only report a User Id of 'xx209' and not 'XX209'.
<b>Sort Order</b>	Allows you to specify the Sort order that the audit trail records will be reported in. Available sort orders are: '1' Timestamp – Ascending. '2' Timestamp – Descending. '3' User Id – Ascending. '4' User Id – Descending. '5' Line Number – Ascending. '6' Line Number – Descending. <i>Note: Field level help is available and is invoked by typing '?' in the field. A pop-up window is displayed with all the available Sort Orders.</i>

SCREEN ITEMS	DESCRIPTION
<b>Object Types</b>	Allows you to select the Object Types to be reported. This is invoked using <b>'PF10'</b> (Types). Available selections are:
<b>'D'</b>	Data Definition Modules
<b>'P'</b>	Programs
<b>'M'</b>	Maps
<b>'A'</b>	Parameter Data Areas
<b>'G'</b>	Global Data Areas
<b>'L'</b>	Local Data Areas
<b>'C'</b>	Copycodes
<b>'N'</b>	Subprograms
<b>'S'</b>	Subroutines
<b>'H'</b>	Help routines
<b>'3'</b>	Dialogs
<b>'4'</b>	Classes

PFKEYS	DESCRIPTION
<b>PF1</b>	Activates the help function.
<b>PF2</b>	Invoke the Impact Version screen.
<b>PF3</b>	Exit from the current function and return to previous screen.
<b>PF5</b>	Invoke NATRJE Job Submission screen.
<b>PF10</b>	Displays pop-up window to change the Object Types to be reported on.
<b>PF12</b>	Returns to the Natural Engineer Main Menu.

After all the CMT report criteria have been specified, use **'PF5'** (Submt) to submit the batch job via the NATRJE Job Submission screen.

## 2

### Natural Engineer Utilities

The following Figure 2-2 illustrates the NATRJE submission screen for the CMT option.

```

                                     - Job Submission -           Application: HOSPITAL
Job Selection details
-----
Job Selected   : (CMTREP) CMTS REPORT
Job Card details
-----
Job Name      : XGSLXX__
Job Class     : _
Job Control Record details
-----
Control Status :
Last Job Submitted - Job Name :
                  - Opid      :
                  - Step      :
                  - Return Code :
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10---PF11---PF12---
      Help      Exit      Sub   Ref              Rel              Main

```

**Figure 2-2 NATRJE Job Submission screen**

*Note: For more information on the NATRJE Job Submission screen refer to the Natural Engineer Batch Processing (Mainframes) manual.*

## CMT Example

---

To illustrate the Change Management Tracking process, an example is shown using the sample Natural application HOSPITAL.

This example will demonstrate the CMT Reports Selection option to produce a CMT report showing a simple set of audit trail records for objects that have been modified using the sample application HOSPITAL.

All the objects from the HOSPITAL application have been extracted and loaded into the Repository and the steps in this example start from the Impact Analysis process.

**Step 1** Version 1 impact search criteria have been specified to search for keyword DATAITEM with search values of #G-MESSAGE, #L-MESSAGE and #M-MESSAGE. Replace values for each of these criteria have been specified as #G-MSG, #L-MSG and #M-MSG respectively.

## 2

### Natural Engineer Utilities

The following Figure 2-3 illustrates the Impact Criteria Summary screen.

Search Keyword		Search Value		Replace Value		Replace TLM	
-	DATAITEM		#G-MESSAGE		#G-MSG		
-	DATAITEM		#L-MESSAGE		#L-MSG		
-	DATAITEM		#M-MESSAGE		#M-MSG		

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10---PF11---PF12---  
Help DeleC Exit GetSa SaveA Add Prev Next W< W> Main

Figure 2-3 Impact Criteria Summary screen

**Step 2** After Impact Analysis has been executed; modification has been applied to all the impacted objects.

The following Figure 2-4 illustrates the Modification Element Categorization screen after all the objects have been modified. Object XX000G00 has been selected and also data item #G-MESSAGE, just to show the modification parameters that have been applied.

```

- Element Categorization -      Application: HOSPITAL
                                Version: 01
                                Page: 1
Object: XX000G00
Field : #G-MESSAGE
Attr  : A070  External Object Name:
Category   : A  Automatic          Replace Defn: _____ TLM: _____
Type       : I_ Data Item          Pos: _____
Replace Value: #G-MSG_____
User Comment : _____
TLM Data    : _____
Reason : Data item can be automatically changed
User ID:      Last Update   :
              Execution Date : 28 Sep 2001 at 17:00:39

Stmt Source Line
0020  1 #G-MESSAGE          A    70

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10---PF11---PF12---
      Help      Exit      Updt  SCrit Prev Next  +Parm Ctxt      Main

```

**Figure 2-4 Modification Element Maintenance screen after all objects have been modified**

## 2

### Natural Engineer Utilities

**Step 3** The CMT option is selected using 'M' (Change Management Tracking System) from the Utilities Menu screen. On the CMT Reports Selection screen; module XX001P01 has been selected and all the other options have been left as per default settings.

This will result in the CMT report displaying all the audit trail information for object XX001P01 in timestamp ascending order.

The following Figure 2-5 illustrates the CMT Reports Selection screen showing the specified reporting options.

```
Change Management Tracking   Application: HOSPITAL
Reports Selection           Version: 01

Object:      XX001P01 to _____
or All Objects: N

All Versions:  N

Date Operator:  ___ Date:  ___ ___ ____ (dd mm yyyy)
                To:  ___ ___ ____ (dd mm yyyy)

User Id:      _____

Sort Order:   1 Timestamp - Asc

Object Types: DGLASNHMP3C4 (PF10 to set)

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10---PF11---PF12---
      Help  Vers  Exit          Submt                    Types      Main
```

**Figure 2-5 CMTS Reports Selection screen showing the specified reporting options**

**Step 4** By using 'PF5' (Submt) on the CMT Reports Selection screen; the NATRJE Job Submission screen is displayed. After the correct Job Name and Job Class have been specified, the CMT Report job is submitted using 'PF5' (Sub).

The following Figure 2-6 illustrates the NATRJE Job Submission screen after the CMT Report job has been submitted.

```

- Job Submission -                Application: HOSPITAL

Job Selection details
-----
Job Selected : (CMTREP) CMTS REPORT

Job Card details
-----
Job Name : XGSLXX01
Job Class : X

Job Control Record details
-----
Control Status :
Last Job Submitted - Job Name :
                   - Opid    :
                   - Step    :
                   - Return Code :

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help      Exit      Sub Ref      Rel      Main
Job : XGSLXX01 Submitted Successfully
```

Figure 2-6 NATRJE Job Submission screen after submitting job

## 2

### Natural Engineer Utilities

**Step 5** Once the job has completed, the CMT Report can be viewed from the job output file.

The following Figure 2-7 illustrates the CMT audit trail records for object XX001P01.

```
Change Management Tracking System Report                28/09/2001
Application:      HOSPITAL
Criteria Order:  Sorted by Timestamp - Ascending
Criteria Range:  Object: XX001P01 (Object Types: DGLASNHP3C4)
Criteria Dates:  For all Timestamps
Criteria Vers:   1
Object Name:     XX001P01
-----
Version:  1 Timestamp: 28/09/2001 17:00:41.3 User: XGSLXX01
Before:   0120 RESET #L-MESSAGE
After:    0120 RESET #L-MSG /* NEE MODIFIED AUTO
Version:  1 Timestamp: 28/09/2001 17:00:41.3 User: XGSLXX01
Before:   0250 MOVE "INVALID OPTION SELECTED" TO #L-MESSAGE
After:    0250 MOVE "INVALID OPTION SELECTED" TO #L-MSG /* NEE MODIFIED
Version:  1 Timestamp: 28/09/2001 17:00:41.4 User: XGSLXX01
Before:   0270 MOVE "INVALID PF KEY PRESSED" TO #L-MESSAGE
After:    0270 MOVE "INVALID PF KEY PRESSED" TO #L-MSG /* NEE MODIFIED
```

**Figure 2-7 CMT audit trail records for object XX001P01**

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